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Vendor: Microsoft

Exam Code: 70-300

Exam Name: Analyzing Requirements and Defining Microsoft .NET Solution Architectures

Version: Demo

Exam Name:	Analyzing Requirements and Defining Microsoft .Net Solution Architectures				
Exam Type:	Microsoft			Exam Code:	70-300
Section Name:	Case Studies + Practice Questions				
Section No:	A, B	Case Studies:	16	Total Questions:	251

Section A

12 Case Studies:
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Case Study #2, Consolidated Messengers
Case Study #3, A.Datum Corporation
Case Study #4, Fabrikam, Inc
Case Study #5, Northwind Traders
Case Study #6, School of Fine Art
Case Study #7, City Power and Light
Case Study #8, Woodgrove Bank
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Section B

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Case Study #1, Blue Yonder Airlines

Background
Blue Yonder Airlines is a regional airline that operates 50 scheduled flights per day. The company anticipates rapid future growth. Within six months, the company will operate 150 flights per day. Within one year, it will operate 500 flights per day.

Currently telephone operators handle all reservations. To support the increased number of flights, the company plans to add an online reservation process. You are contracted to develop a Microsoft .NET solution that will execute the new process.

Your solution must be operational in five months. It must undergo one month of testing before it is available to the public. Within one year, it must be able to support 500 flights per day. To support this expansion, existing flight numbers might need to be reassigned.

Existing IT Environment
Currently Blue Yonder Airlines uses an external vendor to provide flight scheduling services. Fifteen dedicated terminals communicate with the vendor's mainframe computer.

The corporate network includes five Microsoft Windows 2000 Server computers and 15 Windows XP Professional computers. A Microsoft Exchange Server computer provides e-mail services for employees. Internet Information Services (IIS) is used to support intranet application for the human resources department. This department is also supported by a dedicated server that has a single installation of Microsoft SQL Server 2000.

Interviews
IT Department
IT Manager
Currently we have one engineer who is responsible for maintaining the dedicated terminals and the corporate intranet. In the future we need to be able to monitor the performance of the new application. Monitoring will tell us when we need to scale the solution.
Within three months, our scheduling vendor will implement an XML Web service to give us access to its mainframe computer.

Business Stakeholders
Chief Executive Officer
My vision is to give our customers an easy-to-use, self-service reservation process. Our new application must provide customers with the following features:

- Make reservations quickly
- Make reservations at any time, on any day of the week
- Store information in a customer profile, if customers choose
- Maintain complete confidentiality of customers profiles
- Search for available flights either by airport or by city of origin
- Create, save and retrieve an itinerary, without actually booking a flight
- Retrieve a saved itinerary and initiate booking for the flights saved in the itinerary.
- Receive suggestions for alternate flights if the flights saved in an itinerary are no longer available for booking
- Receive an automatic e-mail message to confirm the itinerary after the flights are booked.

A previous development project required a considerable amount of rework.
We were unable to find out why the rework occurred. If rework is needed during this project, we need to know why.

Business Manager
The application should help us provide that we are receiving a return on our investment.
Periodically, detailed usage information must be logged for analysis. We must be able to turn logging on and of without recompiling the application.

When the XML Web service is available from our scheduling vendor, we can stop using dedicated terminals, stop paying a monthly mainframe charge and start reducing our operating expenses. Typically, that vendor meets its deadlines for delivering updates only 50 percent of the time.

Finance Department
Chief Financial Officer
Our business model is based in the expansion of our flight schedules. This project is critical to our continued success. Our budget is sufficient to implement and support the new application. However, we need to reduce operating expenses.

Users
Reservations Agent
The current application is very confusing to use. It requires special keys to perform many functions. It does not offer online help

Business Process
Currently customers make reservations by telephoning a Blue Yonder Airlines reservations agent. The agent uses a dedicated terminal to connect to the mainframe computer and then completes each reservation.

Questions & Answers

Question: 1
You are preparing the functional specification for the new reservation application. Which two functionalities should you specify? (Each correct answer presents part of the solution. Choose two)

A. Localization
B. Monitoring of application performance
C. Secure storage of customer profile information
D. Availability of application for mobile phones and personal digital assistants
E. Integration with Active Directory

Answer: B, C

Explanation:
We do have requirements to monitor the application and to secure it.

Incorrect Answers:
A: There is no requirements for this.
D: The case study makes no mention of any requirement to support mobile phones or PDA's. Therefore it would not be appropriate to prepare a functional specification for this functionality.
E: There is no requirements for this.

Question: 2
You are completing the technical specification for the new reservation application.
Which technique should you recommend for state management?

A. ASP.NET ViewState
B. Server-side database
C. Client-side cookies
D. Application cache

Answer: B

Explanation:
A: This will not be retained when the customer closes the session.
C: They may not be allowed on the client machine's browser.
D: Incorrect.

Question: 3
Which business constraint poses the greatest potential risk to completing your project for Blue Yonder Airlines?

A. The current IT staff must support the solution in the future
B. All testing scenarios and all necessary rework must be completed during the one-month testing period.
C. The scheduling vendor will begin providing access by XML Web service in three months
D. The application must be completed within a five-month development period before it is tested

Answer: C

Explanation:

C: Business Manager says that the vendor only meets its deadlines for delivering updates only 50 percent of the time. This will have the greatest impact.
A: The question is asking for risks to completing the project. This does not have any impact.
B: This is all a matter of resources.
D: Since there is enough funding it should not be a problem.

Question: 4
You are establishing a policy to measure the effectiveness of your deployment process.
You decide to track one or more phases of development to identify defects. Which phase or phases should you track?(Choose all that apply)

A. Design and analysis
B. Development
C. Stabilization
D. Requirements

Answer: C

Explanation:
C: It is during the stabilizing phase that the Testing team completes the tasks and creates the deliverables that move the feature-complete build to a state in which the defined quality level is reached and the solution is ready for full production deployment.
The two main tasks in the stabilizing phase are:

• Testing the solution: The team implements the test plans that were created during the planning phase, which were enhanced and tested during the development phase.

• Conducting the pilot: The team moves a solution pilot from development to a staging area to test the solution with actual users and real scenarios. The pilot is conducted before the deploying phase is begun.

A pilot is a test of the solution in the production environment, and a trial of the solution by installers, systems support staff, and end users. The primary purposes of a pilot are to demonstrate that the design works in the production environment as expected and that it meets the organization's business requirements. A secondary purpose is to give the deployment team a chance to practice and refine the deployment process.

Question: 5
You are listing the operational requirements for the new reservation application.
Which requirement should you include?

A. Extensibility
B. Localization
C. Mantainability
D. Availability
E. Deployability

Answer: D

Explanation:
D: The Chief Executive Officer, who is a Business Stakeholder, wants to allow customers to make reservations at any time, on any day of the week.

Incorrect Answers:
B: There is no mention of Localization in the case study.
A, C: These are not the best answers.

Question: 6
You are writing the primary scenario of a use case named Customer retrieves a saved itinerary. Which action or actions should be included?(Choose all that apply)

A. Application informs customers that no itineraries exist
B. Application informs customers that a saved flight is no longer available
C. Customer asks for saved itineraries
D. Application offers alternate flights
E. Application queries the database for saved itineraries
F. Application displays retrieved itineraries

Answer: C, E, F

Explanation:
C, E, F: The question is asking for the Primary Scenario.

Question: 7
You need to select a strategy that will provide detailed usage information for the new reservation application. Information must be provided with a minimum development effort. What should you do?

A. Use Microsoft .NET performance counters in the application
B. Create a Microsoft Management Console(MMC) snap-in for the application
C. Add Windows Management instrumentation to the application
D. Use the application's configuration file to enable and disable logging

Answer: A

Explanation:
A: This method will require a minimum development effort.

Question: 8
You must ensure that the new reservation application can be monitored while it is running. Which approach should you use?

A. TraceSwitch objects
B. Diagnostic tools
C. PerformanceCounter objects
D. Windows Management Instrumentation Job Object provider

Answer: C

Explanation:
Using the Performance Counter object within the solution would allow developers to write performance specific information that can be monitored by Performance Monitor while the application is running.

Question: 9
You are creating the logical design for a use case named *"Customer updates customer profiles*". Which object or objects should you include in the design? (Choose all that apply)

A. Data access object
B. Customer object
C. Flight object
D. Logging object
E. Airline object

Answer: A, B, D

Explanation:
A, B: These are definitely needed for the use case in question.
D: The Business Manager wants detailed logging of usage information for analysis.

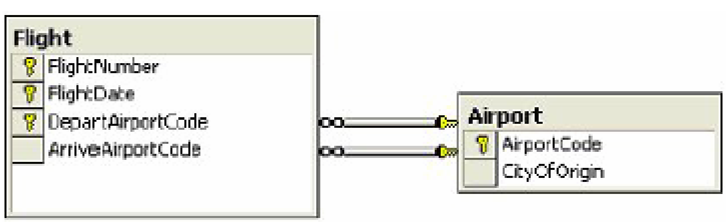
Incorrect Answers
C, E: These are not related to the use case named "Customer updates customer profiles".

Question: 10
You are creating constraints for tables named Flight and Airport. You must ensure data integrity. Which action or actions should you take?(Choose all that apply)

A. Create a primary key constraint on the AirportCode column and the CityOfOrigin column in the Airport table
B. Create a primary key constraint on the FlightNumber column in the Flight table
C. Create a cascading delete constraint on the AirportCode column in the Airport Table
D. Create a foreign key constraint on the ArriveAirportCode column in the Flight table to reference the AirportCode column in the Airport table.
E. Create a primary key constraint on the FlightNumber column, the FilghtDate column and the DepartAirportCode column in the Flight table
F. Create a foreign key constraint on the DepartAirportCode column in the Flight table to reference the AirportCode column in the Airport table.
G. Create a primary key constraint on the AirportCode column in the Airport table.
H. Create a foreign key constraint on the AirportCode column in the Airport table to reference the DepartAirportCode column in the Flight table

Answer: D, E, F, G

Explanation:
The answers will meet the design shown below:



• Primary Keys
o Airport Table: AirportCode is unique enough.
o Flight Table: Composite primary key for FlightNumber, FlightDate and DepartAirportCode. (Flight Number itself may not be unique enough since they could be reused)
• Foreign Keys
o Airport Table: DepartAirportCode will reference AirportCode
o Airport Table: ArriveAirportCode will reference AirportCode.

• CityOfOrigin is not necessary to uniquely identify records within the Airport Table.
• FlightDate has to be part of the composite key within the Flight Table.
Having a cascade delete is a nice-to-have option on the database. It isn't essential.
If you wish to delete an airport, you have 2 options:
o Delete all the related Flight records (programmatically) then delete the Airport record.
o Delete the Airport code and let the database delete all related flight children records.

Question: 11
You are creating the logical design for the new reservation application. Which entity or entities should you include? (Choose all that apply)

A. Airport
B. Flight
C. Customer
D. Gate
E. City

Answer: A, B, C

Explanation:
A: Airport is an entity.
B: Flight is an entity.
C: Customer is an entity.

Incorrect Answers:
D: This can be an attribute
E: This can be an attribute

Question: 12
You need to implement online interactive user assistance for the new reservation application. What should you do?

A. Create a manual that can be downloaded from the Web site
B. Create a compiled help module and use context-sensitive help for all screen elements
C. Implement ToolTips to provide information about all screen elements
D. Use the ALT attribute to provide a short textual description for all images and audio files.

Answer: C

Explanation:
C. This is the most suitable answer

Note:
Providing online user assistance
Even the best user interface design and input validation procedures cannot ensure that your users will be able to know what to do and when to do it. To avoid personally training and supporting every user through their individual learning curves, you need to make some form of online user assistance in a format they are able, willing, and ready to call up. The most common ways to do this are through the use of status bars, tooltips, and application help files.

Incorrect Answers:
A. This is an offline help method.
B. This is suited for Windows Applications instead of Web Applications.

D. This is normally used for people with disabilities.

Providing online user assistance
Even the best user interface design and input validation procedures cannot ensure that your users will be able to know what to do and when to do it. To avoid personally training and supporting every user through their individual learning curves, you need to make some form of online user assistance in a format they are able, willing, and ready to call up. The most common ways to do this are through the use of status bars, tooltips, and application help files.

Question: 13
Your development team proposes four different conceptual designs for the new reservation application. You need to present one of these designs to the board of directors of Blue Yonders Airlines. Which design should you present?

Diagram A:

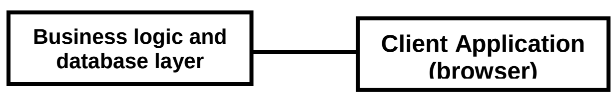


Diagram B:

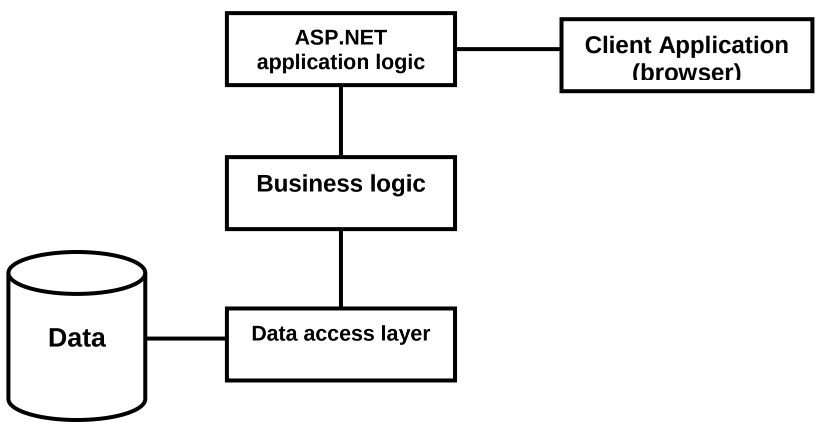


Diagram C:

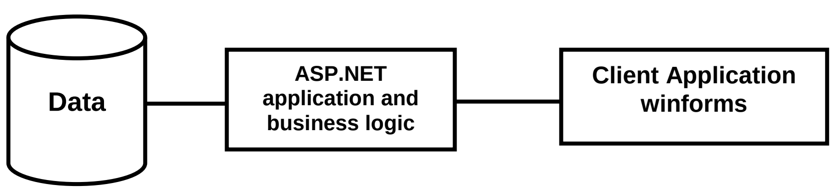
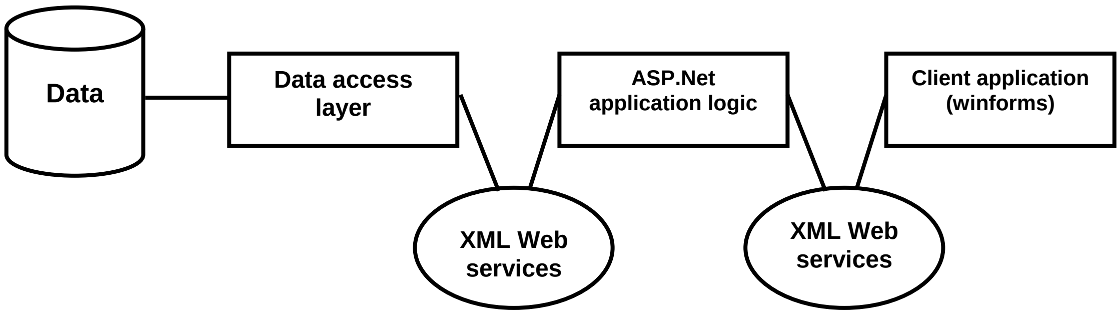


Diagram D:



A. Design A.
B. Design B.
C. Design C.
D. Design D.

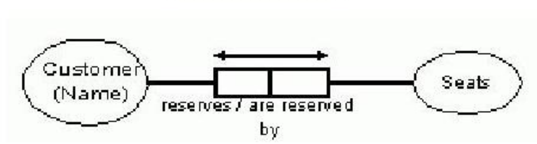
Answer: B

Explanation:
This is an N-tier application.

Incorrect Answers:
A: Incomplete design.
D: This is not possible because it suggests two web services.

Question: 14
During the conceptual design phase, you create the Customer fact as shown in the Customer Fact Diagram. Then you try to validate the population data shown in the Population Data Diagram. However, validation fails. What should you do?
Customer Fact Diagram
Population Data Diagram
Incomplete. Will be fixed in later versions.

CustomerFactDiagram



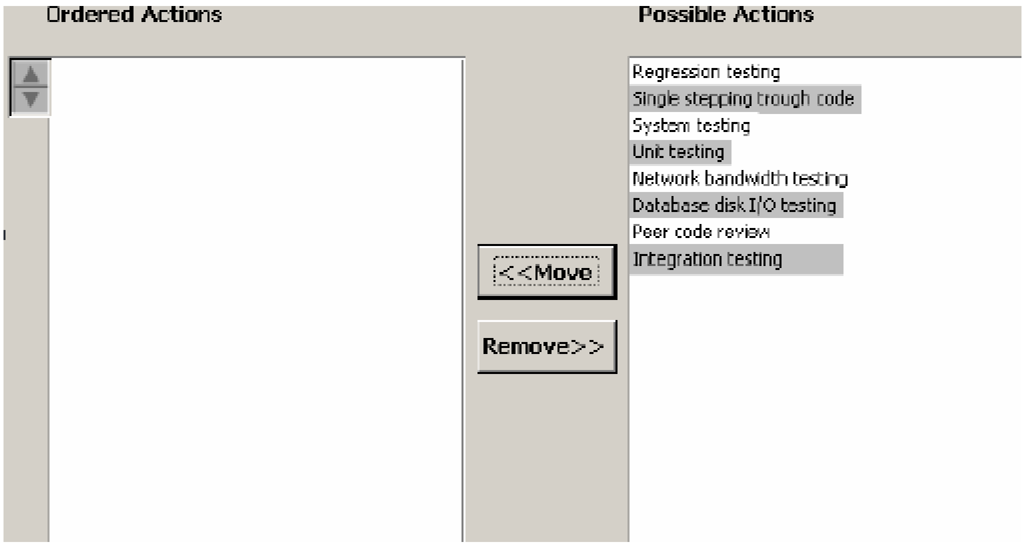
PopulationData

CustomerID	Name	Street	City
A12345	Adam Barr	123 Front Street	Chicago
C45345	Erin O'Melia	454 Main Street	New York
E12323	Jon Ganio	16001 First Avenue	San Francisco
B87334	Adam Barr	1400 Main Street	Chicago

A. Change the Customer reference mode to Name plus City
B. Change the Customer reference mode to CustomerID
C. Add a unique constraint to the Name field
D. Add a mandatory role constraint to the CustomerID field

Answer: B

Question: 15
You need to identify the kinds of testing that should be reformed on your soft were. You also need to specify the order in which testing should occur. Most the accredited action from the possible actions from the ordered actions pane and arrange them in the appropriate order.



Answer:

Ordered Actions	Possible Actions
Unit testing	Regression testing
Integration testing	Single stepping trough code
Regression testing	System testing
Network bandwidth testing	Unit testing
Database disk I/O testing	Network bandwidth testing
System testing	Database disk I/O testing
	Peer code review
	Integration testing

Question: 16
Which new module or modules should you develop for Trey Research? (Choose all that apply.)

A. An application to export laboratory results
B. A data store
C. A Web application for trucking supervisors
D. An automated report generator
E. An application to import laboratory reports
F. An OCR interface
G. An IVR application

Answer: E, F

Question: 17
You are creating a list of business requirements for your solution. Which requirement should you include?

A. Trucking supervisors will always set the same test frequency for all of their drivers
B. Frequency of random testing should vary by driver.
C. Drivers should never be asked to test two days in a row.
D. Frequency of random testing should vary by company.

Answer: B

Question: 18
Your functional specification includes the following statement: 'User identity and a tirnestarnp must be captured when a driver authenticates to the IVR application or the driver Web application.' In your technical specification, you need to specify the target where logged messages should be written. Which target should you specify?

A. The sysmessages table in the Microsoft SOL Server master database
B. The Security event log
C. A table in the application's Microsoft SOL Server database
D. A custom event log

Answer: C

Note:
The Testing Cycle
• Unit Test
o that each independent piece of code works correctly.
• Integration Test
• Ensures that all units work together without errors.
Ordered Actions Possible Actions
Unit testing Regression testing
Integration testing Single stepping trough code
Regression testing System testing
Network bandwidth testing Unit testing
Database disk I/O testing Network bandwidth testing
System testing Database disk I/O testing
Peer code review
Integration testing.
• Regression Test
• Ensures that newly added features do not introduce errors to other features that are already working.

• Unit and integration tests form the basis of regression testing. As each test is written and passed, it gets checked into the test library for a regularly scheduled testing run. If a new component or a change to an existing component breaks one of the existing unit or integration test, the error is called regression.
Performance Test (also called Stress Test)
o Ensures that the product continues to work under extreme usage.
o When you deploy a Web application, it might be used by one or two clients at a time or it might get deluged by thousands of requests. To find out how well a Web application will work in these varying conditions, you need to perform load tests. Use the Microsoft Application Center Test (ACT) to create and run load tests on a Web application. In general, load tests are not created as early in the development process or run as frequently as unit, integration, or regression tests.

• Platform Test

o Ensures that the product works on all of the target hardware and software platforms. For Web applications, platform testing usually means verifying four main points:
ƒ Web forms display correctly on all supported browsers and supported versions of the browsers.
ƒ The web application appropriately handles unsupported browser versions, such as by displaying instructions for downloading the required version.
ƒ The client is prompted to install any required components, such as ActiveX objects or plug-ins, if they are not already installed on his or her computer.
ƒ The Web application has acceptable performance over slower forms of network connections, such as modems.

