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**MCS D
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***Designing and Implementing Distributed
Applications with Visual Basic 6.0***

Exam 70-175

Edition 3

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Designing and Implementing Distributed Applications with Visual Basic 6.0 Concepts

Distributed Applications are client/server applications that use a network in a multi-tier architecture to distribute their presentation services, business logic, and data services. These applications often access many different data sources. The COM components contained in these applications typically participate in transactions, and they can be shared by multiple users and multiple applications.

Microsoft's Enterprise Development Strategy

- Different services are implemented in either the **User** (Presentation), **Business** or **Data** services tiers. Essentially, the User, Business and Data services layers are the main subdivisions from which others can be branched off.
- Any interface that the user interacts with (i.e.: database front end) is placed in the User layer, all business rule processing (i.e.: credit card limit checks, tax calculations, etc.) is done in the Business layer and any services which provide data (i.e.: SQL Server database) to the middle tier (and ultimately the user) are placed in the data services layer. Remember that business services are considered to be *clients* of the data services layer which provides *services* to it. The three services (User, Business and Data) are collectively known as the Microsoft **Application Model**.

Advantages of Modularization:

- The main advantages of COM are *code reusability*, *cross-platform interoperability*, *version control* - and the fact that *testing COM components is much easier* than testing traditional applications that do not use COM.

Building COM DLL's with Visual Basic

COM DLL's are implemented in the *Business Services* layer. When using Microsoft Transaction Server (MTS), COM components must be implemented as DLL's. Business services in MTS must always be compiled as COM **DLL**'s.

- When creating COM DLL's for MTS, you should choose the **apartment-threaded** model.
- Because business service DLL's act as *servers* to the User services layer, there is typically no visual interface involved – and hence no need to expose any properties in the DLL.
- Unhandled errors in COM DLL's are passed back to their calling procedures – and ultimately, the client. If the client doesn't handle the error, the application will terminate.
- **Unattended Execution** can only be used with components that do NOT have a visual interface (i.e.: messages are typically written to logs instead of presented in message boxes).
- DLL's are *in-process* servers (components that run in the same memory process as the client) that are typically *faster* than their ActiveX EXE counterparts.
- The instancing property for business objects (DLL class modules) should be set to **MultiUse**. The *SingleUse* and *GlobalSingleUse* instancing properties do NOT apply to COM DLL's.
- All class modules have 2 built-in events by default: *initialize* and *terminate*.
- Methods in class modules are created using **PUBLIC** Sub or Function procedures.

- Events (such as errors) are raised in the COM DLL server and handled in the client. Error handling should be taken care of as much as possible in each individual component.
- When the DLL is compiled, each class module in the DLL is assigned a unique class ID (**CLSID**). A library identifier (**LIBID**) is also generated for the DLL that describes all of the classes, their properties and methods.
- Version Compatibility options include: **No Compatibility**, **Project Compatibility** and **Binary Compatibility**. If you want a component to remain compatible with previously compiled versions of the DLL, choose *Binary Compatibility*. Choosing this option also makes sure that *you will be warned* if your new DLL has any features that are incompatible with earlier versions. Choose No Compatibility for new projects, Project Compatibility for projects that are still in the testing stage and Binary Compatibility to maintain compatibility with components that have already been implemented and gone live.
- To test an ActiveX DLL, open the DLL project, **add a new project** and then choose Standard EXE. A template for this new project will be added to the Project Group window. Next, right-click on the Standard EXE project and choose **Set as Start Up**. Finally, add a reference to the ActiveX DLL project by clicking on Project in the Visual Basic menu bar and then choosing **References**. To test an ActiveX EXE project, you must open a second (separate) instance of Visual Basic because ActiveX EXE's run out-of-process.
- There are 3 ways to **register** a COM DLL: compile the DLL, use a set-up program – or use the regsvr32.exe utility. Syntax is: **regsvr32.exe sample.dll**
- To **unregister** a COM DLL, use the regsvr32.exe utility with the /u switch as in the following example: **regsvr32.exe /u sample.dll**

Microsoft Transaction Server (MTS)

MTS works on an *all-or-nothing* principle and manages resources in an effective way using *just-in-time activation* and *connection pooling*. Using these three methodologies, MTS is able to conserve valuable resources such as memory, processing time and network bandwidth. In addition, MTS also integrates the tight security features of Windows NT.