• Network Analysis
o An application network analysis is useful for identifying performance bottlenecks and improving end-user response time. Incorporating this into your development process helps detect performance issues in terms of response times, processing delays, and quantity of data transferred.

o In an application network analysis, Network Monitor is primarily used to identify the amount of data transferred and count the number of round trips used in response time calculations per page view, including associated elements or user actions performed that generate activity to the Web server.

• SQL Analysis
• Among the most important uses of any business application are getting, saving, and displaying data. .NET applications are no exception to this rule, and. having a properly analyzed and tuned SQL tier is critical to achieving high scalability.

• The tools used to monitor the server are SQL Profiler, System Monitor, SQL Query Analyzer. For applications with bottlenecks at the SQL tier, purchasing more or better hardware generally does not fix the problem. Before getting new hardware, you should first identify the bottlenecks affecting the scalability.

Reference:
MCAD/MCSD Self-Paced Training Kit: Developing Web Applications with Microsoft Visual Basic .NET and Microsoft Visual C#.NET. ISBN 0-7356-1584-5.

Case Study #2, Consolidated Messengers

Background
Consolidated Messenger is a shipping company that specializes in overnight parcel delivery. The company serves North America and Europe, and it provides both ground and air services. For delivery, the company uses its own vehicles, which includes trucks and aircraft. The company handles an average of 100,000 parcels every week. One of its most important services is business-to-business delivery.

Because the shipping market is declining, the company often sends out vehicles that are less than completely full. To maximize the use of space in its vehicles and to increase revenue, the company wants to offer a new service to independent transportation brokers. The new service will enable the independent brokers to use the company's vehicles to send large shipments between cities. Each shipment will consist of a large number of parcels. The company's existing business applications must be enhanced to support the new service. You are a developer employed by Consolidated Messenger. You will lead the development of a solution that uses the Microsoft .NET Framework to meet the requirements of the new service.

Existing IT Environment
Existing Applications
The company uses a parcel-tracking application that runs on a Microsoft Windows 2000 Server platform. This application has interfaces to client computers, handheld PCs and the Internet. Company employees use client computers and handheld PCs to track the movement of parcels. Customers use the Internet to track the shipping status of their parcels. For each parcel, the existing application tracks the following information:

- Waybill number
- Account number to change
- Terms of payment
- Weight
- Sender name
- Sender address
- Sender telephone number
- Recipient name
- Recipient address
- Recipient telephone number
- Current shipping status

Users do not need to be authenticated to check the status of a waybill.
History records are maintained to track the location of parcels. A history record is written each time a parcel changes location. A history record contains the following information:

- Waybill number
- Date.
- Time
- Route number
- Depot number
- Current shipping status

The average parcel requires 1KB of storage space for the parcel information and all associated parcel history records.
The company also uses a vehicle-scheduling application to track vehicles and their routes.
This application schedules routes between depots, tracks the availability of vehicles and assigns available vehicles to scheduled routes.
The vehicle-scheduling application uses its own database, which includes the following tables:

- The Route Definition table describes the characteristics of valid routes between depots, including scheduled departure time and arrival
- The Vehicle table records the type and size of the vehicle and its availability status
- The Route instance table associates a specific vehicle with a defined route. Every time a vehicle transports a shipment between two depots, an entry in the Route Instance table is created

Physical Implementation

The parcel-tracking application and the vehicle-scheduling application were developed by using Microsoft SQL Server 2000, ASP pages, COM+ components written in Microsoft Visual Basic 6 and client software written in Visual Basic 6. The parcel-tracking database is currently 1 terabyte in size.

The company operates a private network that spans two continents. Its public Web servers run on a separate network and are protected by a firewall.

Standards

As a company standard, Consolidated Messenger uses Windows 200 Server computers and a SQL Server 2000 database management system. The company plans to use the Microsoft .NET Framework for new applications and for significant enhancements of existing applications.

Interviews

IT Department

IT Manager

The new enhancements must be integrated with the existing parcel-tracking and vehicle-scheduling applications. An online registration process must be available to the independent brokers so they can request access to these applications. Once they are registered, the brokers must be properly authenticated for security purposes. We also want to be able to track the revenue associated with each broker. We are not planning to add any additional staff to develop or support the enhancements.

Business Stakeholders

Vice President of Operations

Currently, depot managers report that our vehicles are not being used to capacity. The existing vehicle-scheduling application does not track the amount of space that is being used on each vehicle at a given time. However, the new solution should enable us to track this information.

This enhancement will help us manage our vehicles more efficiently.
To handle the anticipated volume of new shipments, my department needs to know the pickup depot, the dimensions and the weight of each shipment.

The new solution must include an interface for independent brokers. These brokers must be able to use the Internet to schedule their own shipments. Brokers usually comply with strict time constraints. If response time is slow, they will not use our services. To keep our costs low, each broker must be able to track its own shipments. However, no broker must be permitted to see information about the shipments of any other broker. We also want to be able to track the amount of business that each broker gives us over a period of time.

Requests for the new service will be fulfilled in the order in which they are received. When no vehicles are available, independent shipments must wait until the next day. However, all independent shipments must be completed in three days.

Finance Department

Chief Financial Officer

Company revenue and profit margins are declining. The new service is extremely important to our financial outlook. My forecast shows a 20 percent increase in the number of parcels delivered during the first year of the new service and a similar increase in each subsequent year. We can handle this additional volume by using our existing vehicles more effectively.
However, the new solution must be capable of scaling to meet the continuously increasing demand.

Users
Depot Manager
My staff is comfortable with the existing parcel-tracking application. I want the new solution to be well integrated with this application so the staff does not need to learn a new interface. I also want to ensure that our existing handheld PCs and bar code readers can be used to track shipments.
Response time for the bar code readers must be fast enough to handle the new shipping volume, without any errors. Response time for the vehicle-scheduling application must also be fast. Delays in updates can delay a shipment or reduce the amount of space used on a vehicle.
The current parcel-tracking application tracks only the weight of a parcel, not its dimensions.
To ensure that space is fully used on each of our vehicles, my staff will need to know the dimension of each parcel, expressed in terms of height, length and width.

Business Process
Vehicle Scheduling
Currently, Consolidated Messenger operates a fleet of 200 aircraft and 600 trucks. Vehicles operate in all major markets served by the company. Vehicles are scheduled one month in advance on the basis of anticipated demand. One master schedule is in effect Monday through Friday. Each weekday follows the same timetable. Saturday uses a different schedule. No deliveries occur on Sunday.

The master schedule indicates the type and size of the vehicles needed to meet delivery requirements for the week. Available vehicles are associated with a scheduled route to form an active route. In total, the company's vehicles complete approximately 3000 routes each week.

Parcel Tracking
Currently, each parcel is assigned a waybill number when it is picked up. A waybill bar code is affixed to the parcel. This bar code is scanned at various checkpoints in the shipment process. A typical delivery includes the following checkpoints

- Picked up
- Received at depot
- On delivery truck
- Delivered

Customers can query the status of their shipment by using a Web browser. Response time to the customer is not critical, as long as this response is faster than telephoning a customer service representative.

Questions & Answers

Question: 1.
You need to ensure that transportation brokers are authenticated when they access the broker Web site. Which action or actions should you take? (Choose all that apply)

A. Create a distribution list of authenticated users
B. Provide a facility for online registration
C. Provide a facility to view passwords
D. Provide secure storage of user names and passwords
E. Secure the exchange of user names and passwords between the client computer and the server
F. Enable e-mail access for transportation brokers

Answer: B, D, E

Explanation:
B,D,E: To ensure transportation brokers are authenticated, we need a facility for the (B) registration and (D) secure storage for this information. The use of SSL could be implied in (E), to secure the exchange of user names and passwords.
The IT Manager says that: Once they [brokers] are registered, the brokers must be properly authenticated for security purposes.

Incorrect Answers:
A,C,F: All of these do not achieve the required objective.

Question: 2
Which data item or items should you add to the existing applications? (Choose all that apply)

A. Waybill information
B. Broker identification information
C. Depot information
D. Parcel dimensions
E. Parcel routing information
F. Information about use of space on vehicles

Answer: B, D, F

Explanation:
B,D: Basic information required. Parcel dimensions allows us to calculate space on vehicles.
F: The existing vehicle-scheduling application does not track the amount of space that is being used on each vehicle at a given time. However, the new solution should enable us to track this information.

Question: 3
You need to enable brokers to track their own shipment. To meet this requirement, you need to consider various specifications. Which four specifications should you consider? (Each correct answer presents part of the solution)

A. Provide a Web-accessible form to authenticate brokers against a table of registered users
B. Provide a Web-accessible form to enable brokers to request vehicle routes for their shipments
C. Provide a Web-accessible form to query the database for broker shipments
D. Provide a Web-accessible form to generate waybill numbers
E. Identify a parcel in the database as part of a broker shipment

F. Relate a parcel to a specific broker
G. Track the weight of a parcel in the database

Answer: A, C, E, F

Explanation:
A. Form to authenticate brokers is required to allow brokers to log in.
C. Form to query the database for broker shipments is required since brokers need to know about their shipments.
E. Identify a parcel in the database as part of a broker shipment is required since brokers can track the parcel as it is shipped.
F. Required.

Incorrect Answers:
B. Form to enable brokers to request vehicle routes for their shipments – Brokers request the service (if it is available) not the routes.
G. Track the weight of a parcel in the database - This not a requirement.

Question: 4
Before you release the solution, you need to develop a process to validate and enforce an appropriate level of quality. Which three statistics should you use?
(Each correct answer presents part of the solution)

A. Number of defects per component
B. Number of defects per thousand lines of source code
C. Number of defects by developer
D. Percentage of successful builds
E. Percentage of requirements tested
F. Number of defects detected to date
G. Number of defects corrected to date.

Answer: E, F, G

Explanation:
Based on the number of successful builds and the Zero Bug Convergence we should be able to validate and enforce an appropriate level of quality.

Note:
Zero Bug Convergence is an interim milestone of the Stabilizing Phase of the MSF process model

Incorrect Answers:
A,B: Does not validate and enforce an appropriate level of quality
C: We do not need to measure a developer's level of expertise.
D: Does not validate and enforce an appropriate level of quality

Question: 5
Which new business process or processes should be supported by the new solution?
(Choose all that apply)

A. Brokers can order transportation services
B. Vehicle scheduling capability is provided
C. Bar code readers are supported
D. Use of space on vehicles can be tracked

E. Brokers can track shipments
F. Customers can track parcels

Answer: A, D, E

Explanation:
The question requests for new business processes. The existing ASP application already allow users to track their parcels.

Incorrect answers:
B: This process already exists. Vehicles are scheduled one month in advance.
C: This process already exists. Bar code is scanned at various checkpoints in the shipment process.
F: This process already exists. Customers use the Internet to track the shipping status of their parcels.

Question: 6
Which performance standard should you use for your solution?

A. Vehicle usage of at least 80 percent of total capacity
B. Database size of less than one terabyte
C. CPU utilization of less than 50 percent in the database server
D. Screen response time of two seconds or less

Answer: D

Explanation:
Response time is a very important requirement. The industry standard for response time is a maximum of three seconds (MSDN). The new application should not be a bottleneck.
Vice President of Operations says that: If response time is slow, they will not use our services.

Depot Manager says that: Response time for the bar code readers must be fast enough to handle the new shipping volume, without any errors. Response time for the vehicle-scheduling application must also be fast.

Reference:
Capacity Planning, http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnduwon/html/d5cpctyplan.asp

Incorrect answers:
A: Vehicle usage does not related to performance standard for your solution.
B: This is not a performance measurement.
C: There is no such requirement.

Question: 7
You are validating the physical design for your solution. Which element or elements should be included in the design?(Choose all that apply)

A. algorithms for scheduling vehicles
B. scalability to meet increased usage
C. authentication of transportation brokers
D. online registration facility for transportation brokers
E. interface to the bar code readers

Answer: B, C, D

Explanation:
B: Scalability is a design consideration
C: Security is required.
D: Transportation brokers need to register themselves.

Note:
Physical views are the least abstract and illustrate the specific implementation components and their relationships. The physical design should meet scalability elements, provide authentication of transportation brokers and an online registration facility for transportation brokers

Reference:
Chap 6 "Creating the Physical Design" page 234 in MS .Net Sol. Arch. for exam 70-300

Incorrect Answers:
A: Algorithms for scheduling vehicles will not affect the physical design.
E: The interface for the bar code readers already exist.

Question: 8
You are validating your conceptual design in terms of scalability. Which requirement will probably have the greatest impact on scalability?

A. Scheduling additional vehicles
B. Using the interface to bar code readers
C. Reporting use of space in vehicles
D. Handling additional broker shipments

Answer: D

Explanation:
The new service will enable the independent brokers to use the company's vehicles to send large shipments between cities. Each shipment will consist of a large number of parcels. The company's existing business applications must be enhanced to support the new service.

Chief Financial Officer says that: My forecast shows a 20 percent increase in the number of parcels delivered during the first year of the new service and a similar increase in each subsequent year. We can handle this additional volume by using our existing vehicles more effectively. However, the new solution must be capable of scaling to meet the continuously increasing demand.

Reference:
http://msdn.microsoft.com/library/default.asp?url=/library/enus/vsent7/html/vxcondesigningforscalability.asp

Incorrect Answers:
A,B,C: All of these alternatives do not have a major impact on scalability.

Question: 9
When the new solution is in place, parcel information and parcel history information must be stored. You need to estimate the amount of data that will be generated by the new solution during its first year of use. What is the approximate amount?

A. 824MB

B. 5GB
C. 8GB
D. 50GB

Answer: C

Explanation:
Estimate the amount of data that will be generated by the new solution during its first year of use (GB) = 100,000 parcels every week * 52 weeks * 20% increase * 1 KB / 1,048,576 KB = 5.95 GB

Question: 10
You need to decide whether your conceptual design represents a complete solution.
Which four design artifacts are relevant to your decision? (Each correct answer presents part of the solution. Choose four)

A. Unit test for authenticating brokers
B. Component prototypes for tracking shipments
C. Functional requirements for tracking shipments
D. Unit test cases for tracking shipments
E. Use cases for authenticating brokers
F. Functional requirements authenticating brokers
G. Component prototypes for authenticating brokers
H. Use cases for tracking shipments

Answer: C, E, F, H

Explanation:
Conceptual design should include on functional requirements and use cases. Conceptual views are the most abstract and tend to be described in terms that are most familiar to the (non-IT professional) users of the system. The conceptual view is used to define the functional requirements and the business users' view of the application to generate a business model.

The conceptual view is used to define the business requirements and the business users' view of the application to generate a business model. Conceptual modeling techniques, such as use case analysis, activity diagrams, process design, and business entity modeling, help to build a description of the key business processes and the data they use, in way that emphasizes business objectives and requirements, and is free of implementation technology.

Reference:
http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnea/html/eaarchover.asp

Incorrect answers:
A. Conceptual design does not contain component prototypes
B. Conceptual design does not contain component prototypes
D. Conceptual design does not contain unit test cases
G. Conceptual design does not contain unit test cases

Question: 11
Your development team creates four different logical designs for the solution. Which design should you use?

Diagram A:

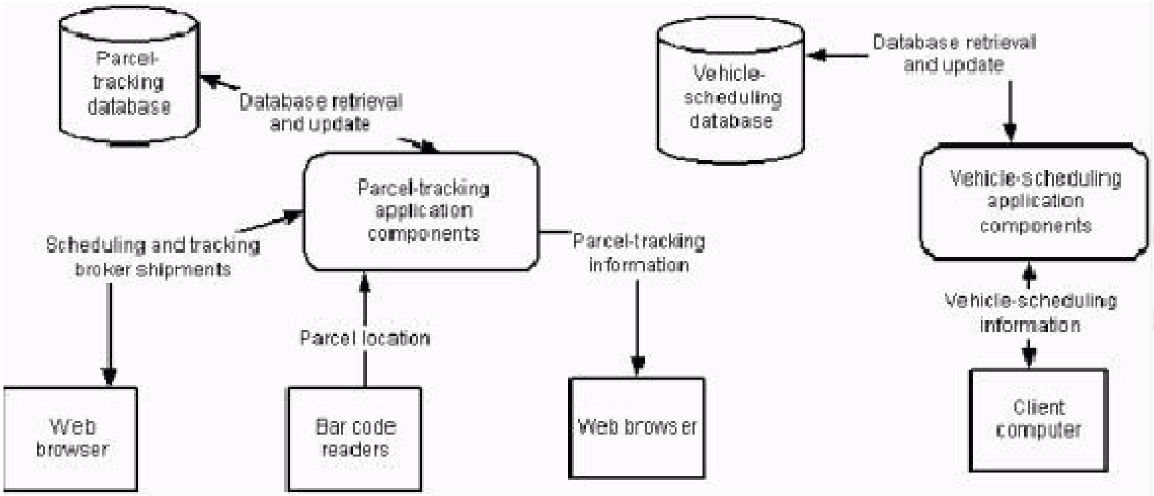


Diagram B:

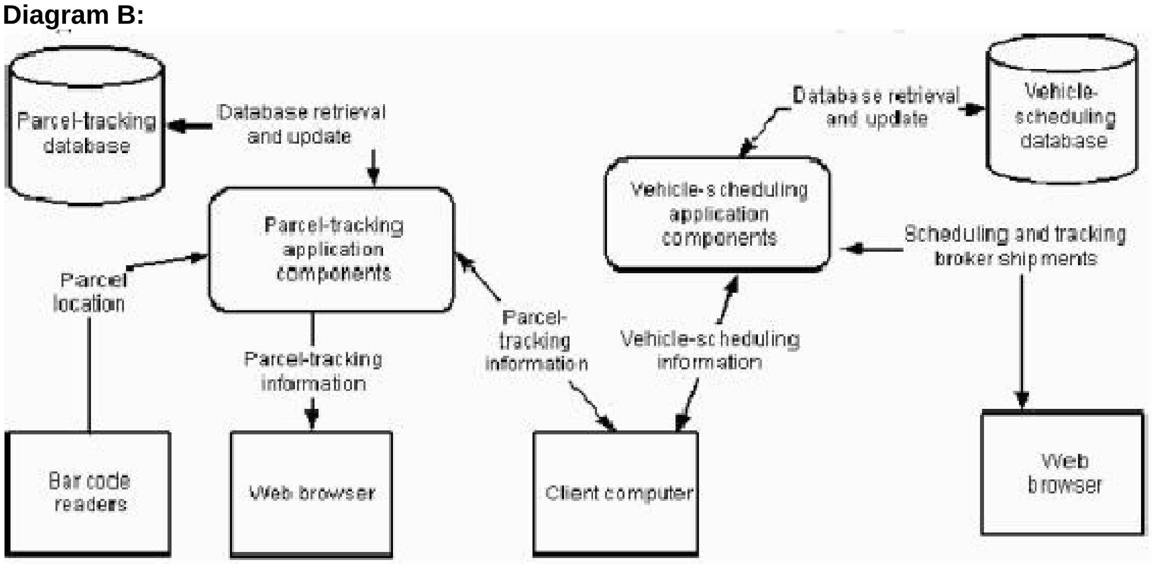


Diagram C:

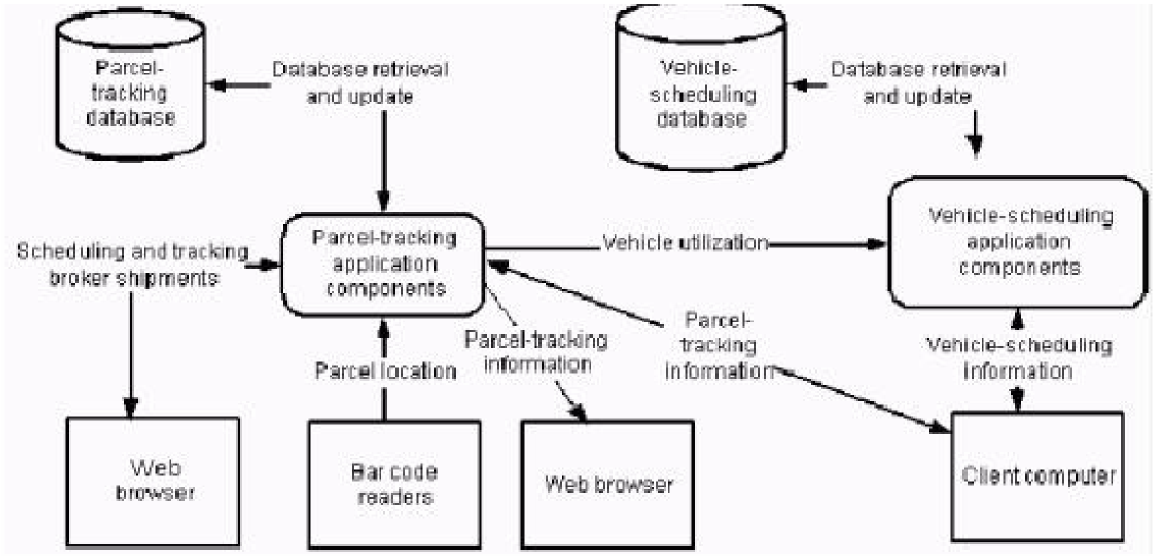
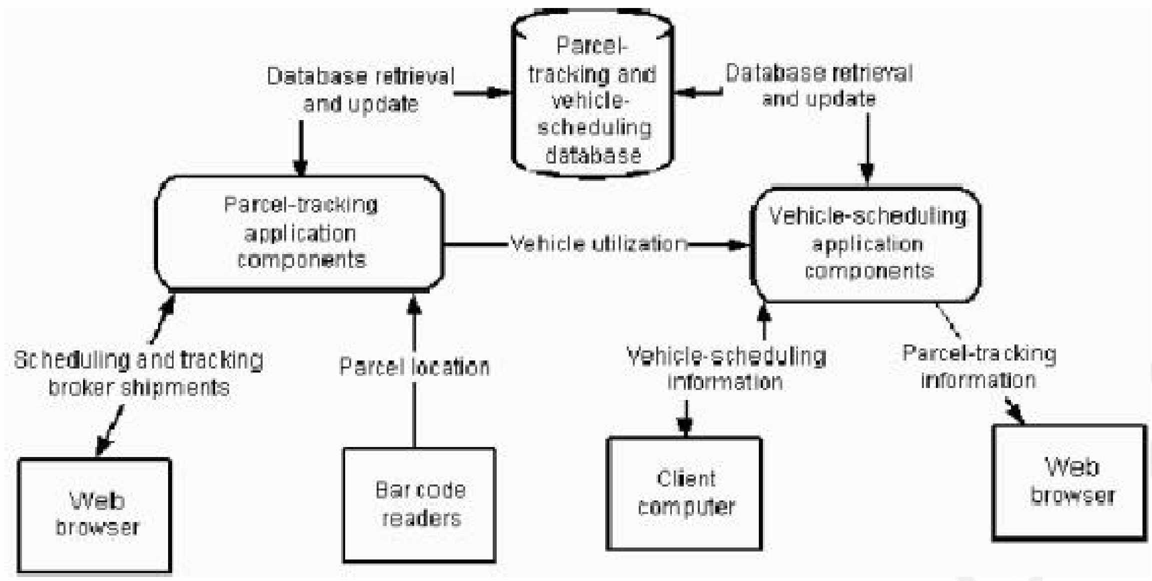


Diagram D:



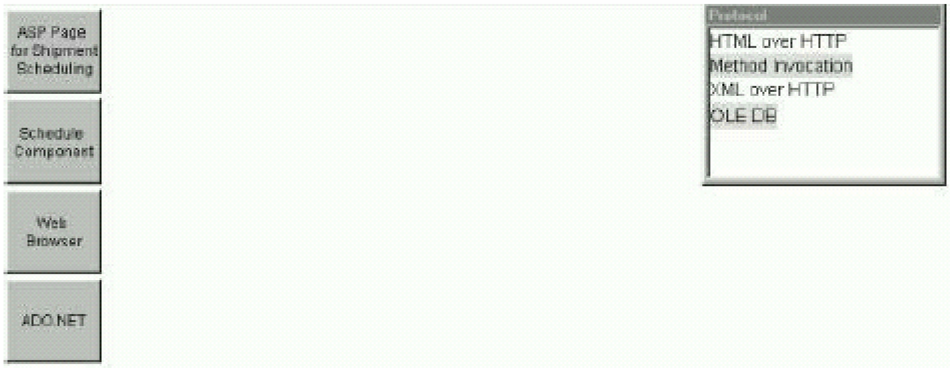
A. Design A.
B. Design B.
C. Design C.
D. Design D.

Answer: C

Incorrect Answers:
A: The interface between the vehicle scheduling application and the parcel tracking application is missing.
B: The scheduling and tracking of broker shipments is part of the parcel tracking application, not the vehicle-scheduling application. Vehicle utilization information is missing.
D: There should be two separate databases.

Question: 12

You are creating the design for shipment scheduling functionality. You need to identify which modules are associated with this functionality and how they will interact. Use available modules and protocols to create a diagram that illustrates your solution.(Use only modules and protocols that apply)



Modules	**Protocol**
ASP Page for Shipment Scheduling	HTML over HTTP
Schedule Component	Method Invocation
Web Browser	XML over HTTP
ADO.NET	OLE DB

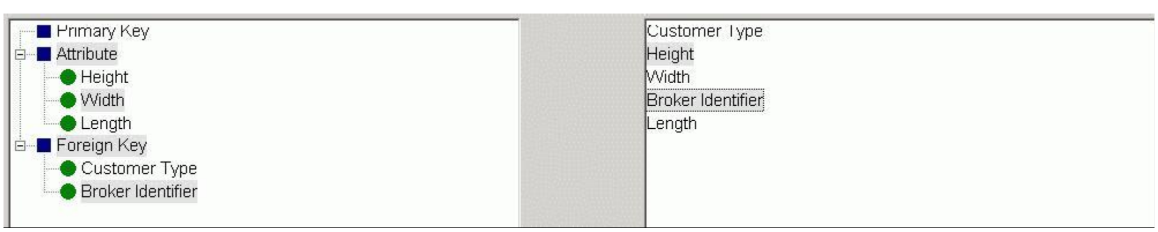
Answer:

Web Browser ↔ HTML over HTTP ↔ ASP Page for Shipment Scheduling ↔ Method Invocation - Schedule Component

Question: 13

The parcel-tracking application uses a table named Parcel. You need to modify the schema for this table to support the requirements of your solution. Create a diagram that illustrates your modifications. Move the appropriate data elements to the appropriate location in the schema. (Use only data elements that apply. You might need to reuse data elements.)

There are no original exhibits for this question, but we only provide the correct answer here for you!



Answer: See table below

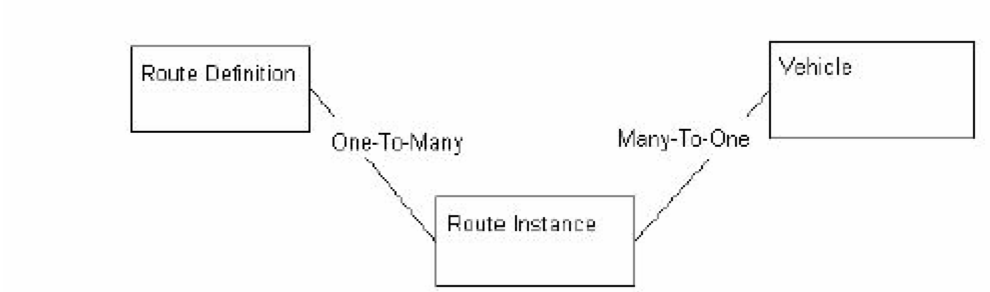
Primary Key	
Attribute	•Height •Width •Length
Foreign Key	• Customer Type • Broker Identifier

Explanation:
The Parcel table already exists within the database. We are simply modifying it.
Therefore, we do not need to add to the Primary Key as this has already been set previously.
Height, Width and Length are attributes.
This Broker table will be a new table, therefore we need a foreign key in the Parcel table to reference the Broker Table. Broker Identifier is a new field that identifies the Broker from the Broker Table.

• Foreign key is set to customer type because parcels can belong to two groups:
o A Package belonging to Consolidated Messengers
o A Package belonging to a Broker.
The envisioned design is shown below:

Question: 14
You are creating the logical data model for associating vehicles with routes. Use entities and relationships to create a diagram that illustrates your solution.(Use only entities and relationships that apply. You might need to reuse relationships)

Answer: See diagram below



The Route Instance table associates a specific vehicle with a defined route. Therefore, Route Instance is a simple associative table.

Case Study #3, A. Datum Corporation

Background
A. Datum Corporation is a large law firm. Currently, the firm uses a commercial timesheet application to track billable hours. However, this application no longer meets the firm's needs.
You are contracted to create a new Windows-based solution by using the Microsoft .Net Framework and Microsoft SQL Server.

Existing IT Environment
Each lawyer uses a computer that runs either Microsoft Windows 2000 Professional or Windows XP Professional. Many lawyers travel frequently and use only portable computers.
Most lawyers also use handheld PCs that run Windows CE.
Each employee has a domain user account. The domain is served by a Windows 2000 domain controller. All employees use Internet Explorer 6.0.
Employees do not have VPN access to the corporate network. A firewall restricts incoming traffic to HTTP connections on TCP ports 80 and 443. The IT staff will not open additional ports.

Interviews
Users
Lawyer, Corporate Law Division
I am a typical end user at A. Datum Corporation. With our current software, I find it laborious to make timesheet entries. We often postpone updating our timesheets. As a result, we often forget important task details. The new timesheet application must be better suited to the way we work.
Typically, I spend each afternoon writing a contract. However, I might also receive 10 telephone calls related to other cases, and I might respond to 10 e-mail messages. The new solution should make easy to record each of these tasks while I am working.

We envision a taskbar-type interface that should always be displayed along the edge of the screen. This taskbar should contain toolbar-type buttons. These buttons should represent the legal clients whom we most frequently bill. Each time we begin a new task for a client, we should be able to click the button associated with that client to start a timer. Clicking the same button again, or clicking another client button, should stop the timer. A pop-up window should then prompt us to describe and categorize the task that was just completed.
The taskbar should also expand to show a more conventional timesheet interface. The expanded interface must allow us to sort, review, add and edit our entries.

The new timesheet application should not require us to provide explicit name and password information. When we work at home, we want to be able to use the application over the internet. When we do so, the application should update the data immediately.

Lawyer, Criminal Law Division
Each week we spend several hours making billable telephone calls. We make a large number of these calls while commuting to the office, while traveling to and from meeting and court appearances and while waiting at the courthouse. We want to be able to keep track of our telephone calls by using our handheld devices. We need a simple timesheet application that runs on our devices and is similar to the taskbar application. When we return to the office, the application should synchronize with our desktop computers and add the information from the handheld device.

Business Stakeholders
Business Manager
We need a new solution to serve the needs of Team Leads and Business Planners.
Each large project has a Team Lead. One responsibility of the Team Lead is to review and approve all timesheet entries before the entries can be used to create invoices. The new

application should prevent Team Leads from viewing or approving entries that are unrelated to their projects.
My own staff consists of several Business Planners. They must be able to view all timesheet entries. In addition, they must be the only users who can add new clients, create new projects, close projects and assign lawyers to projects. After a project is closed, lawyers should no longer be able to bill to it and the project should be described as completed.

Team Leads and Business Planners often work at home or while traveling. Therefore, we want the new solution to be a Web application that is accessible from the Internet.

Accounting Manager
For billing, we use a commercial software package. Each month, I create an invoice for each of our legal clients. Currently, I need to consult a timesheet report to look up the numbers of hours billed by each lawyer to each client. Then, I must manually add a line item to the invoice for each lawyer's hours. This task is time-consuming and clients complain about the lack of detail in the invoice.

We want the new solution to include a utility that automatically creates invoices in our billing application. This utility should create the invoices once each month, on the last business day of the month. A sales representative from the billing software company told me that the billing software package is fully programmable. He can provide you with API documentation.

IT Department
IT Manager
Our IT staff consists of five people. None of them has any programming experience. The new application must include tools that alert us to all failures and help us resolve failures. The application must also be secure. Any Web application or application endpoint exposed to the Internet must require authentication.

Business Process
Timesheet Entries
Each timesheet entry is billable to a project. A given client might have several ongoing projects. Each timesheet entry includes a time, a lawyer and a task description. The following example is a typical entry:
Lawyer: John Chen
Client: Fabrikam.Inc.
Time: 18 minutes
Project: Kite patent application
Task Description: Sent e-mail message to Ben with technical questions about Kite

Data Migration
Data from the existing timesheet application must be migrated to the new timesheet application. This data is in a proprietary format. From an examination of the existing application, you learn that all required data can be exported to a comma delimited file.

Questions & Answers

Question: 1.
You are writing the technical specification for your solution. Your new timesheet application must be able to access timesheet entry data. You need to specify the technology that will be used for accessing this data. Your solution must require the minimum development effort. Which technology should you use?

A. a SQLConnection class
B. a .NET Remoting object that uses TCP channel and binary formatting
C. an XML Web service proxy class
D. an interop assembly

Answer: C

Explanation:
This is the best solution since data can also be accessed through the firewall.
Lawyer, Corporate Law Division: When we work at home, we want to be able to use the application over the internet. When we do so, the application should update the data immediately. To update the data immediately, a data layer webservice will have to be called from the Windows Form Application. This can be accomplished by using an XML Web service proxy class to make the call.

Note:
NET Remoting vs. XML Web Services
XML Web services offer a simpler model for distributed applications than that provided by .NET Remoting. XML Web services are fine-tuned for Internet scenarios and cross-platform use. Although you can apply .NET Remoting in these scenarios, thanks to its SOAP formatter and HTTP channel, .NET Remoting is more suitable as a high-speed solution for binary communication between proprietary .NET components, usually over an internal network. And although XML Web services can't match the communication speed of .NET Remoting over a binary channel, they still lend themselves to high-performance designs thanks to their stateless nature and ASP.NET's multithreaded hosting service.
Here's a quick overview of the major differences between the XML Web service and .NET Remoting technologies:

• *The IT staff will not open additional ports:* Because XML Web services work through Microsoft Internet Information Services (IIS) and ASP.NET, they can communicate with clients using the default HTTP channel (usually port 80). This means that consumers can use XML Web services just as easily as they can download HTML pages from the Internet. There's no need for an administrator to open additional ports on a firewall.

• *Minimum development effort:* Because of the restricted nature of XML Web services, the design issues are simplified. XML Web services are generally easier to create than remotable components (and easier to design well).

• XML Web services are more restricted than objects exposed over .NET Remoting. AnXML Web service works in a similar way to a SingleCall .NET Remoting object. It isn't possible to create a singleton or a client-activated object.

• Communication with .NET Remoting can be faster than XML Web service communication if you use a binary formatter. XML Web services support only SOAP message formatting, which uses larger XML text messages. XML Web services support open standards that target cross-platform use. For example, each .NET XML Web service has an associated WSDL document that describes how a client can interact with the service. Therefore, any client that can parse an XML message and connect over an HTTP channel can use an XML Web service, even if the client is written in Java and hosted on a UNIX computer.

• XML Web services are designed for use between companies and organizations. They can use a dynamic discovery mechanism or a UDDI registry that "advertises" services to interested parties over the Internet.

• XML Web services don't require a dedicated hosting program because they are always hosted by ASP.NET. That also means that they gain access to some impressive platform services, including data caching, Web farm–ready session state management, authentication, and an application collection for global, shareable objects. These features, if required, can be extremely difficult to re-create by hand in a component exposed through .NET Remoting.

References:
Chapter 5: XML Web Services (RPC the Easy Way),
http://www.perfectxml.com/WebSvcRPC.asp

Incorrect Answers:
A. SQLConnection is a class that is part of ADO.Net technology. The class on its own is not enough for data access. We must view solutions from a holistic view point.
B. Remoting requires more development effort than Web Services
D. This makes no sense. An interop assemble is a way to access data.

Question: 2
You are writing a conceptual diagram of the modules that must be developed for your solution. Which module or modules should be included?(Choose all that apply)

A. a Web application for Team Leads and Business Planners
B. a timesheet entry database
C. a billing database
D. a notification engine that sends timesheet entry reminders
E. a timesheet entry application
F. a Windows CE application
G. a utility that uploads information to the billing application

Answer: A, B, E, F, G

Explanation:
We identify all modules.

Incorrect Answers:
D. This is not a requirement.
C: This is not required.

Question: 3
You are writing the technical specification for your solution. You need to select a technology for the new timesheet application. Which technology should you use?

A. an XML Web service
B. a Web application
C. a console application
D. a Windows Forms application

Answer: B

Explanation:
There are three applications to be developed:
- A web application for Team Leads and Business Planners. The Business Manager wants “the new solution to be a Web application that is accessible from the Internet.” (Refer to the hint given in *Question:* 11)
- A *simple time sheet* Windows CE application for Lawyers in the Criminal Law Division. (Refer to the hint given in *Question:* 2)
- A web application for Lawyers in the Corporate Law Division. This refers to this question. It must be a web application because:
- Critical constraint: Only TCP ports 80 and 443 are open. A Windows Form, which uses an XML web service will be able to penetrate the firewall • Our web application does not require any client installation.
- Data will be updated immediately when users work at home
- The underlying XML Webservice which the windows Form will use is accessible from the Internet, as required by the Business Manager
- It is stated: *“We envision a taskbar-type interface that should always be displayed along the edge of the screen. This taskbar should contain toolbar-type buttons.”* A web application is capable of this.

Incorrect Answers:
A: An XML Web Service does not have the type of user interface required to build the application.
C,D: These alternatives will not meet the requirements.

Question: 4
A database architect on your team prepares a logical data model. The model includes entries that correspond to clients, projects and timesheet entries. You are reviewing the model. Which entity relationship or relationships should be included?(Choose all that apply)

A. a Project entity is the parent of a TimesheetEntry entity
B. a Client entity is the child of a TimesheetEntry entity
C. a many-to-many relationship exists between a Client entity and a Project entity
D. a many-to-many relationship exists between a Project entity and a Timesheet Entry entity
E. a Client entity is the parent of a Project entity
F. a Client entity is the parent of a TimesheetEntry entity

Answer: A, E

Explanation:
A. Timesheets are billable to projects.
E. One client may have many projects
The sample design is shown below:

Incorrect Answers
B. Does not appear to make sense.
C. A client can have many projects, but a project may have only one client.
D. A project will have many timesheet entries, but a timesheet entry will have only one project

F. Timesheets belong to projects, not clients.

Question: 5
The invoice creation process must be dynamically monitored to track the following information:

- Average number of seconds to create an invoice
- Number of invoices created per second
- Total number of successfully created invoices
- Total number of failed attempts to create an invoice

Monitoring should occur with a minimum of development effort. What should you do?

A. Write statistics to the database and use SQL Query Analyzer to dynamically monitor the statistics
B. Create a removable Microsoft .NET class to contain statistics. Configure the class as singleton class. Write a utility that retrieves statistical information from this class
C. Write statistics to the application event log
D. Use custom performance counters

Answer: D

Explanation:
Custom Performance Counter objects can be created to collect and monitor performance data while the application is running.

Incorrect Answers
A. This takes more time and is not as efficient as the proposed solution.
B. Will require too much effort.
C. This would work, but viewing and analyzing the statistics would be a hassle. Using performance monitor is much easier.

Question: 6
You are creating a high level class diagram for your solution. You need to add one or more business entities to the diagram. Which entity or entities should you add? (Choose all that apply)

A. Task time
B. Pop-up window
C. Project
D. Lawyer
E. Client
F. Task description
G. Time entry

Answer: C, D, E, G

Explanation:
A use case diagram documents the following design activities:
• Identifying the system
• Identifying actors
• Defining the interactions between the actor and the system
• Determining the system boundary

Incorrect Answers
A. Task time is part of a time entry.
B. A popup window is not a business object.

F. Task Description is also part of the time entry.

Question: 7
You are analyzing the feasibility of your solution. You need additional information to decide whether the solution is technically possible. Which additional information do you need?

A. A copy of the existing timesheet application
B. A prototype of the Web application that will be used by Team Leads and Business Planners
C. A list of the different models of Windows CE devices that need to be supported
D. API information and requirements related to integration with the billing application

Answer: D

Explanation:
The Accounting Manager has the following requirement: "We want the new solution to include a utility that automatically creates invoices in our billing application." It is also stated that the billing software package is fully programmable." Thus we will need the API documentation.
You would need to ensure that these API will let you satisfy the Accounting Manager's. If the API's cannot satisfy the requirements then that will greatly affect the feasibility of the project.

Incorrect Answers
A. Why would you need a copy of the existing application to see if a new updated application is feasible?
B. Access to a prototype application will not assist you determine if your proposed application is feasible.
C. As long as the handhelds supports Windows CE, it is sufficient.

Question: 8
You are designing a strategy to migrate data from the existing timesheet application to the new application. Which tool or technology should you use?

A. XML Schema Definition tool (xsd.exe)
B. COM interoperability
C. Microsoft SQL Server Data Transformation Services (DTS)
D. Microsoft SQL Server replication

Answer: C

Explanation:
(DTS) provides a set of tools that lets you extract, transform, and consolidate data from disparate sources into single or multiple destinations.

Incorrect Answers
A. The XML Schema Definition tool generates XML schema or common language runtime classes from XDR, XML, and XSD files, or from classes in a runtime assembly.

B. Interoperability with COM, or *COM interop*, enables you to use existing COM objects while transitioning to the .NET Platform at your own pace.

D. Using replication, you can distribute data to different locations, to remote or mobile users over a local area network, using a dial-up connection, and over the Internet. Replication also allows you to enhance application performance, physically separate data based on how it is used (for example, to separate online transaction processing (OLTP) and decision support systems), or distribute database processing across multiple servers.

Question: 9
You are writing the operational requirements document for your solution. Which should you include?

A. The application must encrypt all time entry data on client computers and in the database, and data must be encrypted when transmitted over the internet
B. The IT staff will be responsible for fixing bugs in the code
C. The IT staff must be alerted to application problems
D. The application can have no single point of failure

Answer: C

Explanation:
This is an operational requirement. It satisfies the requirement of the IT Manager:
"The new application must include tools that alert us to all failures and help us resolve failures."

Incorrect Answers
A. The requirement just requires us to ensure that the application is secure and that users are authenticated.
B. The IT staff are not programmers, so they will not be able to fix bugs.
D. There is no requirement for this.

Question: 10
The Web application used by Business Planners generates many types of reports. One type displays billing information over specified timeframes. The other selects a lawyer and a timeframe and the report displays the average number of minutes billed by that lawyer per day and the average number of minutes billed to each client per day over that timeframe. You must ensure that this report is generated with a minimum network traffic. What should you do?

A. Use Microsoft SQL Server indexes to optimize the data calculations
B. Implement the calculations in a business layer class
C. Implement the calculations in a data layer class
D. Use Microsoft SQL Server stored procedures for the data calculations

Answer: D

Explanation:
When SQL statements and conditional logic are written into a stored procedure, they become part of a single execution plan on the server. The results do not have to be returned to the client to have the conditional logic applied; all of the work is done on the server.

Note:
To remove bottlenecks while accessing and writing to the database, you can perform the following steps:
• Identify potential indexes, but do not index excessively.
• If using Microsoft SQL Server, use SQL Server Profiler and Index Tuning Wizard.
• Monitor total processor usage; desired range is 75 to 80 percent processor time.
• Analyze query plans by using Query Analyzer to optimize queries.
• Use stored procedures to maximize performance.
• Normalize data that is written frequently.
• Denormalize data that is read frequently.

Incorrect Answers

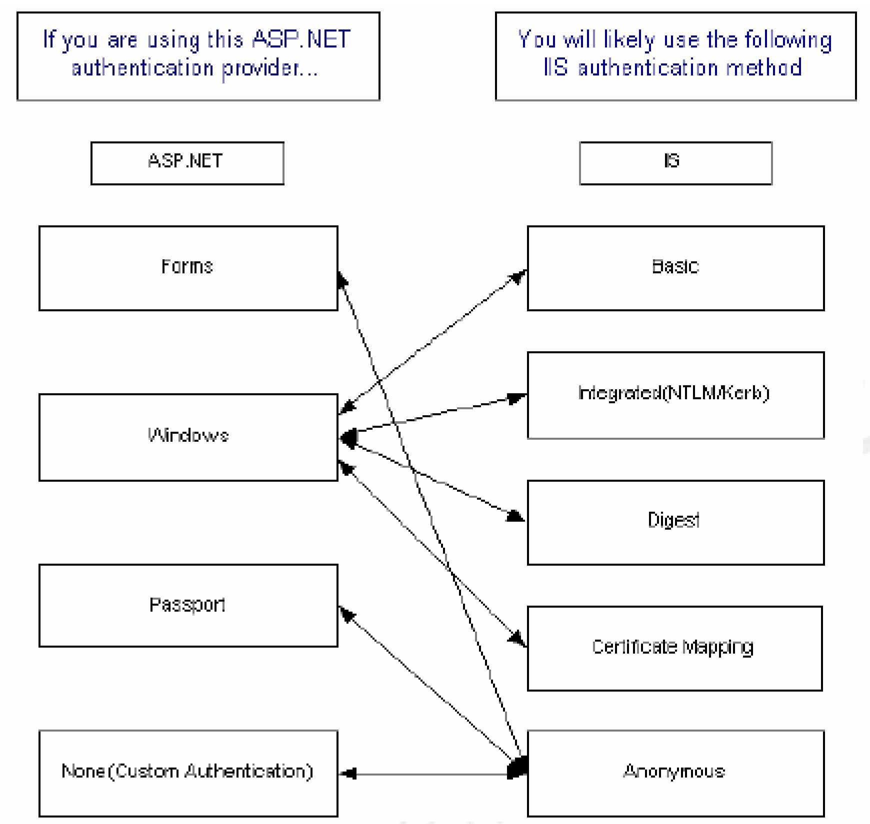
A. Indexes can help to retrieve data faster from SQL server but not minimize network traffic.
B, C. Such classes can only add to network traffic.

Question: 11
The Web application used by Team Leads and Business Planners requires an authentication mechanism. Which pair of authentication technologies should you recommend?

A. IIS Anonymous authentication with ASP.NET Passport authentication
B. IIS Anonymous authentication with ASP.NET Forms authentication
C. IIS Basic authentication with SSL and ASP.NET Windows authentication
D. IIS Integrated Windows authentication with ASP.NET Windows authentication
E. IIS Basic authentication with SSL and ASP.NET Forms authentication

Answer: C

Explanation:
Each employee has a Windows 2000 domain user account. This solution will work because the User Name and Password as passed in as strings in clear text which can work through port 80 & 443. Because of this, Microsoft recommends using SSL with IIS Basic authentication.
Please refer to diagram below:



Incorrect Answers
A, B: The IT Manager: Any Web application or application endpoint exposed to the Internet must require authentication. Anonymous authentication fails this requirement.

D: Because of the firewall restrictions, IIS Integrated Windows authentication cannot be used because it requires additional ports to be open. Kerberos uses port 88. There are other ports as well like 464 (kpasswd) and 543 (klogin).
E. This would work, but is less than ideal. Using ASP.Net forms authentication you will need to somehow maintain a list or database of valid users, and provide some way for them to change their passwords. Using Windows authentication you do not have to worry about that

Question: 12
You are validating the physical design of a data a data layer class that will return a set of time entries from the timesheet database. This class will be used by the Web application for Team Leads and Business Planners and, indirectly, by the new timesheet application.
The class must use connection pooling, and it must be as secure and as flexible as possible. You need to specify a Microsoft SQL Server authentication strategy that meets these requirements. Which strategy should you use?

A. The data class uses SQL Server authentication with an application specific SQL Server account. The account name and password are embedded in a connection string
B. The data class uses Windows authentication when connecting to the database and impersonates a specific account created for operations on the database
C. The data class uses Windows authentication when connecting to the database and impersonates the application user
D. The data class uses SQL Server authentication with the SQL Server sa account

Answer: B

Explanation:
This is both secure and flexible. A specific account implies that connection pooling can be achieved.

Note 1:
There are some drawbacks to using integrated security, most of which you can overcome. Because integrated security requires a Windows account, it defeats connection pooling if you impersonate each authenticated principal using an individual Windows account. However, if you instead impersonate a limited number of Windows accounts, with each account representing a particular role, you can overcome this drawback. Each Windows account must be a domain account with IIS and SQL Server in the same or trusted domains. Alternatively, you can create identical (including passwords) Windows accounts on each machine. If you configure SQL Server to use Windows Authentication, you could create one Windows account for read-only operations and another Windows account for read/write operations. You then map each Windows account to a SQL Server login and establish the desired permissions.

Using application logic, you then determine which Windows account to impersonate when performing database operations. In SQL Server, you can add any Windows user account as a member of a fixed database role.

Reference:
http://msdn.microsoft.com/library/default.asp?url=/library/en-us/vsent7/html/vxconDatabaseSecurity.asp

Note 2:
Windows authentication requires a Windows account for database access. Although it might seem logical to use impersonation in the middle tier, you must avoid doing so because it defeats connection pooling and has a severe impact on application scalability.

To address this problem, consider impersonating a limited number of Windows accounts (rather than the authenticated principal), with each account representing a particular role.
For example, you can consider the following approach:

• Create two Windows accounts, one for read operations and one for write operations.
(Or, you might want separate accounts to mirror application-specific roles. For example, you might want to use one account for Internet users and another for internal operators and/or administrators.)

• Map each account to a SQL Server database role, and establish the necessary database permissions for each role.

• Use application logic in your data access layer to determine which Windows account to impersonate before you perform a database operation.

• Note Each account must be a domain account with Internet Information Services (IIS) and SQL Server in the same or trusted domains; or, you can create matching accounts (with the same name and password) on each computer.

Incorrect Answers
A. This is not flexible.
C. This is not feasible because for connection pooling to work the same user account has to be used.
D. It is not secure to use the System Administrator (sa) account.

Question: 13
Your team builds a daily release of the timesheet application for testing by the quality assurance (QA) team. You find that the volume of bugs is threatening your project schedule. The following example is a typical bug:
One method should return a dataset that is based on a date range given as input parameters. However, when the method queries the database, it erroneously interchanges the beginning date and the end date. An empty dataset is always returned.
You need to minimize these kinds of bugs using a minimum of development effort and
QA effort. What should you do?

A. Require more frequent builds
B. Require the QA team to perform more integration testing
C. Require engineers to perform complete integration testing before submitting code
D. Require engineers to perform adequate unit tests before submitting code

Answer: D

Explanation:
It is unit testing that is causing the problem.

Incorrect Answers
A. More frequent builds will not help. We will have the same number of bugs, but just find them more often.
B. The role of the QA team is not to fix bugs. They should be sorted out before QA.
C. In the example, the method that always returns an empty dataset is one that should be fixed in unit testing.

Question: 14

In your first code review, you detect several violations of your policies. The following examples are typical violations:

- Data controls are used in presentation layer components
- Windows UI elements are added to Web UI projects
- Shareware user controls are used

You must establish and enforce standards to prevent these kinds of violations. You want to enforce the standards with a minimum of administrative effort. What should you do?

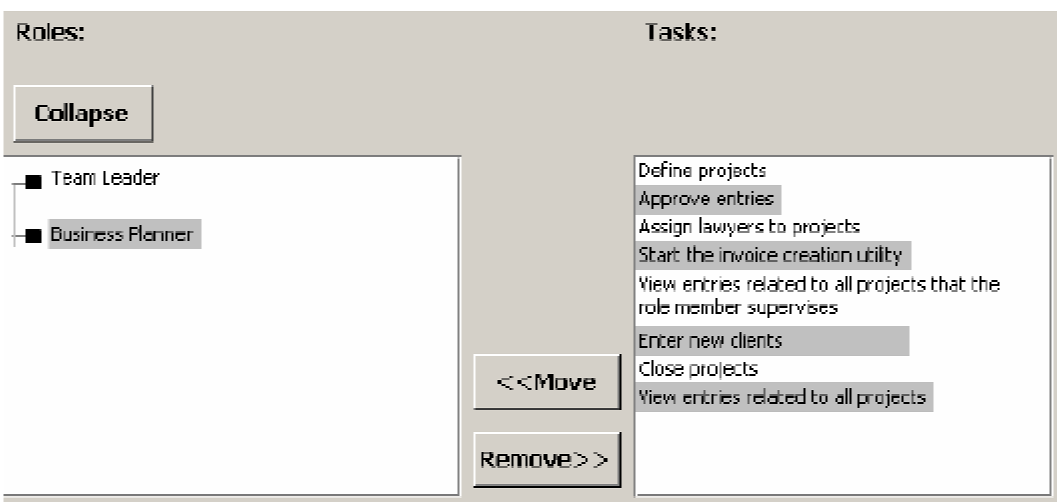
A. Base projects on an appropriate Microsoft Visual Studio .NET Enterprise Template
B. Conduct more frequent code reviews
C. Use Active Template Library projects
D. Write a utility that uses Microsoft .Net reflection to examine compiled code for inappropriate types

Answer: A

Explanation:
An enterprise Template allows you to enforce policies and rules.

Incorrect Answers
B. More frequent code reviews would be time consuming and not required.
C. Active Template Library projects are for C++.
D. This is not appropriate.

Question: 15
You are writing the functional for your solution. You define two roles, one for your solution. You define two roles, one for team leads and the other for Business planners. Each role performs various tasks. You need to identify the tasks that are performed by each role. Move the appropriate tasks to the corresponding role.



Answer: See table below:

Roles	Tasks
Team Lead	View entries related to all projects that the role member supervises
	Approve entries
Business Planner	View entries related to all projects
	Enter new clients
	Define projects
	Close projects
	Assign lawyers to projects

Incorrect Answers:
Start the invoice creation utility: Performed by the Accounting Manager.

Case Study #4, Fabrikam, Inc

Background
Fabrikam, Inc manufactures and sells kites on a hole sale basis to more than 5.000 customers. Currently, the company maintains a static Web site and receives customer orders by telephone. It obtains raw materials from two vendors.

The company contracts you to design and develop a solution by using the Microsoft .NET Framework that will enable customers to place orders over the internet. The solution will include a new customer Web site. Testing and deployment of the site must be complete in six months.

Existing IT Environment
Fabrikam, Inc has a private VPN. Salespeople use VPN to access e-mail and file shares when they travel.

The company uses an accounting application to manage the customer billing process. The accounting application runs on a mainframe computer. This application accepts connections over TCP/IP and it uses its own binary communication protocol. It responds to requests slowly and supports a maximum of two concurrent TCP/IP connections. It cannot store information about shipping status.
The company will continue to use the accounting application

Interviews
Users
Sales manager
Our salespeople need access to customer information and order history when they are in the office and when they travel in the field.

We categorize our customers by sales volume. We use three categories, in ascending order of volume, they are Bronze, Silver or Gold. Customer in higher categories pay lower prices. We currently store category pricing on paper. I want to store category pricing as part of the new solution. I want also the ability to change pricing every quarter. Each customer must be able to see only its own pricing information. Customers must not learn that different pricing categories exist.

Manufacturing Manager
I want a solution that tracks my raw material inventory and helps me order raw materials

Shipping Manager
We spend too much time handling customer telephone calls. Customers often telephone to learn the shipping status of their orders. Our staff needs to find each printed order and then report the shipping status to the customer

It Department
IT Manager
I own this project and I will be working directly with you. Eventually, I want to locate all our business process on the Internet. However, our highest priority is to make our customers happy. Anything makes our salespeople more efficient will make our customers happier. One of our bigger customer requests is the ability to place orders at the end of the month.
Currently, we cannot fulfill that request because we do not have enough staff to answer the telephones.

Customers also want better information about order status. They want to track the stages of their orders and monitor shipping status. They want to be notified by e-mail when an order ships.

Currently customers do not receive any notification, because we do not have enough staff to telephone them when orders ship.

We invest a lot of money in building our brand. Whenever our customers have a request that involves our company, I want them to be able to go to the Web site of Fabrikam, Inc to complete the request. Customers should not be redirected to another site with another company's branding for such requests. Our competitors have very successful Web sites, so we must act quickly to ensure that our Web site offers all appropriate functionality.

I manage a staff of four people. They all have experience with ASP, but no experience with ASP.NET. I want at least two of my staff to participate in the development project. My staff will maintain the new application after its initial deployment.

We will host the application ourselves. We are upgrading our network to handle the expected traffic. We want the Web site to be as easy as possible to administer. During peak loads, we must be able to monitor how many customers in each customer category are logged on to the site.
I do not want to modify our existing accounting application and I do not want to add any applications to the mainframe computer.

In four months our shipping partner will begin using an XML Web service to track shipments.
We already have the documentation for the interfaces that our partner will support.

Finance Department
Chief Financial Officer
This project is critical to our business. However, we have only a limited amount of money to spend. We must ensure that the scope of the project will maximize the benefit to our customers

Business Process
Customers place orders for Kites once a month. After an order is placed, it cannot be changed.
Each order is taken over telephone by a salesperson. The salesperson immediately enters the order into the accounting application by using a client computer. The order is then printed and delivered in the shipping department. The shipping department completes and ships the order from existing inventory. The order is the marked as complete.

Many customers have standing orders. A standing order is a list of products that the customer expects to need each month. Currently, the sales department records standing orders on paper.
Customers with standing orders sometimes override their standing order by placing a monthly order.

The accounting application does not store shipping information for an order. When an order is placed, the accounting application considers the order complete for billing purposes.

Questions & Answers

Question: 1.
You are creating the physical design for the customer category data model. For reporting purposes, you want to optimize access to customer category data. You define a Customer table and a Category table. What should you do next?

A. Define three foreign key columns in the Category table, such that each column references a different parent row in the Customer table. Define indexes on the foreign key columns.
B. Define three foreign key columns in the Customer table, such that each column references a different parent row in the Category table. Define indexes on the foreign key columns.
C. Define a foreign key column in the Category table that references the parent row in the Customer table. Define an index on the foreign key column.
D. Define a foreign key column in the Customer table that references the parent row in the Category table. Define an index on the foreign key column.

Answer: D

Explanation:
D: This solution is depicted below

Incorrect Answers
A,B,C: All other designs to link Customer table and Category table are invalid.

Question: 2
You are designing the implementation of the interface to the accounting application. You need to ensure that the new application can communicate with the accounting application. What should you do?

A. Create an XML Web service class
B. Create TcpClient objects
C. Create TcpListener objects
D. Create an XML Web service proxy class by using Wsdl.exe

Answer: B

Explanation:
B: TcpClient provides client connections for TCP network services.

Reference:
TCPClient,
http://msdn.microsoft.com/library/default.asp?url=/library/enus/cpref/html/frlrfsystemnetsocketstcpclientclasstopic.asp
TCPListener,
http://msdn.microsoft.com/library/default.asp?url=/library/enus/cpref/html/frlrfsystemnetsocketstcplistenerclasstopic.asp

Incorrect Answer
A: The accounting application which runs on a mainframe computer only accepts connections over TCP/IP and uses its own binary communication protocol.

C: TcpListener listens for connections from TCP network clients.
This class is from the System.Net.Sockets namespace.
D: The accounting application which runs on a mainframe computer only accepts connections over TCP/IP and uses its own binary communication protocol.

Question: 3
Which module or modules should you include in your solution concept for Fabrikam, Inc? (Choose all that apply)

A. Data store
B. Interface to mainframe computer
C. Web site for customers
D. Feature set for ordering raw materials
E. Web site for salespeople

Answer: A, B, C, D, E

Explanation:
A: Data stores are part of a solution concept as they require designing.
B: An interface to the mainframe computer is needed.
IT Manager: I do not want to modify our existing accounting application and I do not want to add any applications to the mainframe computer.
C, D: The company contracts you to design and develop a solution by using the
Microsoft .NET Framework that will enable customers to place orders over the Internet
E: Sales manager: Our salespeople need access to customer information and order history when they are in the office and when they travel in the field.

Reference:
MOC 2710:

Note:
Solution Concept
The Solution Concept is part of the Vision/Scope Document, which is a deliverable of the Envisioning Phase of the MSF process model.

The Solution Concept outlines the approach the team will take to meet the goals of the project and provides the basis for proceeding to the Planning Phase. After identifying the business problem and defining the vision and scope, the team creates the solution concept that explains in general terms how the team intends to meet the requirements of the project.
The Solution Concept can serve as a business case. Because it focuses only on the concepts and not the details of the solution, it is not very technical.

The Solution Concept includes a conceptual model of the system's software and hardware architectures. The solution concept is the proposed method of addressing the issues identified as being in scope. The team must evaluate the various options and select the one that is the best for its particular situation. A team can then narrow the range of solution concept options to a few alternatives.

Question: 4
You are planning the deployment of the new application. You need to decide how to migrate customer data on the shortest possible time. What should you do?

A. Load the customer data into the new application from Active Directory

B. Create a Data Transformation Services package to load the customer data into the new application from the mainframe computer
C. Create an interface to the accounting application. Always access customer data from the accounting application
D. Create a Data Transformation Services package to load the customer data into the new application from the customer category data

Answer: B

Explanation:
B: Customer data may have to be expanded to include new field, such as shipping status.
The existing customer data on the mainframe should not be modified otherwise there would be a need to make modifications to the Accounting Application on the mainframe.

Incorrect Answers
A: Incorrect
C: There is no data migration at all. There is only two TCP/IP channels to communicate.
D: Customer data is located in the accounting application

Question: 5
You are writing a document that identifies potential project risks. Which business constraint poses the greatest potential risk?

A. The solution must be hosted by Fabrikam, Inc
B. Testing and deployment of the customer Web site must be complete in six months
C. The shipping partner will deploy the XML Web service in four months
D. All customers will try to place orders at the end of the month

Answer: D

Question: 6
You are validating your physical design. You need to ensure that the design maps to the categorization requirements for customer pricing. Which member should you include in the design?

A. A GetPrice method of a Product class with no parameters
B. A Price property of a Product class
C. A Price property of a Customer class
D. A GetPrice method of a Product class with a single Customer Object parameter

Answer: D

Explanation:
D: By passing the Customer Object as a parameter to the GetPrice method of a product class, we can assign a different price based on the customer type.

Incorrect Answers
A,B,C: All other designs will not allow different customers to have different prices for a product.

Question: 7
You are writing a list of integration requirements for your solution. Which requirement or requirements should you include? (Choose all that apply)

A. Order data must be read from the accounting application

B. Shipment tracking must be read from an XML Web service
C. Customers must be redirected to another Web site to track shipments
D. Customers must be able to place orders by using an XML Web service
E. Order data must be written to the accounting application
F. Order data must be e-mailed to the salespeople

Answer: A, B, E

Explanation:
A: The salespeople need access to customer information and order history Under the old system, the staff needs to find each printed order and then report the shipping status to the customer. The new system should allow them to access order data.
B: This is a requirement.
Manufacturing Manager: I want a solution that tracks my raw material inventory and helps me order raw materials.
IT Manager: Customers also want better information about order status. They want to track the stages of their orders and monitor shipping status.
E: The new application should support this action of the old system. "The salesperson immediately enters the order into the accounting application by using a client computer"

Incorrect Answers
C: Customers are not to be redirected to any other websites
IT Manager: Customers should not be redirected to another site with another company's branding for such requests.
D: Customers must be able to place orders by using a Web Application.
Background: The company contracts you to design and develop a solution by using the Microsoft .NET Framework that will enable customers to place orders over the Internet.
The solution will include a new customer Web site.
F: It is the customers who want to be notified by e-mail when an order ships.