- All COM DLL's that are used in MTS must be part of a *package* (which define the security boundaries of the application).
- To use MTS, components must be compiled as COM DLL's. An MTS application is implemented as a group of packaged COM DLL's.
- Once you have access to one package (i.e.: you have passed the security check to access its components), *there are no subsequent security checks for components within the same package*. MTS does check security, however, when you try to access components' methods *across different packages*.
- **Resource Managers** manage *durable data*. Examples of resource managers include databases (SQL, Oracle, etc.), message queue systems like MSMQ Server and transactional file systems.
- **Resource Dispensers** are services that manage *non-durable data*. Examples include the ODBC resource dispenser (used for connection pooling) and the Shared Property Manager.
- **MTS Explorer** is used to manage components and packages on MTS. It allows you to create packages, add or delete components from packages, distribute packages, install and maintain packages and monitor transactions. Package properties (such as identity and security) can also be set from the MTS Explorer.

- **Microsoft DTC** (Distributed Transaction Coordinator) coordinates transactions over multiple resource managers. It ensures the all-or-nothing transaction processing rule (either all transactions are committed – or none are).
- To **create a new package** using MTS Explorer, first click on the Packages Installed folder. From the Action menu, choose NEW and then PACKAGE. You can alternatively right click on the Packages Installed folder, click NEW and then choose PACKAGE as well. When the Package Wizard shows up, choose *Create an Empty Package* and enter a name for the new package. You can also import *pre-built packages* (that were created using the export function) by using the *Install pre-built packages* option.
- To set the properties of the new package, right click on the package in MTS Explorer.
- To **add a component** (DLL) to a package, double-click the Packages Installed folder and then double click on the package that you'd like to add the component to. At this point, click on the *Components* sub Folder, click New on the Action menu and then choose Component. As an alternative to the Action menu, you can also right-click the *Components* Folder, click New and then select Component. The last step is to follow the instructions in the dialog boxes, select *Add Files* (choosing the components that you would like to add to the package) and then click *Finish*.
- You can also add components to the Components folder of a package by *dragging* DLL files *from Windows Explorer* to the package in MTS Explorer.
- Once a component (DLL) becomes part of a package, MTS modifies the corresponding entries for each class in the *Windows registry* so that they can run under MTS: a **Local-Server32** key is added (containing the path to the MTS executable), a **/p parameter** is added to the Mtx.exe path (which specifies the identity of the package that contains the class) and the **InProcServer32** key is cleared (empty value assigned) as it is no longer needed.
- Package files have a **.pak** extension.
- Remember that a component *can only be included in one package* on a single computer and that a package's components cannot be split across computers. You can duplicate packages, however, so that multiple copies of it and its components reside on multiple (different) computers.
- To **export a package**, double-click the Packages Installed folder, select the package that you'd like to export and then choose *Export* from the Action menu. As an alternative to the Action menu, you can also right-click on the package and select Export. Follow the dialog box instructions which follow.
- When a package is exported, a *Clients folder* is created in the directory where the package file is exported to. You will find a *client application executable* in the that same folder which will allow you to configure a client to remotely use the MTS components in the package. To install the executable, simply run it on the client computer. Do **not** ever run this *client application executable* file on the server!
- The client which accesses the MTS components does not need to have any MTS files installed – just **DCOM** support (Distributed Component Object Model). Windows NT clients (version 3.x or later) already have DCOM support but Windows 95 clients do not. DCOM can be downloaded from the Microsoft web site for Win95 clients.