Question: 8
You need to recommend standard development processes for your solution. Your recommendations must assist the development team in learning to use the Microsoft .NET Framework as quickly as possible. Which process or processes should you recommend?(Choose all that apply)

A. Create an automated build process
B. Install error-tracking software
C. Ensure that all assemblies pass unit testing
D. Permit individual developers to use any Microsoft .NET language
E. Hold regular code reviews

Answer: C, E

Incorrect answers
A, B: These would not help.
D: Individual developers not should be given too much freedom to decide on what language to use as this may result in communication problems.

Question: 9
You need to create a physical design that meets the monitoring requirements of Fabrikam, INC. What should you do?

A. Create and use a new event log to record each customer logon event

B. Use the built-in ASP.NET performance counters to monitor application load
C. Use the Trace class to record each customer logon event
D. Create and use new NumberOfItems performance counters to monitor active customer sessions

Answer: D

Explanation
D: The requirement stated by the IT Manager can be fulfilled using this solution.
Performance Monitor is suited for this.
IT Manager: During peak loads, we must be able to monitor how many customers in each customer category are logged on to the site.

Incorrect Answers
A: Not a suitable method.
B: We are not interested in application load
C: We are not interested in tracing.

Question: 10
You are writing the functional specification for your solution. You must include the customer pricing requirements. Which requirement or requirements should you include? (Choose all that apply)

A. Pricing data must be encrypted
B. Each user must be uniquely identified
C. Content must be personalized by user
D. Order data must be read from the accounting application

Answer: B, C

Explanation:
B: To provide categorized pricing, we need to uniquely identify each customer.
C: Content is personalized based on customers.

Note:
Sales Manager: We use three categories, in ascending order of volume, they are Bronze, Silver or Gold. Customer in higher categories pay lower prices. We currently store category pricing on paper. I want to store category pricing as part of the new solution. I want also the ability to change pricing every quarter. Each customer must be able to see only its own pricing information. Customers must not learn that different pricing categories exist.

Incorrect Answers
A: We are concerned with protecting pricing categories, not price data. We only need to allow the customer to view their own their prices.
D: The accounting application is only used to manage the customer billing process. This has nothing to do with including the customer pricing requirements.

Question: 11
You are writing the technical specification for your solution. When a customer uses the new Web site to place an order, the new Web application must submit the order data to the accounting application. You need to specify how the data will be submitted. Which technology should you use?

A. Transactional serviced component

B. .NET Remoting object
C. Queued component
D. XML Web service

Answer: C

Explanation:
Our chosen solution shall be queued components implemented with .Net Remoting.
Our solution must use a maximum of two concurrent TCP/IP connections.

Our constraint is stated here: The accounting application runs on a mainframe computer. This application accepts connections over TCP/IP and it uses its own binary communication protocol. It responds to requests slowly and supports a maximum of two concurrent TCP/IP connections. It cannot store information about shipping status.
The company will continue to use the accounting application.

Queued Components (QC) provide an easy and safe way to implement background processing. Easy because a Queued Component can be called much like any other object, and the fact that the processing occurs asynchronously in the background is transparent. Safe because QC supports automatic retry functionality, so if the processing fails, it is automatically retried several times.

Reference:
Working with Queued Components,
http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnadvnet/html/vbnet10222002.asp

Incorrect Answers
A,B,D: All the other suggestions will not be able to use a maximum of two concurrent TCP/IP connections reliably.

Question: 12
You need to ensure that the security implementation for the customer Web site meets the requirements of Fabrikam, Inc. Which strategy should you use?

A. Use SSL to secure the logon page and customer order pages
B. Encrypt the customer category data and the product pricing data in the database
C. Encrypt only the customer category data in the database
D. Use SSL to secure only the logon page

Answer: A

Explanation:
The order pages must be secured as well.

Question: 13
You need to select a user authentication mechanism for the new customer Web site. Which mechanism should you use?

A. Basic Authentication
B. ASP.NET Forms authentication
C. Integrated authentication
D. ASP.NET Windows authentication

Answer: B

Explanation:
We will need to create a custom login screen for customers.

Note:
ASP.NET Authentication Providers and IIS Security
ASP.NET implements authentication using authentication providers, which are code modules that verify credentials and implement other security functionality such as cookie generation. ASP.NET supports the following three authentication providers: Forms Authentication. Using this provider causes unauthenticated requests to be redirected to a specified HTML form using client side redirection. The user can then supply logon credentials, and post the form back to the server. If the application authenticates the request (using application-specific logic), ASP.NET issues a cookie that contains the credentials or a key for reacquiring the client identity. Subsequent requests are issued with the cookie in the request headers, which means that subsequent authentications are unnecessary.

• Passport Authentication. This is a centralized authentication service provided by Microsoft that offers a single logon facility and membership services for participating sites. ASP.NET, in conjunction with the Microsoft® Passport software development kit (SDK), provides similar functionality as Forms Authentication to Passport users.

• Windows Authentication. This provider utilizes the authentication capabilities of IIS. After IIS completes its authentication, ASP.NET uses the authenticated identity's token to authorize access.

Authentication using non-Windows accounts
If you are planning to authenticate users at the application level, and the users do not have Windows accounts, you will typically configure IIS to use Anonymous authentication. In this configuration, consider the following .NET authentication modules:
None: Use when you are not authenticating users at all, or developing custom uthentication code.

• Forms: Use when you want to provide users with a logon page.

• Passport: Use when you are using Passport services.

Reference:
http://msdn.microsoft.com/library/en-us/dnbda/html/authaspdotnet.asp

Incorrect Answers
A. This will not work. We need every user identified.
C. The customers are not users in the network. Customers should be able to register themselves via web and login through a login form.

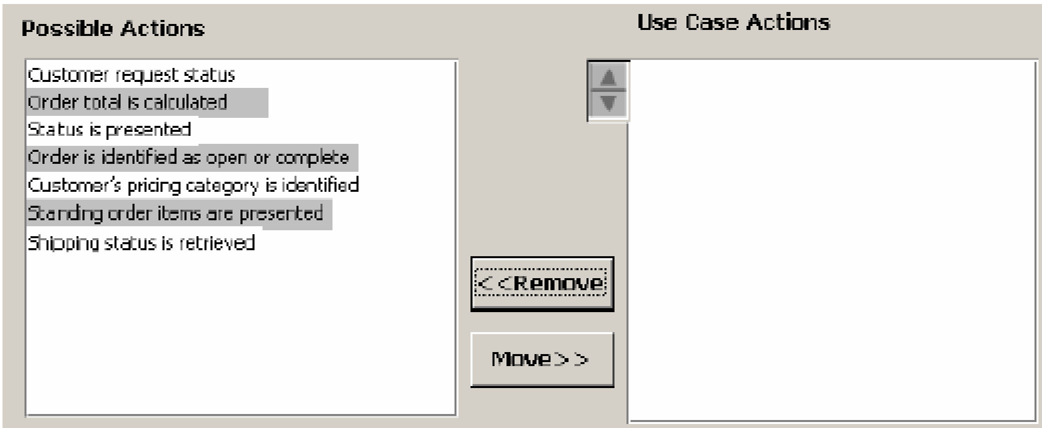
Question: 14
You are writing the conceptual design for your solution. The Sales Manager sends you a spreadsheet containing sample data. Which new fact should you add to your conceptual design ?

A. Standing orders are monthly, quarterly or annually
B. Customer has one standing order
C. Customer has a unique ID
D. Customer has several standing orders

Answer: C

Explanation:
Incorrect Answers
A: Standing orders are defined as: A standing order is a list of products that the customer expects to need *each month*
B: Customer may or may not have one standing order: It is stated that many customers have standing orders.
D: Customer may have only one standing order

Question: 15
You are creating a use case named customer requests the status of an order. Identify the actions that should be part of this use case .Move the actions from the possible actions pane to the use case actions pane and arrange them in the appropriate order.



Answer:
A. Customer request status
B. Order is identified as open or complete
C. Shipping status is retrieved
D. Status is presented

Explanation:
Business Process
1a: Customers with standing orders sometimes override their standing order by placing a monthly order. – OR –
1b: Customers place orders for Kites once a month.
Business Rule: After an order is placed, it cannot be changed.
2: The order is still open until the shipping department completes and ships the order from existing inventory.
It is stated: The shipping department completes and ships the order from existing inventory. The order is then marked as complete.
3: The order is then marked as complete.
4: The shipping department completes and ships the order from existing inventory.

Incorrect Answer
• Standing Order Items are presented: We are interested in the order status only
• Order Total is calculated: We are interested in the order status only
• Customer's pricing category is identified: We are interested in the order status only
• Shipping Status is retrieved: This is not part of the use case

Case Study #5, Northwind Traders

Background
Northwind Traders operates retail stores in 16 countries worldwide. The company sells a wide variety of furniture, dining and kitchen goods, bath end bedding accessories and other specialty items for the home. Products are delivered to retail stores from regional distribution centers.

The company plans to offer its products in an online store, which will also be serviced by the regional distribution centers. The company contracts you to design and implement a Microsoft .NET solution architecture for the online store.

The new online services will be made available in three cities in a pilot implementation. If the pilot is successful, the company will deploy the online store worldwide over the next 13 months. The worldwide deployment must be completed without any additional development effort.

Existing IT Environment
The existing corporate network includes both Microsoft Windows NT Server 4.0 computers and Windows 2000 Server computers in a single domain. Employees use desktop computers that run Windows XP Professional and Microsoft Office XP. The human resources department has its own intranet, which uses Internet Information Services (IIS) and Microsoft SQL Server 2000. Product inventory functions are currently performed by a mainframe computer. Users connect to the mainframe computer by using terminal emulation software on their desktop computers. The regional distribution centers are connected to the main office by a dedicated T1 frame relay link. Every night, the distribution centers update the inventory data on the mainframe computer.

Interviews
IT Department
IT Manager
I manage a staff of 50 trained technicians who are located around the world. We employ two technicians at the main office in each country where we do business. The technicians spend most of their time troubleshooting computers that stop responding. We want a replacement for the terminal emulation software that we currently use. The new software should still permit us to use the mainframe computer to print reports. It should also provide secure access to the mainframe computer from the Internet. The development and deployment of the mainframe solutions should occur during the pilot implementation of the online store.

Lead Developer
Five developers work on my staff. They are responsible for maintaining an inventory management application on the mainframe computer. They also maintain the human resources intranet. They are proficient in Microsoft Visual Basic Scripting Edition (VBScript) and ASP. They can also use several mainframe development languages.

Finance Department
Chief Financial Officer
We want to be able to update product information more frequently. Currently, updating the product information from our vendors is a time-consuming process. Replacing this process is essential if we want to remain competitive in the marketplace. We will continue to perform inventory reporting from the mainframe computer.

Business Stakeholders
Business Manager
As a global company, we have some unique challenges. We must be able to present our online store in a way that is appropriate to each locale in which it is viewed. In particular, we need to display currencies and calendars in the format that is most familiar in each locale.

Currently, we use an international company to perform credit card verification for our retail stores. We want to use the same company's XML Web Service to perform verification for our new online store. One key goal is to protect the confidentiality of credit card information during online transactions.

Marketing manager
Currently, we analyze customer spending by examining paper reports that are generated each month by the mainframe computer. These reports provide limited data and we cannot perform any additional analysis of the data. Our online store will require us to analyze data that relates to virtual shopping carts. Analyses must be performed several times each month in a variety of ways, such as by customers, by promotion, by geographical location and by time period.

Users
Inventory Manager
The terminal emulation software is slow and difficult to use. It often causes our computers to stop responding. In addition, we need to remember several different user names and passwords to access our desktop computers and to use the mainframe computer. This requirement is difficult and frustrating.

Business Process
Northwind Traders obtains products from 15 different vendors. Once a month, a magnetic tape is sent by each of the vendors to the main office of Northwind Traders. These tapes are used to update the product data in the mainframe computer. The tapes include data relating to new products and discontinued products. They also include pricing changes for existing products. Each tape provides product names and descriptions in several different languages. Each vendor uses a different format for the data on tape.

Questions & Answers

Question: 1.
You are establishing a new development environment for the online store application.
You are using source code control (SCC) software. Every night, you must perform software builds that use the source code currently in SCC. Which action or actions should you take? (Choose all that apply)

A. Copy the most current source code from SCC onto the lead developer's computer.
B. Check all source code into SCC every night
C. Check all source code into SCC after unit testing
D. Copy the most current source code from SCC onto an isolated build computer

Answer: C, D

Explanation:
C. You should only check in source code in SCC after it has been tested.
D. As the question states, you must perform software builds that use the source currently in SCC, hence it is a good practice to copy the source code onto an isolated build computer.

Question: 2
You are creating the data model for a table named Product. This table will contain data relating to products sold by Northwind Traders. Each product can belong to more than one category. Categories include furniture, bedding, bath accessories and kitchen goods.
Which entity or entities should you model?

A. A Product entity that contains attributes for three Category names and descriptions
B. A Product entity and a Category entity that are related by a ProductID attribute
C. A Product entity and a Category entity that are related by a ProductID attribute and a CategoryID attribute
D. A Product entity, a Category entity and a ProductCategory entity that are related by a ProductID attribute and a CategoryID attribute

Answer: D

Explanation:
There is a Many-to-Many relationship between Product and Category but some Relational DBMS (including SQL Server) are not able to model Many-to-Many relations. This would require an additional ProductCategory entity.

Question: 3
You want to establish development process that will speed the detection of development errors. Which two processes should you recommend?
(Each correct answer presents part of the solution)

A. Daily integration testing
B. Daily validation of application build
C. Daily build of application code
D. Daily system testing
E. Daily code reviews

Answer: B, C

Explanation:
Daily build of application code and B. Daily validation of application build would be two recommended process to speed the detection of development errors. Reference: Module 1 in MOC2710

Note:
MSF recommends the preparation of frequent builds of the components of a solution for testing and review. This approach applies to developing code in addition to builds of hardware and software components. By creating daily builds, you can ensure that you understand the stability of the total solution and have accumulated ample test data before releasing the solution.

Using the daily build approach is particularly effective for larger, complex projects that are divided into smaller subsystems. Separate teams develop and test these subsystems and then consolidate them into a single solution. Developers complete core functionality of the solution or product first, and add additional features later. Development and testing occur continuously and simultaneously. Creating daily builds ensures that all code is compatible and allows the various sub-teams to continue their development and testing iterations.

Incorrect Answers:
A: Requires a lot of effort.
D: Impractical.
E: Impractical.

Question: 4
The online store application needs to be localized. You plan to use the localization support in the Microsoft .NET Framework. Which localization feature or features are feasible?
(Choose all that apply)

A. Support multiple character sets (MBCS)
B. Support right-to-left mirroring of Web pages
C. Automatically translate text for different cultures
D. Automatically convert currency values for different cultures.
E. Support localized resources for different cultures
F. Automatically format currency for different cultures

Answer: B, E, F

Explanation:
B: switch to HTML view. Modify the HTML tag like
<HTML dir="rtl">this can even be done partially, for certain controls.
E, F: Currency formatting and localized resources are supported.

Incorrect answers:
A: This is a C++ feature.
C, D: The .NET Framework does not support text translation or currency conversion.
This however, can be implemented by XML Web Services.

Reference:
http://msdn.microsoft.com/library/default.asp?url=/library/en-us/vsent7/html/vxconlanguageissues.asp

Question: 5

You must enable the marketing department to analyze data that relates to virtual shopping carts. Which action or actions should you take? (Choose all that apply)

A. Create an OLAP interface to the mainframe computer to enable the marketing department to perform its analisys
B. Create OLAP cubes by using Analysis Services
C. Use Microsoft Excel and Pivot Table Services to enable the marketing department to perform its analysis
D. Use Data Transformation Services (DTS) to extract customer demographic information and order information to a Microsoft SQL Server computer at the main office
E. Use Microsoft SQL Server Replication to copy the customer demographic information and order information to a SQL Server computer at the main office

Answer: B, C, D

Explanation:
B. To use Pivot tables, you need a connection to an OLAP Cube which is provided by Analysis Servers in Microsoft SQL Server.
C. Employee desktop computers have Office XP installed, so they can use Microsoft Excel and Pivot Table Services to perform its analysis.
D. You need to import the data into Microsoft SQL Server using DTS.

Reference:
OLAP Cubes, http://msdn.microsoft.com/library/default.asp?url=/library/en-us/comsrv2k/htm/cs_mmc_datawarehouse_sgee.asp
OLAP, DataGrid, and Ann Landers,
http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnaskdr/html/askgui07022002.asp
Processing Objects Using Data Transformation Services,
http://msdn.microsoft.com/library/default.asp?url=/library/en-us/olapdmad/agautomating_7rjn.asp

Incorrect answers:
A. The DBMS on the mainframe computer probably does not support OLAP Cubes.
E. Replication is not used to copy data from the mainframe to SQL Server.

Question: 6
You need to identify the primary actors who will participate in the use cases for the online store application. Which type of actor should you identify?

A. delivery truck driver at a distribution center
B. Inventory management clerk at a distribution center
C. Customer
D. Accountant

Answer: C

Explanation:
The purpose of the online store application is to serve customers.

Reference:
http://www.objectsbydesign.com/books/larman_notes/2-RequirementsModeling.html

Note:

An Actor:
• Is something with behavior such as person, computer system or organization.
• Actors are classified as:
o Primary actor has user goals fulfilled through using services of the system under development.
o Supporting actor provides a service to the system under development.
o Offstage actor has "somehow" an interest in the behavior of the use case.
• Actor is a role that a user plays with respect to the system.
• When dealing with actors is important to think about roles rather than people or job titles.
Actors carry out use cases.
• A single actor may perform many use cases and many roles.

Question: 7
You need to deploy a new Web application that will enable employees to access the ainframe computer. You plan to use the services provided by Microsoft Host ntegration Server.
What should you do?

A. Add an OBJECT tag with a CODEBASE attribute to the Web page for the ActiveX controls for Host Integration Server
B. Create a Windows Installer package and install the package on the desktop computers used by the employees
C. Use a group policy object (GPO) to advertise the application on the Start menu of the desktop computers used by the employees
D. Use XCOPY to distribute the components to the desktop computers used by the employees

Answer: A

Incorrect Answers:
B: This is a Web-application.
C: Since this is a Web-application, the OBJECT tag will be more appropriate.
D: This is a Web-application

Question: 8
You are creating the logical design for the online store application. You are retrieving a use case named “Customer places an order item in the virtual shopping cart”. Which object or objects should you include to support the use case?(Choose all that apply)

A. Transaction object
B. Virtual shopping cart object
C. Order item object
D. Customer object

Answer: B, C, D

Explanation:
The use case clearly specifies nouns (objects) that should be included to support the use case. This implies Customer, Order Item and Virtual Shopping cart as objects.

Incorrect answers:
A. Transaction is not mentioned in the use case.

Question: 9
The company’s inventory management application runs on a mainframe computer. You are creating the functional specification for a new Web application that will provide access to this

application. You propose the use of Microsoft Host Integration Server. Which requirement or requirements will Host Integration Server meet? (Choose all that apply.)

A. Web-based access to the inventory management application
B. Single user logon to a desktop computer and the mainframe computer
C. Secure connectivity through the internet
D. Ability to print mainframe computer reports.

Answer: A, B, C, D

Explanation:
A. Host Integration Server provides ActiveX-enabled 3270 and 5250 clients.
B. Host Integration Server provides Single User Log-On which streamline and reduces management burden by automatically and simultaneously authenticating a user on both the Windows NT domain and on the host system.
C. Host Integration Server provides low-cost tunneled connectivity through the Internet for client-to-server and network-to-network VPN features.
D. Host Integration Server 2000 has a Host Print Service which provides server-based 3270 and 5250 print emulation, allowing mainframe and AS/400 applications to print to a LAN printer supported by Windows 2000 and Windows NT Servers.

Reference:
Microsoft Host Integration Server Product Overview and Features
Overview, http://www.microsoft.com/hiserver/

Question: 10
After the online store is implemented, vendors will use data files instead of tape to deliver product update data. However, each vendor uses a different file format. Input files need to be processed to produce output files in a standard format. Output files will be submitted to the mainframe computer. You need to recommend a flexible solution for file processing. What should you do?

A. Create a Windows service that periodically examines a folder for new files and processes them.
B. Use Microsoft Host Integration Server
C. Create a console application
D. Use Microsoft Biz Talk Server

Answer: D

Explanation:
Microsoft Biz Talk Server is a more appropriate answer since it is able to transform various file formats into one specific file format. It has support for various document types. It has Data and transformation services and the application integration features in BizTalk Server can provide businesses with the tools they need to achieve a unified view of data and applications both within the organization and business partners.

Reference:
http://www.microsoft.com/biztalk/evaluation/features/default.asp
http://www.microsoft.com/biztalk/evaluation/overview/default.asp.

Question: 11
You create a product fact diagram to explain your solution. Which fact or facts does the diagram show? (Choose all that apply)

A. A unique index will be created over the Product role
B. Each Product has at most one vendor
C. Every product is identified y one distinct ProductID
D. It is possible that some Products have more than one Vendor
E. A unique index will be created over the vendor role

Answer: B, C

Question: 12
You are creating the logical design for customer profiles. These profiles contain data that requires the highest possible level of security. Which strategy or strategies should you recommend? (choose all that apply)

A. Log all failed customer logon attempts
B. Lock out a customer after a predefined number of failed logon attempts.
C. Encrypt all confidential customer information
D. Authenticate each customer by using a logon process

Answer: B, C, D

Explanation:
We can recommend the above to implement the highest level of security for the solution. This is part of the STRIDE model.
The simplest way to apply the STRIDE model to your application is to consider how each of the threats in the model affects each Commerce Server component and each of its connections or relationships with other application components. Essentially, you look at each part of the application and determine whether any threats that fall into the S, T, R, I, D,or E categories above exist for that component or process. Most parts will have numerous threats, and it is important that you record all of them.

Following are some sample threats to a Web site. Note that this is a highly abridged list.
In a two-hour threat-analysis meeting you will likely be able to identify 20 to 40 security threats.

• Threat #1 A malicious user views or tampers with personal profile data en route from the Web server to the client or from the client to the Web server. (Tampering with data/Information disclosure)

• Threat #2 A malicious user views or tampers with personal profile data en route from the Web server to the COM component or from the component to the Web server. (Tampering with data/Information disclosure)

• Threat #3 A malicious user accesses or tampers with the profile data directly in the database. (Tampering with data/Information disclosure)

• Threat #4 A malicious user views the Lightweight Directory Access Protocol
(LDAP) authentication packets and learns how to reply to them so that he can act "on behalf of" the user. (Spoofing identity/Information disclosure/Elevation of privilege [if the authentication data used is that of an administrator])

• Threat #5 A malicious user defaces the Web server by changing one or more Web pages. (Tampering with data)

• Threat #6 An attacker denies access to the profile database server computer by flooding it with TCP/IP packets. (DoS)

• Threat #7 An attacker deletes or modifies the audit logs. (Tampering with data/Repudiation)

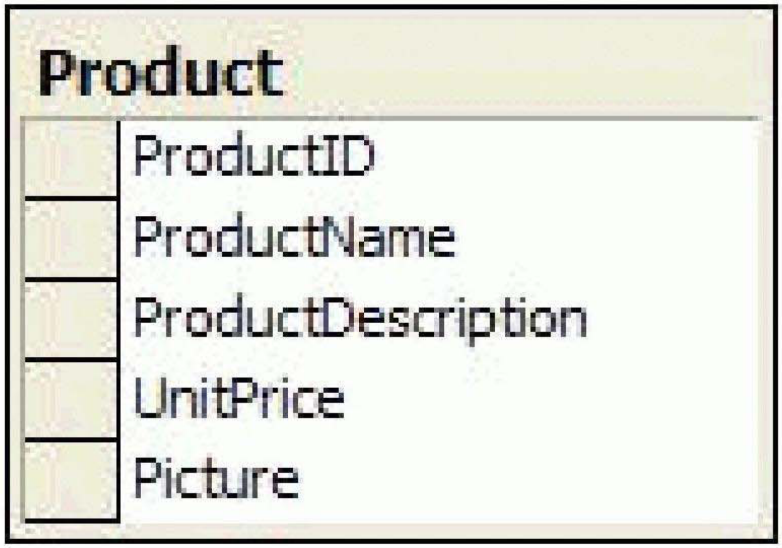
• Threat #8 An attacker places his own Web server on the network after killing the real Web server with a distributed DoS attack. (Spoofing identity; in addition, a particularly malicious user could instigate all threat categories by stealing passwords or other authentication data, deleting data, and so on.)

Reference:
Commerce Server 2002, Applying STRIDE

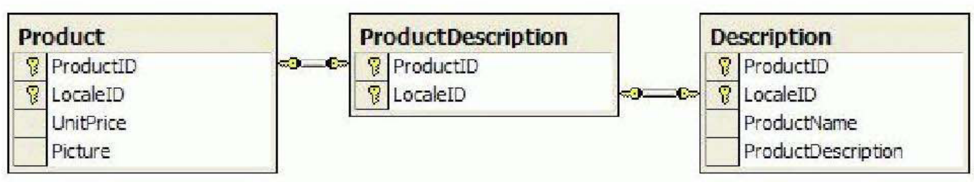
Incorrect answers:
A. Logging alone is not effective, however no remedial action is specified. We should be able to ban certain IP addresses based on failed customer logon attempts.

Question: 13
You are creating the physical design for a database table that will contain product information. Your design must support multiple translations of the Product Name entity and the Product Description entity. You evaluate four different designs. Which design should you use?
Incomplete. Will be fixed in later versions.

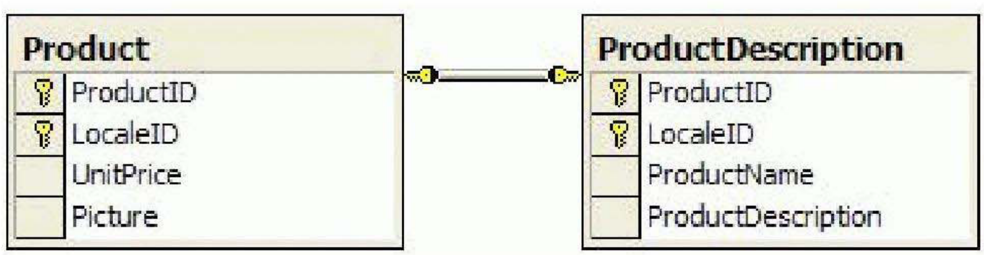
DiagramA



DiagramB



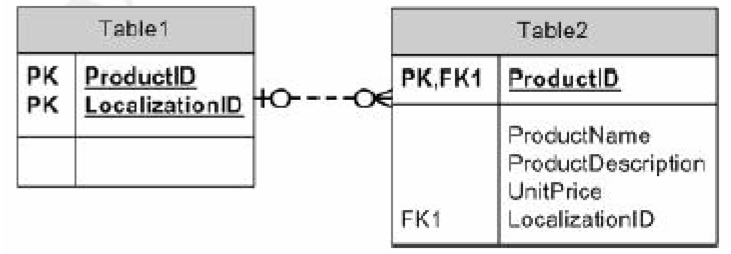
DiagramC



DiagramD

A. Design A.
B. Design B.
C. Design C.
D. Design D.

Answer: See diagram below:

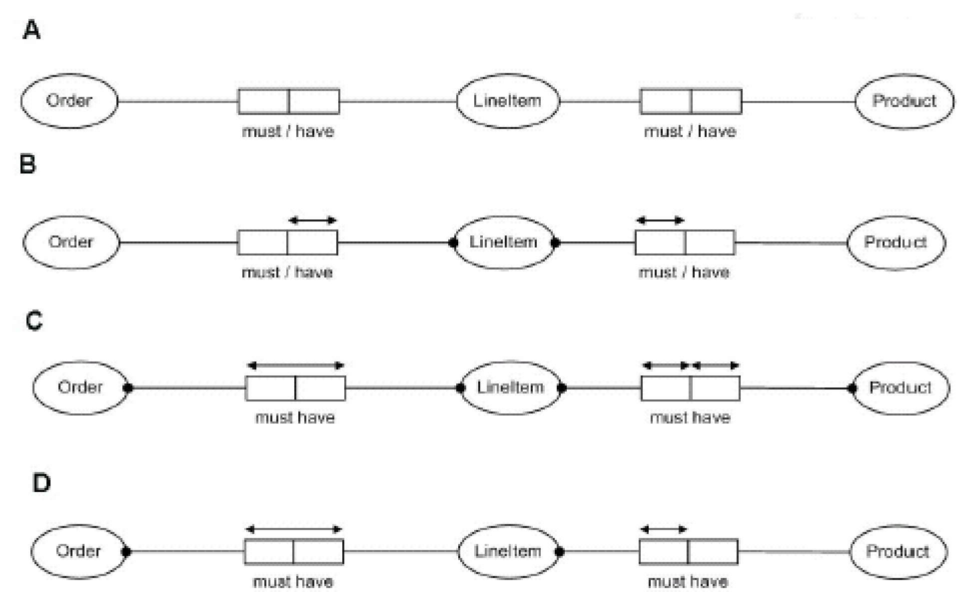


Explanation:
We have one Product definition with multiple translations and unit prices.

Question: 14
Your development team is creating the conceptual model of an order. You need to comply with the following business rules.

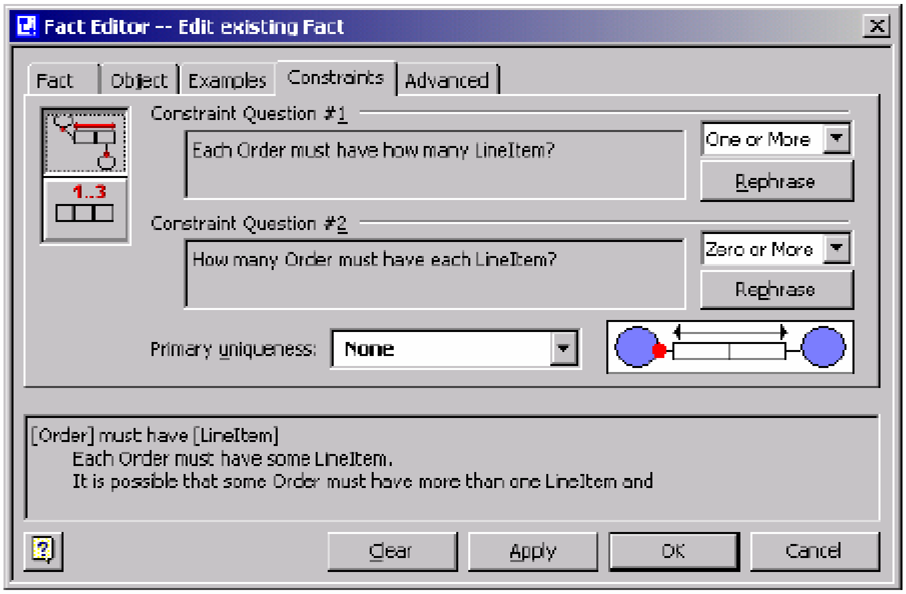
- Each order must have at least one LineItem
- Each LineItem must have only one product

Your team proposes four different Object Role Modeling (ORM) diagrams. Which diagram should you use?

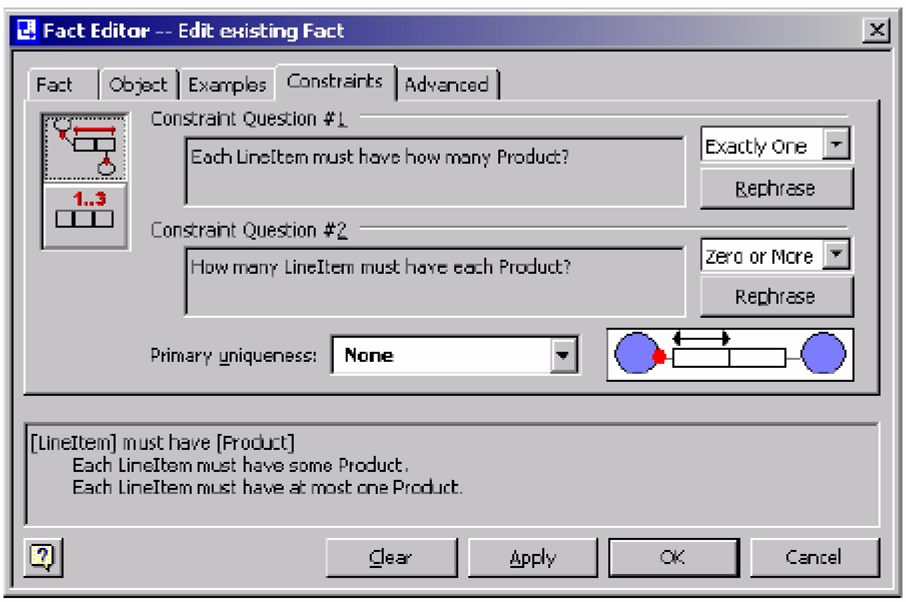


Answer: D

Explanation:
See below:
This is the explanation for the answer using Visio:

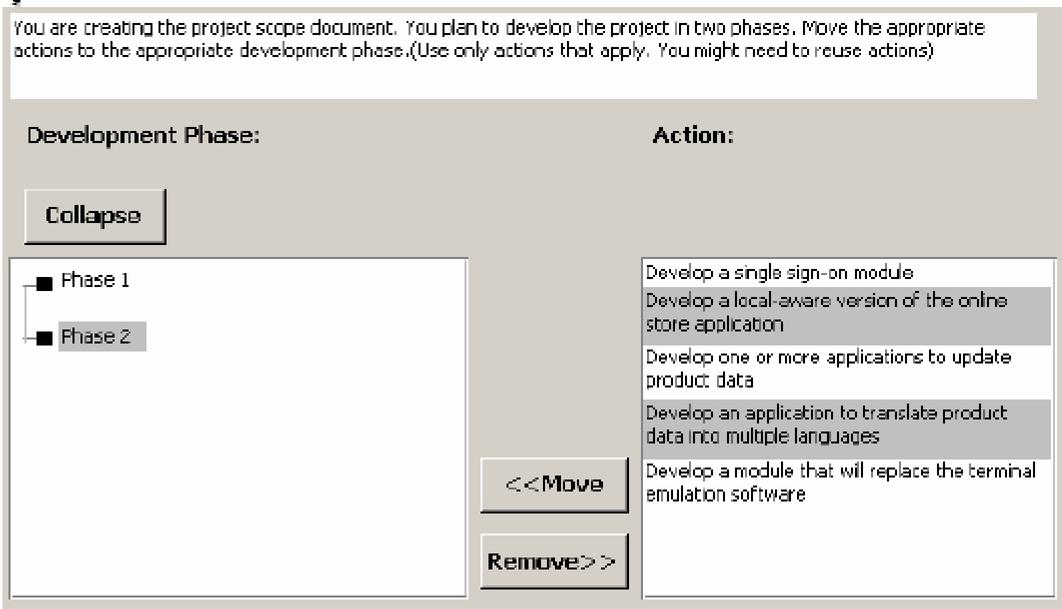


Fact Editor -- Edit existing Fact
Fact
Object
Examples
Constraints
Advanced
Constraint Question #1
Each Order must have how many LineItem?
One or More
Rephrase
1..3
Constraint Question #2
How many Order must have each LineItem?
Zero or More
Rephrase
Primary uniqueness:
None
[Order] must have [LineItem]
Each Order must have some LineItem.
It is possible that some Order must have more than one LineItem and
Clear
Apply
OK
Cancel



Fact Editor -- Edit existing Fact
Fact
Object
Examples
Constraints
Advanced
Constraint Question #1
Each LineItem must have how many Product?
Exactly One
Rephrase
1..3
Constraint Question #2
How many LineItem must have each Product?
Zero or More
Rephrase
Primary uniqueness:
None
[LineItem] must have [Product]
Each LineItem must have some Product.
Each LineItem must have at most one Product.
Clear
Apply
OK
Cancel

Question: 15



Answer: See table below.

Development Phase	Action
Phase 1	Develop a single sign-on module. Develop one or more applications to update product data. Develop a module that will replace the terminal emulation software.
Phase 2	Develop a local-aware version of the online store application.

Explanation:
We have to optimize communication with the mainframe since it gives a lot of problems and has a high priority Incorrect answers:
Develop an application to translate product data into multiple languages: This is not needed. Product names and descriptions are already provided in the vender tapes, so there is no need to translate them. Development Phase Action

Phase 1 Develop a single sign-on module.
Develop one or more applications to update product data.
Develop a module that will replace the terminal emulation software.
Phase 2 Develop a local-aware version of the online store application.

Case Study #6, School of Fine Art

Background
The School of Fine Art is a large regional university with more than 45,000 students. Currently, the university manages course scheduling and course registration by using applications that run on an AS/400 computer. However, this solution is no longer adequate. The university has a long-term goal of migrating away from all of its existing AS/400 applications. You are contracted for a short term goal. You will replicate and extend the existing functionality course scheduling and course registration in a new Windows-based solution. Your solution will consist of a new administrative application and associated user applications. You will develop the new application by using the Microsoft .Net Framework and Microsoft SQL Server

Existing IT Environment
The university uses two AS/400 applications to provide the existing functionality for scheduling and registration:

- A scheduling application is used by administrators, academic counselors and professors to establish and review course schedules for the upcoming academic term
- A registration application is used by students to register for the upcoming academic term

Both of these applications use a DB2 database named REG2. This database contains all current information relating to students, professors, course schedules and registrations.
Both of these applications can be accessed by using dedicated terminals located on campus, or by using terminal emulation software on computers that are connected to the university network. Both applications will be replaced as part of the new solution
The university has two additional AS/400 applications, which were developed by a single software vendor:

- A grading application is used by professors to assign course grades to students at the end of each academic term
- A transcript application is used by administrators to generate official student transcripts

The grading application and the transcript application use a DB2 database named TRANS2.
This database contains records of all courses completed by each student and all grades received by each student. TRANS2 and the associated applications will not be replaced. Four registration periods occur each year. Each registration period begins one month before the beginning of an academic term. Registration closes when the term begins. A summary of student enrolment data is then exported by a batch export operation from REG2 to TRANS2.

Interviews
Business Stakeholders
Director, Department of Registrars
We want to make it impossible for students with overdue tuition accounts to register for courses.

Project Manager
Currently, students must wait in long lines to use dedicated terminals or on-campus computers during each registration period. We want to enable students to register over the Internet. In addition, we want to enable professors, academic counselors and administrators to access the new administrative application over the Internet.

Users
Director, Department of South Asian Art
Our existing scheduling application lets us specify prerequisite courses only in a very simple way. We can specify prerequisite relationships of the following type: 'ARTHI 101 and ARTHI 202 are

required before registering for ARTHI 303'. However, we need to be able to specify more complex prerequisite relationships, such as 'ARTHI 101 and ARTHI 202 are required, or ARTHI 301 is required, before registering for ARTHI 303'. Currently, a student cannot register for a course if it is fully enrolled or if the student has not completed the prerequisites. The professor who currently teaches a course section can issue various waivers. One type of waiver authorizes a student to register in a course section that is fully enrolled. Another type authorizes a student to register for a course section without completing the prerequisites.

Currently a professor issues a waiver by signing a paper form and sending it to the IT department. However, we want the new administrative application to enable professors to issue waivers online. After a professor issues an online waiver, the student should be able to register for the appropriate course.

Academic Counselors
If a student transfers from another university, the student's academic history will not exist in TRANS2. This omission can cause problems with prerequisite requirements. Academic counselors must be able to use the new administrative application to issue prerequisite waivers on the basis of our own evaluation of a student's academic history. When an academic counselor issues a waiver, it must apply to all sections of a course, except for sections that are fully enrolled.

IT Department
IT Manager
High availability is critical to the success of this solution. We can have no single point of failure. For maximum scalability and flexibility, we do not want any Web server session affinity.

AS/400 Application Support Engineer
Initially, the IT department will generate an XML file to populate the new SQL Server database from REG2.

At the end of each registration period, we must be able to import into TRANS2 a list of all courses for which a student is registered. We need this information in an XML file format. All information about courses that students have already completed must be stored only in TRANS2.
At the end of each registration period, all course registration information for students should be archived and then removed from the SQL Server database.
We have the Microsoft OLE DB Provider for DB2, which will enable access to student transcript data from TRANS2

Accounting Application Support Engineer
Each course is worth between one and six credits. Tuition for each term is calculated on the basis of the total number of credits for which a student is registered during that term.

Information about student tuition accounts is stored in an Oracle database named Accounting.
This database is located on the same intranet that the new solution will use. Whenever a student adds or drops a course, the new student registration application must update the credit information for the student in Accounting. The credit data in Accounting must reflect the total number of credits for which the student is registered.

We can also provide the SQL statements needed to update credit data and to establish whether a student's tuition account is past due. We have an OLE DB provider for Oracle and Oracle supports the Microsoft Distributed Transaction Coordinator (MS DTC).

Business Process
Courses and Course Sections

The university offers thousands of different courses each year. Each course has a name (for example, Introduction to Art History), a department code (for example, ARTHI), a three-digit course number (for example, 101) and a number of credits(for example, 5). Each course is taught in one or more sections.

However, not all courses are taught every term. Zero, one, or more than one section of any course might be offered in any given term. Therefore, the professor, section identifier, location, meeting time and maximum student count are properties of a section of the course rather than of the course itself.

Questions & Answers

Question: 1.
The Web application for the student registration includes business logic that queries TRANS2. The purpose of the query is to establish whether a student satisfies the prerequisite requirements for a course. Preliminary testing shows that the query is slow. To optimize access to transcript data, you need to minimize the number of these queries. What should you do?

A. Store the student's transcript data in the ASP.NET Session object. Use the default session state configuration
B. Cache the students transcript data in a session cookie.
C. Use ASP.NET page caching
D. Store the student's transcript data in the ASP.NET Session object. Configure ASP.NET to store session state in a Microsoft SQL Server database

Answer: D

Explanation:
This is the best alternative for the fastest queries with scalability and flexibility.
For applications that rely extensively upon external resources, consider enabling Web gardening on multiprocessor computers. The ASP.NET process model helps enable scalability on multiprocessor computers by distributing work to several processes, one per CPU, each with processor affinity set to its CPU. This technique is called Web gardening. If your application uses a slow database server or calls COM objects that have external dependencies, to name only a couple of possibilities, it can be beneficial to enable Web gardening for your application. However, you should test how well your application performs in a Web garden before your decide to enable this.

Server-Side Method State Management Summary
The following table summarizes server-side state management options and when you should consider using them.