Using MTS Transaction Services

- When an MTS object is accessed and created (by the client or another object), it must be aware of its *context*. MTS creates a *context object* for each MTS object instance. The

context object informs the MTS object of its environment and that it is participating in a transaction. Transactions must be initially *stateless* to participate in transactions.

- MTS also uses the context object to track the success or failure of transactions. If an object completes its work successfully, it is noted in the context object. Likewise, if an object fails to complete its work, the failure is noted in the context object. When all context objects report successes, then MTS **commits** the transaction – otherwise if there is even one failure being reported by an object (in its respective context object), then MTS **rolls back** the entire transaction, undoing any changes that were made.
- To determine how a class participates in transactions, set its **Transaction attribute**. This can either be set from within MTS (by right-clicking the class name in MTS Explorer, choosing properties and then clicking on the Transactions tab) – or by using the properties window (for the particular class module) in Visual Basic.
- Choose **Requires a transaction** if the object MUST have a transaction. Choose **Requires a new transaction** if the transaction must be new and separate from all others. Choose **Supports transactions** if transactions support may be needed and **Does not support transactions** if the object will not participate in any transactions.
- Context information about each object is stored in the **ObjectContext** object. This object is responsible for the tracking of individual MTS objects' work successes or failures as well as security information. When an object completes its work successfully, the **SetComplete** method of the ObjectContext object should be called. If, on the other hand, an object's work fails to complete, the **SetAbort** method of the ObjectContext object should be called. **SetComplete** informs the object context that it can commit transaction updates – and release the *state* of the object (and any resources that it was using). **SetAbort**, on the other hand, informs the object context that any transaction updates for that object (and any other objects within the same transaction) must be rolled back to their original state – even if the other objects completed successfully and called **SetComplete**. Remember: all or nothing.
- Objects can get references to their respective ObjectContext by using the **GetObjectContext** function.
- When an MTS object that needs access to its context information needs to be created, use the **CreateInstance** method of the ObjectContext object.
Example: set objExample = GetObjectContext.CreateInstance("Sample.Class")
- There are three ways to create objects in VB: using the **New** keyword, using **CreateObject** and calling the **CreateInstance** method of the ObjectContext object. The first two methods will create MTS objects – but unlike **CreateInstance**, they will not inherit the object's context information. Unless **CreateInstance** is used, the object will not be able to participate in any transactions and will not have access to security information.
- MTS uses **just-in-time activation** to create and release objects as they are needed and **connection pooling** to manage open database connections. Both help reduce the consumption of valuable system resources by recycling objects.
- **Error handling** should be implemented when transactions are rolled back from **SetAbort** calls. If a transaction aborts and you do NOT raise an error to the client, MTS forces an error to be raised. Error trapping code should be used in each object using **On Error Goto** syntax.
- In order to ensure that the application remains **scalable** (performance isn't affected as application use increases), you should try to avoid maintaining state as much as possible. **State** is object data that is maintained over several method calls. State consumes re-

sources such as memory, disk space and database connections. MTS requires stateless objects. Remember to obtain resources late and to release them as early as possible.

- Other services provided by MTS include *Trace Messages*, the *Transactions List* and *Transaction Statistics*. The *Trace Messages* window lists any messages issued by Microsoft Distributed Transaction Coordinator (DTC), the *Transaction List* window shows any transactions in which MTS is currently participating and the *Transaction Statistics* window allows you to view information about transactions since the DTC was started (example: number of transactions that were committed, aborted, transaction response times, etc.).