Method	Use when
Application state	You are storing infrequently changed, global information that is used by many users, and security is not an issue. Do not store large quantities of information in application state.
Session state	You are storing short-lived information that is specific to an individual session, and security is an issue. Do not store large quantities of information in session state. Be aware that a session state object will be created and maintained for the lifetime of every session in your application. In applications hosting many users, this can occupy significant server resources and affect scalability.
Database support	You are storing large amounts of information, managing transactions, or the information must survive application and session restarts. Data mining is a concern, and security is an issue.

Note:
If the process is not long-running and does not need to be recovered in case of a problem, you should persist the state in memory. For user interfaces created for rich clients, you might want to keep the state in memory. For Web applications, you can choose to store the user process state in the Session object of ASP.NET. If you are running in a server farm, you should store the session in a central state server or a SQL Server database. A server farm is a grouping of several Web servers used for load balancing. When you implement a Web site on a server farm, the

processing load is distributed across different Web servers. ASP.NET will remove unnecessary SQL Server–stored session to prevent the buildup of unwanted data.

Reference:
NET Framework Developer's Guide, Developing High-Performance ASP.NET Applications
MCSD Self-Paced Training Kit: Analyzing Requirements and Defining Microsoft .NET Solution Architectures, Exam 70-300.

Incorrect answers:
A. Not scalable.
B. Not scalable. Client side caching of cookies will not improve query performance on the server.
C. Not scalable.

Question: 2
Which new module or modules should you develop for the school of Fine Arts?
(Choose all that apply)

A. A Web application for administrators, academic counselors and professors
B. An application to report transcripts
C. An accounting database
D. A Web application for student registration
E. A utility to export course registration data
F. A course registration database

Answer: A, D, E, F

Explanation:
A: The administrators, academic counselors and professors will use a Web application.
D: This is a requirement.
E: Course registration data must be exported to their existing application.
F: Their solution necessitates the creation of a SQL Server based course registration database.

Incorrect Answers
B: This is not required
C: The accounting database is retained

Question: 3
You are writing the functional specification for your solution. You need to specify the data integration needs and the migration needs for transferring data to and from the existing REG2 and TRANS2 databases. Which two statements should you include n your specification? (Each correct answer presents part of the solution. Choose two)

A. The new student registration application must query historical transcript data in REG2.
B. Student data, professor data and course schedule data from REG2 are needed to initially populate a Microsoft SQL Server course registration database.
C. Student data, professor data and course schedule data from REG2 will be needed each term to populate the Microsoft SQL Server course registration database.
D. The new student registration application must query historical transcript data in TRANS2.

Answer: B, D

Explanation:
B. This is what the AS/400 Application Support Engineer says.

D. The historical transcript data are in TRANS2.

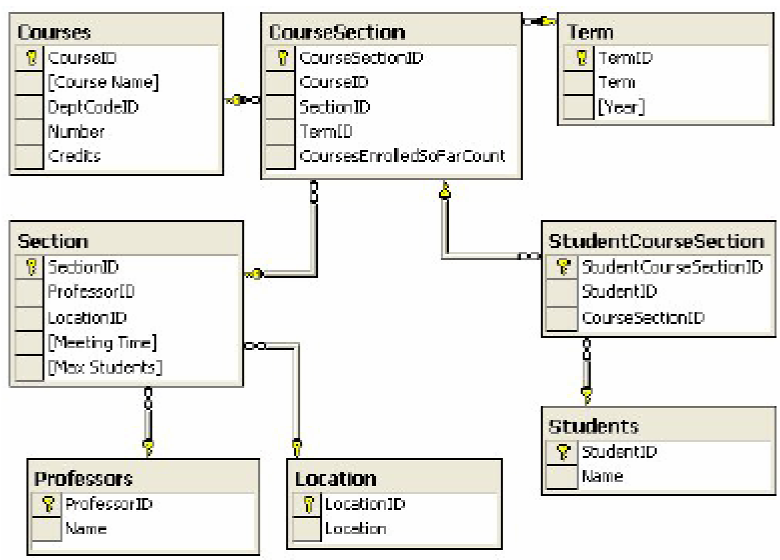
Incorrect Answers:
A. REG2 does not contain historical transcript data.
C. This is incorrect.

Question: 4
You must minimize the time required to establish whether a course section is fully enrolled. What are two possible ways to achieve this goal?(Each correct answer presents a complete solution. Choose two)

A. Keep a hash table of enrolment counts for each course section. Save the hash table in the ASP.NET Cache object.
B. Keep a hash table of enrolment counts for each course section. Save the hash table in the ASP.NET Application object.
C. Create an index on the CourseSectionID foreign key column in the Student Course Section table.
D. Denormalize the course registration database so that the CourseSection table contains a column for enrolment count.

Answer: C, D

Explanation:
C. Creating an index will help in speeding up queries.
D. By including an enrolment count, we will be able to establish whether a course section is fully enrolled or not. This will require us to denormalize the registration database. By using a single select statement, we are able to establish whether a course section is fully enrolled.
The suggested database design is shown below:



To create the CoursesEnrolledSoFarCount field, you would run the following query against the StudentCourseSection Table.
SELECT @CoursesEnrolledSoFarCount = count (*) FROM Student Course Section
WHERE CourseSectionID = ?

(C) will complement our solution since the index on the Course Section ID will speed up the query and we will be able to determine the results almost instantly. Without an index, a slower table scan would have to be done.

Incorrect answers:
A. Cache and Application object cannot span over web farms. Storing a huge hash table in the Cache object is not a good idea. The IT Manager points out that *"High availability is critical to the success of this solution. We can have no single point of failure. For maximum scalability and flexibility, we do not want any Web server session affinity*". We will lost data if the server is down.
B. Cache and Application object cannot span over web farms. Application is suitable to store read-only, small objects or data. If there are a lot of CourseSections, they will consume resource.

Question: 5
You want to simplify the code that embodies security restrictions and exception handling. You also want to minimize redundant code. What should you do?

A. Use Microsoft Visual Studio .NET Enterprise templates
B. Use Microsoft .NET reflection
C. Derive all classes in your solution from a single base class that implements best practices
D. Apply attributes
E. Use utility components

Answer: C

Explanation:
The main criterion in this question is: You want to simplify the code that embodies security restrictions and exception handling. We are not required to apply any policies onto controls, components or references. Simply deriving all classes in your solution from a single base class that implements best practices will achieve the objective.

Reference:
The Dwarmish7 sample that comes with the Microsoft .Net Framework Installation uses a base class for every module and page.

Incorrect Answers:
A. Enterprise Templates quickly get you building distributed applications by providing a choice of customized architecture models that fit your company's application infrastructure. The policy file of an application template describes the elements of a multiproject application and the technologies to build it. Policies can permit specific components, references, or controls and exclude others. They can shape elements and their properties and can customize the Visual Studio environment to meet the needs of team members and projects.

Question: 6
You are writing the technical specification for your solution. You need to implement a class that will retrieve information about tuition account status from the Accounting database. Which implementation should you specify?

A. A Microsoft .NET class that is not a serviced component.
B. A queued component
C. An XML Web service proxy class
D. A Microsoft .NET serviced component that requires a transaction

Answer: A

Explanation:
Since information is retrieved, it is not necessary to use a serviced component that requires a transaction.
B,C,D: Inappropriate solution to retrieve information about tuition account status from the Accounting database.

Question: 7
Your developers are allowed to use only the project types and components that are approved by your architectural guidance team. You need to establish a process to ensure that the developers comply with this guideline. This process should be as automatic as possible.
What should you do?

A. Create and distribute a Microsoft Visual Studio .NET Enterprise template
B. Use Enterprise Services components
C. Establish a code review process
D. Write and distribute a white paper detailing your architectural policies

Answer: A

Explanation:
This solution supports an automated process. Enterprise Templates help define policies and best practices that simplify the Visual Studio integrated development environment (IDE) and offer guidance throughout the development process

Reference:
http://msdn.microsoft.com/library/en-us/vsent7/html/vxconEnterpriseTemplatePolicyOverview.asp

Incorrect Answers:
B,C,D: All of these will not achieve the required objectives.

Question: 8
You are creating a list of business requirements for your solution. Which two requirements should you include? (Each correct answer presents part of the solution. Choose two)

A. A professor can grant a student a waiver from a prerequisite requirement for any course section that he or she teaches
B. An academic counselor can grant a student a waiver from a prerequisite requirement for a course
C. A professor can grant a student a waiver from a prerequisite requirement for any course section
D. An academic counselor can grant a student a waiver to enroll in a course section even if it is fully enrolled

Answer: A, B

Explanation:
This is clearly stated in the case study.

Incorrect Answers:
C,D: These statements are incorrect.

Question: 9
You are writing the technical specification for your solution. You need to implement a lass that will update information about course credit in the Accounting database.

Which implementation should you specify?

A. A Microsoft .NET class that is not a serviced component
B. A queued component
C. An XML Web service proxy class
D. A Microsoft .NET serviced component that requires a transaction

Answer: D

Explanation:
The Accounting database is an Oracle database which has an OLE DB provider and supports Microsoft Distributed Transaction Coordinator. When updating information, transactions are recommended.

Question: 10
To create the logical data model for your solution, you need to identify the relationships between the Student, Course and CourseSection entities. Which two entity relationships should you identify? (Each correct answer presents part of the solution. Choose two)

A. The Student entity is a parent of the CourseSection entity
B. There is a many-to-many relationship between the Course entity and the CourseSection entity
C. The Student entity is a parent of the Course entity
D. There is a many-to-many relationship between the Student entity and the CourseSection entity
E. The Course entity is a parent of the CourseSection entity
F. There is a many-to-many relationship between the Student entity and the Course entity

Answer: D, E

Explanation:
A: Course (not Student) should be the parent of CourseSection.
B: There should be a One-to-Many relationship between Course and CourseSection.
C: Incorrect.
F: Student entity and the Course entity cannot be linked as such.

Question: 11
You are using Object Role Modeling (ORM) to model data relationships between courses and course sections. You plan to use entities named Course and CourseSection.
Which fact should you include in your model?

A. It is possible that the same CourseSection is of more than one Course and that the same Course has more than one CourseSection
B. CourseSection has a name
C. Course has a location
D. Course has CourseSection. CourseSection is of Course

Answer: D

Explanation:
Only the statement D is correct.

Incorrect Answers:
A: Incorrect
B: Course has a name.

C: CourseSection has a location.

Question: 12
You are designing a utility to export all data from REG2 to an XML file. The utility must write important messages to an event log. You must choose a log type. What are two possible log types for you to use?(Each correct answer presents a complete solution. (Choose two)

A. The security log
B. The Application log
C. A custom log
D. The system log

Answer: B, C

Explanation:
B, C: Applications and services should add their names to the Application log file, or a custom log file.

Reference:
http://msdn.microsoft.com/library/default.asp?url=/library/en-us/debug/base/event_sources.asp

Incorrect Answers:
A: This log stores security related events
D: Device drivers should add their names to the System log file. The Security log file is for system use only.

Question: 13
You are creating the physical design of the Web application for student registration.
Your design includes a Web page that shows all course names within a selected department. The content of this page will change once each term. The page is generated slowly. You want to optimize its generation. What should you do?

A. Store the list of courses for each department in a session cookie
B. Store the list of courses for each department in the ASP.NET Application object
C. Store the list of courses for each department in the ASP.NET Session object
D. Use ASP.NET page caching

Answer: D

Explanation:
Using ASP.NET page caching, we are able to optimize its generation.

Incorrect Answers:
A: Session cookies are stored on the client and lost when the browser is closed, so it is inappropriate here.
B: Caching the course names at the application level can be efficient, but there will be little automatic control over when the data is refreshed.
C: Caching the course names at the session level can be efficient, but there will be little automatic control over when the data is refreshed.

Question: 14
The new administrative application will be used by administrators, professors and academic counselors. You need to select a mechanism that will authorize the use of application functionality on the basis of user type. Which mechanism should you use?

A. Microsoft .NET role-based security
B. Access Control List (ACL) based security
C. Integrated Windows authentication
D. Code access security

Answer: A

Explanation:
This will allow the use of application functionality on the basis of user type. Role-based security supports authorization by making information about the principal, which is constructed from an associated identity, available to the current thread. The identity (and the principal it helps to define) can be either based on a Windows account or be a custom identity unrelated to a Windows account.

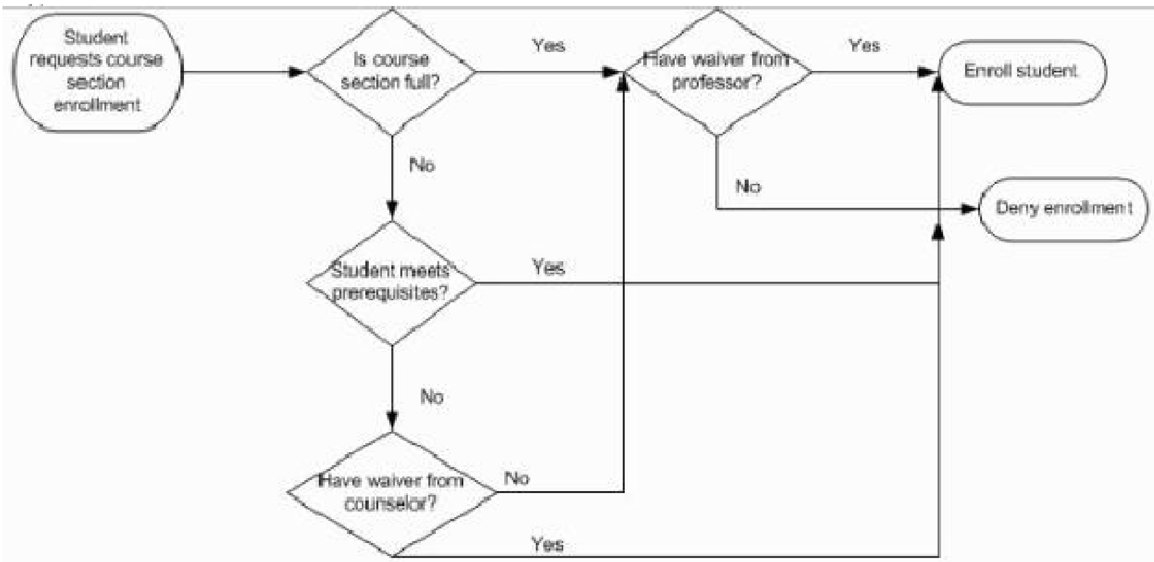
Reference:
http://msdn.microsoft.com/library/en-us/cpguide/html/cpconintroductiontorole-basedsecurity.asp
http://msdn.microsoft.com/library/en-us/cpguide/html/cpconcodeaccesssecurity.asp

Incorrect Answers:
B: This is a possible answer but there is no indication that all administrators, professors and academic counsellors have Windows login accounts.
D: Code access security allows code to be trusted to varying degrees, depending on where the code originates and on other aspects of the code's identity.

Code access security also enforces the varying levels of trust on code, which minimizes the amount of code that must be fully trusted in order to run. Using code access security can reduce the likelihood that your code can be misused by malicious or error-filled code. It can reduce your liability because you can specify the set of operations your code should be allowed to perform as well as the operations your code should never be allowed to perform. Code access security can also help minimize the damage that can result from security vulnerabilities in your code. This is not what we want here.

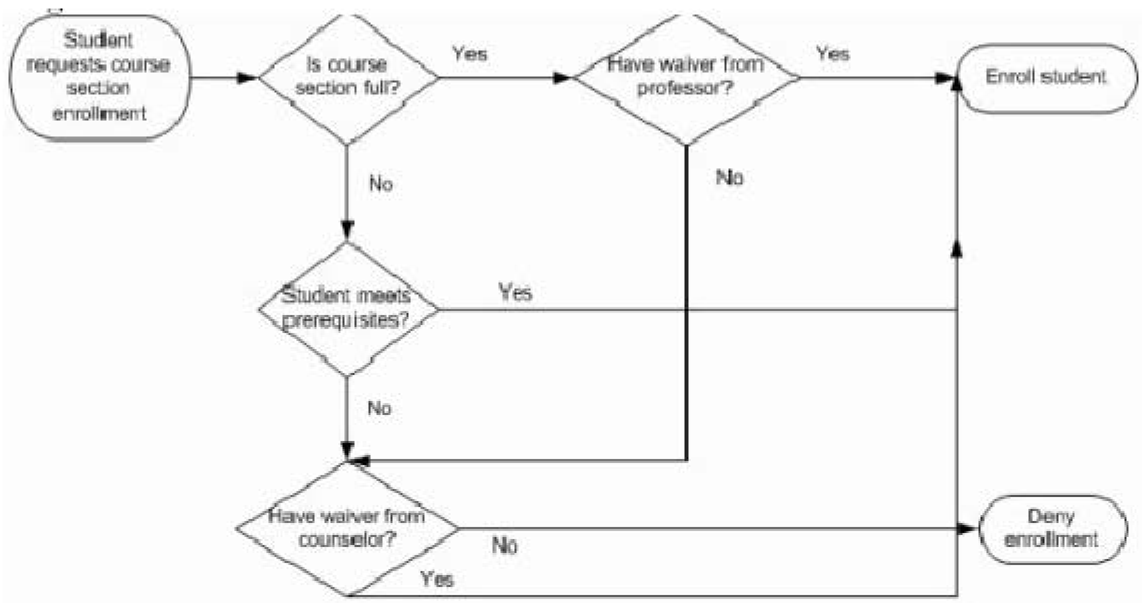
Question: 15
You need to identify the sequence of decisions that are required when a student tries to register for a course section. Proposed sequences are shown in the sequence diagrams. Which diagram should you use?

Diagram A:



Student requests course section enrollment
Is course section full?
Yes
Have waiver from professor?
Yes
Enroll student
No
No
Deny enrollment
Student meets prerequisites?
Yes
No
Have waiver from counselor?
No
Yes

Diagram B:



Student requests course section enrollment
Is course section full?
Yes
Have waiver from professor?
Yes
Enroll student
No
No
Student meets prerequisites?
Yes
No
Have waiver from counselor?
No
Deny enrollment
Yes

Diagram C:

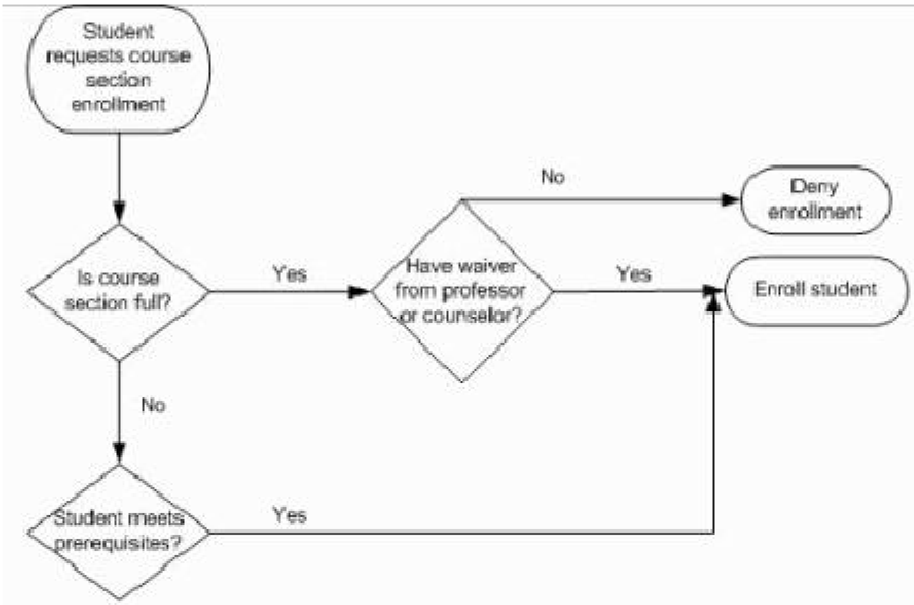
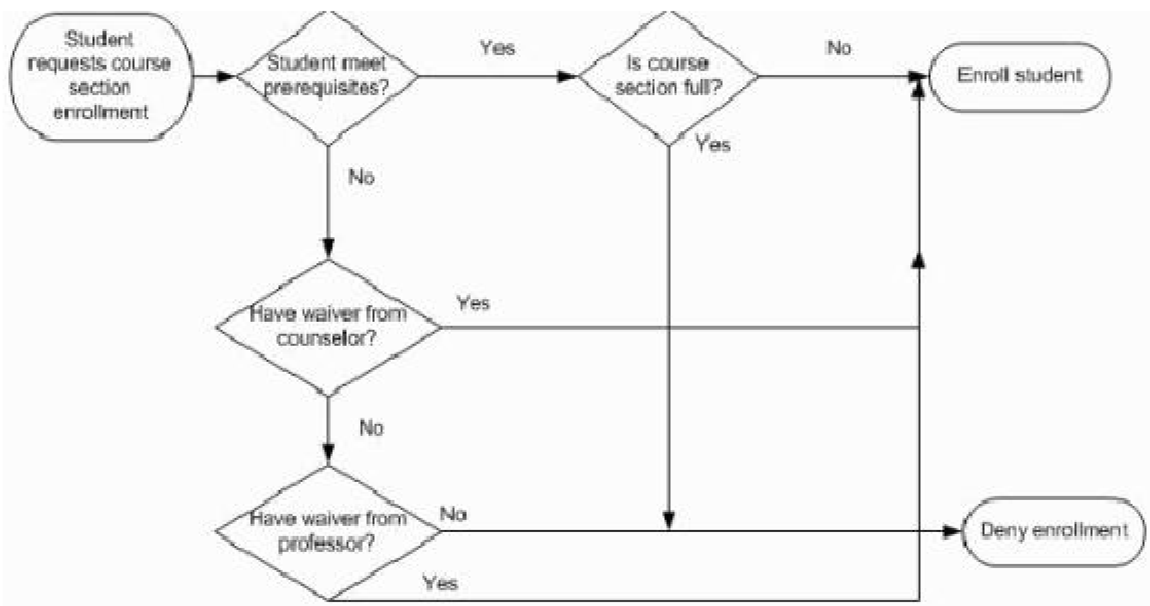


Diagram D:



A. Diagram A.
B. Diagram B.
C. Diagram C.
D. Diagram D.

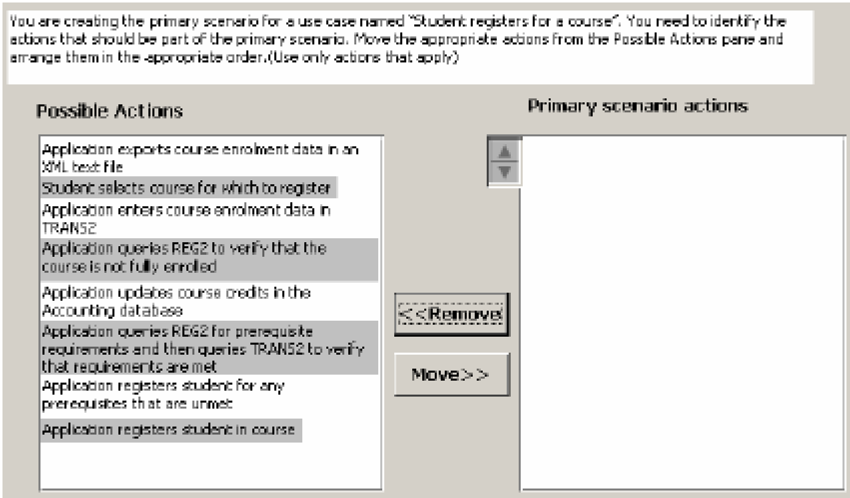
Answer: A

Explanation:

Only diagram A will meet the business logic or rules as stated in the case study.
Please follow the arrow to understand the flow of decisions emanating from the decision diamond boxes.

Incorrect Answers:
B: This is incorrect because even if the course is full, it is possible for the student to have a waiver from an Academic counselor. A student cannot register for a fully enrolled course with a waiver from an Academic counselor.
C: Academic counselors cannot issue a waiver if the course if full
D: The course must be checked to see if it is full first.

Question: 16



Answer:

Possible actions	Primary scenario actions
Application exports course enrolment data in an XML text file	Student selects course for which to register
Student selects course for which to register	Application queries REG2 to verify that the course is not fully enrolled
Application enters course enrolment data in TRANS2	Application queries REG2 for prerequisite requirements and then queries TRANS2 to verify that requirements are met
Application queries REG2 to verify that the course is not fully enrolled	Application updates course credits in the Accounting database
Application updates course credits in the Accounting database	Application registers student in course
Application queries REG2 for prerequisite requirements and then queries TRANS2 to verify that requirements are met	
Application registers student for any prerequisites that are unmet	
Application registers student in course	

Explanation:
Application enters course enrolment data in TRANS2
• At the end of each registration period, we must be able to import into TRANS2 a list of all courses for which a student is registered.
• Each registration period begins one month before the beginning of an academic term. Registration closes when the term begins. A summary of student enrolment data is then exported by a batch export operation from REG2 to TRANS2.
• Application should update course credits in the Accounting database before registers student in course.
• We want to make it impossible for students with overdue tuition accounts to register for courses.

Question: 17
You are validating the logical model for course prerequisites.

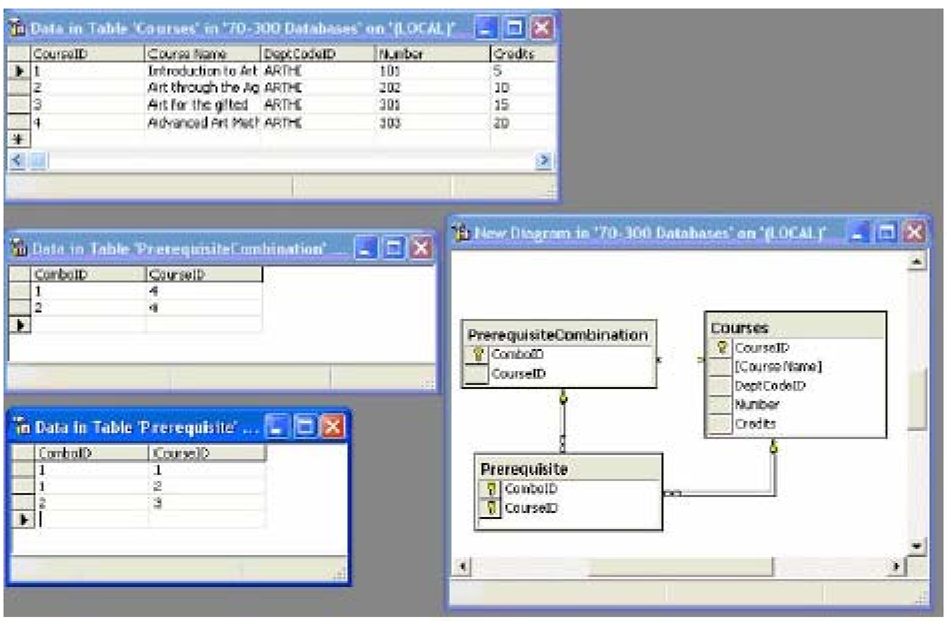
Which two entity relationships should be included in the model? (Each correct answer presents part of the solution? (Choose two)

A. The Prerequisite entity is a child of the PrerequisiteCombination entity
B. The PrerequisiteCombination entity is a child of the Course entity
C. The Prerequisite entity is a child of the Course entity
D. The PrerequisiteCombination entity is a parent of the Course entity
E. The Prerequisite entity is a parent of the Course entity.

Answer: A, C

Explanation:
See below for full explanation.

Incorrect Answers:
B: In designing a logical model, relating Course to PrerequisiteCombination is not desirable, although there is an implicit relationship. It would be better to state the relationship with Prerequisite and PrerequisiteCombination explicitly instead.
D: PrerequisiteCombination entity is a child of Course entity
E: Prerequisite entity is a child of Course entity



Note:
The diagram above explains the question.
• Entities are represented by tables.
• All the combinations for a course are setup within the PrerequisiteCombination Table.
So in our example, Course 4 (ARTHI 303) has 2 combinations.
• These combinations are defined within the Prerequisites Table.
o Combo 1 consists of doing course 1 (ARTHI 101) and course 2 (ARTHI 202).
o Combo 2 consists of doing course 3 (ARTHI 301)

Case Study #7, City Power & Light

Background
City Power and Light is a large regional provider of electrical services for residential and business customers.

The company has more than 500,000 residential customers. Every month, bills are printed and mailed to these customers. Most of them pay their bills by mail. However, a growing number of residential customers pay their bills by using online payment services offered by their banks.
The company contracts you to create a Web site for customer bill payment and an XML Web service for bill presentment. You will use the Microsoft .NET Framework.

When the new bill presentment solution is implemented, banks will not store monthly billing data for individual customers. Instead, banks will use a bill payment application to obtain this data from the XML Web service.

Whenever a customer uses a bank's online service to pay bills, the bank's application will query the XML Web service to provide the correct billing amount.

Existing IT Environment
An existing accounting application manages the customer billing process for City Power and Lights, This application receives electrical usage data for customers and then creates and prints monthly bills. The accounting application runs on a mainframe computer that is located on the corporate network. The mainframe computer has a TCP/IP interface that uses a binary protocol. Communication over this interface is very slow.

Another existing application receives bank payments. This application enables banks to submit electronic payments on behalf of their customers to City Power and Light. The bank payment application is hosted on a network that is separate from the corporate network. The hosting network and the corporate network are connected by firewalls and a leased line.

Interviews
IT Department
IT Manager
If we expose any programmatic interfaces that are externally accessible, they must be available only to authenticated users. These interfaces must also use secure transport. Our mainframe computer is operating a capacity. I do not want to add any new applications or data to this computer.

Currently, we do not store authentication credentials for our customers. However, all customers have unique account numbers. Customers will need to create passwords and enter them when they use the new customer Web site to pay bills.

I want the administration of the bill presentment solution to be as easy as possible. We expect many banks to use this service. We already have authentication credentials for most of the banks as part of our existing bank payment application. These credentials are accessible from the bank payment application through COM interfaces.

Business Stakeholders
Chief Executive Officer
Reliability is critical to our services. The new solution must always be available both to our residential customers and to our banking partners.

Security is also very important. Unauthorized users must not be able to view billing data or bill presentment data that relates to our customers.

Some bank plan to discontinue electronic payment for our bills unless we offer a bill presentment data that relates to our customers.

Some banks plan to discontinue electronic payment for our bills unless we offer a bill presentment service. We want to ensure that these banks continue to offer electronic payment for our bills.

Finance Department
Chief Financial Officer
We want to reduce the costs involved in handling paper bills. We want as many of our residential customers as possible to pay their bills electronically.

Currently, some of our customers use bill payment services offered by their banks. However, the banks have no way to obtain billing data from us. Therefore, customers need to enter each bill amount in the bill payment application. Customer entry results in frequent billing errors and in dissatisfied customers.

We need a bill presentment application to solve this problem. This application will enable banks to query our computers for detailed billing data for each customer. It will also enable us to control the appearance and branding of bills that are electronically presented to our customers.

In addition, we need a customer Web site to enable our customers to view and pay their monthly bills. Some of our customers do not have access to bill payment services offered by a bank. We want to enable each customer to pay bills by using one or more credit cards. Some customers prefer to pay bills manually each month by credit card. Other customers prefer to schedule an automatic monthly payment by credit card. We must support both preferences.

Business Process
Residential customer bills can be due on ten different dates during the month. Each customer is assigned to one of the ten dates. The existing accounting application stores the due date for each customer Meter reader employees read electrical usage meters for residential customers. However, each meter is read only four times a year. Therefore, most monthly bill amounts are estimates. Each bill amount is generated 30 days before the bill is due. Bill amounts are adjusted to balance actual estimated usage. The existing interface for the accounting application can provide data only for the current billing cycle.

Questions & Answers

Question: 1.
Which solution concept should you recommend for bill presentment?

A. Banks communicate an XML Web service to access customer billing data.
B. Each bank has an XML Web service for submitting bill presentment data.
C. Banks provide customer billing data to an XML Web service.
D. Each bank has an XML Web service for receiving bill presentment data.

Answer: A

Explanation:
This is the requirement as stated in the background.

Incorrect Answers:
B, D: It is City Power and Light who needs to provide the web service, not the banks.
C: The XML Web Service provides banks with customer billing data.

Question: 2
You are creating the functional specification for your solution. Which bill presentment requirement should you include?

A. Communicate with a secure programmatic interface for bulk loading of customer billing data when the data changes.
B. Provide a secure programmatic interface for bulk loading of customer billing data.
C. Provide a secure XML Web service for presenting individual customer billing data.
D. Communicate with a secure XML Web service for loading individual customer billing data.

Answer: C

Explanation:
IT Manager says that: *If we expose any programmatic interfaces that are externally accessible, they must be available only to authenticated users. These interfaces must also use secure transport.*

Chief Executive Officer says that: *Security is also very important. Unauthorized users must not be able to view billing data or bill presentment data that relates to our customers.*
Therefore, we need to provide a secure XML Web service for presenting individual customer billing data.

Incorrect Answers:
A, B, D: No requirement in case study.

Question: 3
You are creating the conceptual design for your solution. Which entity or entities should you include? (Choose all that apply)

A. Meter read
B. Customer
C. Billing schedule
D. Bank
E. Credit card

Answer: B, D, E

Explanation:
B, D: These are required.
E: Because the Chief Financial Officer wants to allow each customer to pay bills by using one or more credit cards. Otherwise, this would have been an attribute of Customer instead of an entity.

Incorrect Answers:
A. The Meter read is not needed because meter reader employees only read electrical usage meters for residential customers only four times a year and most monthly bill amounts are estimates. This should be an attribute.
C. Not required.

Question: 4
You are validating the logical data model for your solution. Which attribute or attributes should be included in the Customer entity? (Choose all that apply)

A. Password
B. Customer Identifier
C. Bank Identifier
D. Bill Identifier
E. Credit Card Number

Answer: A, B, C

Explanation:
A: IT Manager: *All customers have unique account numbers. Customers will need to create passwords and enter them when they use the new customer Web site to pay bills.*
B: The Customer Identifier is the Primary Key for Customer entity.

Incorrect answers:
C,D: These should not be included in the Customer entity.
E: Chief Financial Officer wants to allow each customer to pay bills by using one or more credit cards. After normalization, this should not appear in the Customer entity..

Question: 5
You need to create the physical design for the authentication mechanism in the bill presentment module. What should you do?

A. Pass authorization credentials in SOAP headers.
B. Include a WindowsPrincipal parameter in every Web method.
C. Create a single authentication service that has authentication parameters.
D. Include a Generic-Principal parameter in every Web method.

Answer: A

Explanation:
Client application communicates with an XML Web service by sending and receiving SOAP messages over Hypertext Transfer Protocol (HTTP).

XML Web services created using ASP.NET can choose their security options from the authentication and authorization options offered by ASP.NET or customized SOAP-based security. ASP.NET operates in conjunction with Internet Information Services (IIS) to provide several authentication and authorization options. It is also possible to create custom authentication options, such as the use of SOAP headers.

Note:
Summary of Authentication Options for XML Web Services

Authentication option	Description
Windows - Basic	Use for nonsecure identification of clients, as the user name and password are sent in base 64-encoded strings in plain text. Passwords and user names are encoded, but not encrypted, in this type of authentication. A determined, malicious user equipped with a network-monitoring tool can intercept user names and passwords.
Windows - Basic over SSL	Use for secure identification of clients in Internet scenarios. The user name and password are sent over the network using Secure Sockets Layer (SSL) encryption, rather than plain text. This is relatively easy to configure and works for Internet scenarios. However, using SSL degrades performance.
Windows - Digest	Use for secure identification of clients in Internet scenarios. Uses hashing to transmit client credentials in a secure manner so the password is not transmitted in clear text. In addition, Digest authentication can work through proxy servers. However, it is not widely supported on other platforms.
Windows - Integrated Windows	Uses NTLM or Kerberos. Uses a cryptographic exchange with the user's Microsoft Internet Explorer Web browser.
Windows - Client Certificates	Use for secure identification of clients in Internet and intranet scenarios. Requires each client to obtain a certificate from a mutually trusted certificate authority. Certificates are optionally mapped to user accounts, which are used by IIS for authorizing access to the XML Web service.
Forms	Not supported by XML Web services. This is a system by which unauthenticated requests are redirected to an HTML form using HTTP client-side redirection. Most clients of XML Web services will not want to provide credentials using a UI. You have to use work around this in order to avoid the logon form.
SOAP headers – Custom	Useful for both secure and nonsecure Internet scenarios. User credentials are passed within the SOAP header of the SOAP message. The Web server, regardless of the platform hosting the XML Web service, provides a custom authentication implementation.

For all options listed above, except the use of SOAP headers, the security settings are specified using a combination of configuration files and IIS. The custom SOAP headers option is detailed following the Authorization section, as that solution involves both authentication and authorization.

Incorrect Answers:
B: Not using IIS Windows authentication.
C: Not suitable.
D: Not suitable.

Reference:
http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnbda/html/authaspdotnet.asp
.NET Framework Developer's Guide
Securing XML Web Services Created Using ASP.NET,
http://msdn.microsoft.com/library/default.asp?url=/library/en-us/cpguide/html/cpconsecuringaspnetwebservices.asp

Note:
Windows Principal object
The System.Security.Principal namespace within the .NET Framework Class Library (BCL) provides a WindowsPrincipal object to represent the security context under which the code is running. This object is created for you automatically when you use Windows authentication in IIS. It allows you to check the Windows group membership of a Windows user and restrict access accordingly.

Generic Principal object
A Generic Principal object can be created based on your own custom roles. You will use this when you have your own user/role database. The Principal object is populated in the OnAuthenticate event. You may have a custom table mapped to Windows accounts that you map in this event. In any case, you can create a custom Principal object for that particular user.

Question: 6
Simple logical errors often occur in your daily builds. You need to recommend improvements in the build process. Which action or actions should you recommend? (Choose all that apply)

A. Developers must create and perform unit tests.
B. Developers must instrument code before checking it in.
C. All errors must be logged in an error-tracking application.
D. Developers must write comment for classes, methods, and properties.
E. Quality assurance testing must be performed on all assemblies.

Answer: A, B, E

Explanation:
By requiring Developers to create and perform unit tests and instrument code before checking it in, we help create a streamlined build process. Quality assurance testing should also be performed on all assemblies.

Incorrect Answers:
C,D: Does not prevent simple logical errors.

Case Study #8, Woodgrove Bank

Background
Woodgrove Bank is a regional financial institution that has 30 branch offices. It maintains a Web site that allows customers to perform banking operations over the Internet.

Woodgrove Bank processes an increasingly large volume of loans. The existing loan processing application cannot handle this volume effectively. The board of directors wants to replace the application with a scalable solution based on the Microsoft .NET Framework. You are a developer employed by the bank. You will lead the development of the new solution, which must be operational in six months. You already have all the hardware that you will need for development and production.

Existing IT Environment
Logical Design
The existing loan processing application is based on a client/server architecture. The client application is written in Microsoft Visual Basic 6.0. This application implements the loan processing logic and interacts with a database server named Database1 to store and retrieve data.

An application can request a loan by using an HTML form available on the bank's Web site.
The information on this form is e-mailed to a loan clerk, who telephones the applicant to complete the request.

Physical Implementation
A computer named Server1 is located at the main branch of Woodgrove Bank. Server1 hosts modules for reporting and for exchanging data with a mainframe computer named Main1. Main1 hosts a check disbursement application and an accounting application. Currently, the interface to Main1 is not well integrated with the loan processing application. Database1 runs Microsoft SQL Server 2000. It hosts a database that includes a table containing the loan request data. This table is indexed by applicant name and by loan number. All 30 branches of the bank are connected to a common internal network by private T1 lines.

The network supports TCP/IP and NetBEUI and is protected by a firewall. All branches employ loan clerks and loan officers.
These employees use computers that run Microsoft Windows 2000 Professional.

Interviews
IT Department
IT Manager
All of our existing applications share a standard appearance. Our standard includes colors, fonts, and the position of the company logo. All new applications must adhere to this standard.

The new loan processing application must use a Web browser as the user interface, without any additional client software. Database1 will be used in the implementation of the new application. The confidential information that resides on this server must be inaccessible to unauthorized users. The information must remain secure even if our firewall is penetrated.

When a loan is approved, the new loan processing application must send data to the check disbursement application. The new application must also send data to the accounting application to indicate which general ledger accounts need to be created or debited. Therefore, we need a reliable interface between the new application and Main1. The interface must support transaction recovery and logging.

The check disbursement application and the accounting application were implemented 10 years ago. They remain unmodified. No one on my staff understands how to interface with these applications.

Six people on my staff are assigned to work with you on this project. However, four of them have less than one year of experience as a developer.

Finance Department
Chief Financial Officer
The new loan processing application must include an audit module. The module must randomly select 5 percent of the loans approved in each month to be audited by a member of my staff.

All server hardware to support development and production has already been procured. For the new loan processing solution, budget is approved for application software, development software, and utilities. However, we have no budget to replace either the check disbursement application or the accounting application.

At the beginning of the fiscal year, we made high-level projections about the new application.
We estimated that its development would require 30 staff months, but only if we use senior staff. Our goal is to complete this project in six calendar months.

Business Stakeholder
Loan Processing Manager
I authorized the funding for this project, and I will make the final decisions.
The new loan processing application must reduce the amount of time needed to process each loan request. If we can directly enter all of an applicant's personal data into the new application, we can work more efficiently.

The new application must also support simple workflow routing between the loan clerks and the loan officers.

In addition, I want the application to assign loans to different loan officers on the basis of business rules. These business rules will use loan amount and loan type as criteria for assignment. The rules might need to change every month.

The loan processing staff has little computer experience. Because of their current workload and experience they might have difficulty learning how to use the new application. I want to ensure that this project causes the least possible disruption to our business.

Business Process
Loan Processing
Each of the 30 branches of Woodgrove Bank employs 10 loan clerks and 10 loan officers. Using the current loan processing application, both the clerks and the officers are directly involved in processing loans.

The loan clerks perform the following actions:
1. Collect personal data and credit history data from the applicant.
2. Enter the data into the database by using the loan processing application.
3. Review all data for clerical accuracy.
4. Verify the credit history data by using external resources, such as lending agencies and employers.

The loan officers then perform the following actions:
1. Review the loan request for risk.

2. Either reject the loan request or approve it for disbursement.
An employee of Woodgrove Bank can fulfill more than one role. For example, a branch manager can assist in processing loan requests, and can also approve loans as needed. Employee roles are not defined in the current application.

Workflow and approval are managed by external business processes.
Loan requests are stored in our database for six months and then purged.

Loan Request
Loan requests contain the following confidential information about the applicant:
• Name
• Address
• Telephone number
• Personal identification number
• Current employer and salary
• One or more credit history items
The loan department handles many types of loans. Applicants can request mortgages, automobile loans, home equity loans, and unsecured consumer loans.

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