Accessing Data from the Middle Tier

- There are three kinds of database components: *data consumers*, *data services* and *data providers*. An example of a *data consumer* would be a database front end written in a language such as Visual Basic or C++. Other examples include Active Server Pages and even the high-level ADO programmatic interface itself. *Data Services* refer to the cursor engines and query processors that take on some of the work that the database would normally do, speeding up operations significantly and allowing the database to focus solely on serving data to its eventual consumers. Finally, *data providers* refer to the actual databases themselves (both relational or non-relational). Typical examples of *data providers* include SQL Server 7, Oracle and mainframe databases.
- Remember that **OLE-DB** is able to access both relational and non-relational database information. *Non-relational databases* include information such as traditional file systems and e-mail stores.
- **UDA** (Universal Data Access) is Microsoft's latest strategy for universal data access. By using high-level programmatic interfaces such as **ADO** (Active X Data Objects), programmers are able to access *any* kind of information from both relational and non-relational databases. ADO works on top of OLE-DB (the lower-end programmatic interface), which is able to access the eventual data. In effect, OLE-DB supercedes the older ODBC data access method by being able to access non-relational data as well. ODBC only accesses relational databases. ADO is also a replacement for the older DAO (Data Access Objects) and RDO (Remote Data Objects) data access technologies.
- There are three ways that you can use ADO in Visual Basic:
 1. Using the **Data Environment Designer**, which is perhaps the easiest way to graphically bind objects to data.
 2. Using the Microsoft ADO Data Control 6.0 (OLEDB) **ActiveX Control** from the toolbox (you must first add the component through Project, Components before using it).
 3. Accessing ADO **programmatically** (set a reference to the Microsoft ActiveX Data Objects Library 2.0 Library first through Project, References).
- The Data Environment Designer always provides a *default Connection* ("Connection1"). You do not have to initially add one to the environment.
- Once a data environment is configured (at least one connection to a database is established), you can use the **Data View Window** to view information about the database's structure (tables, stored procedures, views, etc.).

- When binding controls to data using the DataEnvironment Designer, remember to set the **DataMember** property to the name of the Data Environment Designer **Command** which accesses the data that you are interested in.
- When using the ADO ActiveX control to bind data to a control such as a text box, set the bound control's **DataSource** and **DataField** properties.
- There are three principle objects in the ADO object hierarchy:
 1. Connection (with an errors collection)
 2. Command (with a parameters collection)
 3. Recordset (with a fields collection)
- To use ADO's objects, you must:
 1. Set a reference to the ADO library.
 2. Establish a connection, specifying the data provider and passing any important connection information such as UserID, password and data source (by setting the connection object's ConnectionString property).
 3. Open the connection.
 4. Access and manipulate data by using the ADO recordset object.
 5. Close the connection.
- There are **three ways** to access the **recordset object** in ADO:
 1. Use the Open Method
 2. Call the Execute method of the Connection object
 3. Call the Execute method of the Command object
- Use the *execute method of the **connection** object* when the command needs to be issued *only once*. If, on the other hand, you have to issue the command several times, use the *execute method of the **command** object*. It takes up fewer system resources to use one connection object (with several command objects) than to have several distinct connections open at the same time. **Prepared** command statements also execute faster.
- When discussing **cursors** ("current set of records"), there are different *types*, *locations* and *locking strategies* available and they are distinguished by their ability to be **scrollable** and or **updateable**:

Cursor Type Information:

Forward-Only (default)	not scrollable	Read Only	Least expensive resource-wise Fastest cursor type Useful for filling list boxes, etc.
Static	scrollable	Updateable but changes by other users are not immediately visible	Copy of records is retrieved (snapshot information) They are used in disconnected Recordsets
Keyset	scrollable	Can't see inserts	Keys are used for each record
Dynamic	scrollable	Can see all additions, deletions and changes	Most flexible cursor type Most expensive resource-wise

Cursor Location Information:

AdUseClient	Used with disconnected (client-side) recordsets
AdUseServer	(default)

Locking Strategies:

AdLockReadOnly	(default) – data cannot be changed
AdLockPessimistic	The record is locked immediately upon entering edit mode
AdLockOptimistic	The record is locked only when the update is requested
AdLockBatchOptimistic	Used with disconnected recordsets

- To use a **disconnected recordset**, the correct property settings are:
rs.CursorLocation = adUseClient
rs.CursorType = adOpenStatic
rs.LockType = adLockBatchOptimistic
- Whenever OLE-DB (lower-level programmatic interface) issues any errors, they are stored in the **ERRORS** collection, whereas whenever ADO (higher-level programmatic interface) returns any errors, they are sent to the Visual Basic **ERR** object. Always use proper error handling to respond to both types of errors.
- The command object's *parameter collection* must be populated. To add parameters to the collection, create each parameter object first by using *CreateParameter* and then add each parameter to the collection using the *Append* method:

Set param1 = cmd.**CreateParameter**("vLastName", adVarChar, adParamInput, 20, "Smith")cmd.Parameters.**Append** param1

- The **Direction** property setting within the CreateParameter statement (see example above) determines if a parameter is set for input, output or both. *adParamInput* is the default.

Building Stored Procedures with SQL

- Note the difference between a regular *query*, a *stored procedure* and a database *trigger*. Stored procedures execute much faster than queries because they are compiled. Triggers are special stored procedures that respond to modification attempts (insert, update or delete) on a database. These special procedures (which enforce the integrity of the database) are automatically triggered in response to these attempts.
- Know the syntax of basic SQL **SELECT** statements. For example:
SELECT * FROM EMPLOYEES
WHERE SALARY > 75000 AND CITY='DALLAS'
ORDER BY LASTNAME DESC
- Know the proper SQL syntax for database **joins**. You will always have one fewer JOIN statement than the number of tables. For example, if you are joining 3 tables, you will have 2 JOIN statements in the SQL statement, as illustrated below:

Table:	Fields:
CUSTOMERS	CustomerID (primary key)lastname, firstname, etc...

RESERVATIONS	CustomerID (foreign key)airlineID (foreign key)ticketprice, etc...
FLIGHTS	airlineID (primary key)number, departuretime, etc...

```
SELECT customers.lastname, flights.number, SUM(reservations.ticketprice)FROM customers
JOIN reservations ON customers.customerID = reservations.customerID
JOIN flights ON reservations.airlineID = flights.airlineID
```

Implementing Security in MTS and SQL Server

There are two types of security that you can use in MTS – **declarative** and **programmatic**. Declarative is the most widely used of the two.

- **Declarative security** is implemented on MTS by setting up **roles**. Windows NT *User Manager for Domains* is then used to map user and group accounts to these roles.
- A **role** is the name of a group (created using MTS Explorer) that is used to define a specific group of related users - allowing them access to components in a package. Each role defines the names of specific users that are allowed access to the **interfaces** (methods) of components within MTS packages. In other words, whenever someone tries to gain access to the interfaces of a component, roles determine which users have the rights to do so.
- There are **no security checks** for method calls between components in the **same package** because components in the same package **trust** each other.
- Whenever a request for a component is made **from outside** a package, however, security checks are invoked. If a component in Package A calls a method from another component in Package B, for example, security is checked.
- **To create a role**, select the MTS package that you want to include it in and double-click on the **roles folder**. Next, click New on the Action menu and choose Role. As an alternative, you can also right-click on the roles folder, click New and then Role. Follow the instructions that follow.
- **To assign roles** to components or their interfaces, select the component or interface within it that will include the role, double-click the **Role Membership** folder, and then click New and then Role from the Action menu. You can also right-click on the Roles Membership folder, click New and then Role. In the dialog box that follows, select the pre-defined roles that you would like to add to the Roles Membership folder and then click OK.
- When you are ready to distribute your application, you must **map Windows NT users** to your roles. You do this using Windows NT *User Manager for Domains*. To add (map) users to existing roles, open the package first, then open the Roles folder and double click on the specific role that you'd like to add users to. Open the **Users folder** and then click on New and then Users from the Action menu. You can also right-click Users, choose New and then Users. In the dialog box that follows, add your NT groups or users to the role.
- You can implement security at both the **package level** and the **component level** in MTS. Component-level security can be set for each individual component in the package but package-level security is only set once for the whole package.

- In order for component-level security to be enabled, package-level security must be enabled first. As soon as package-level security is disabled, component-level security for all components in that package becomes disabled as well.
- **To enable or disable security**, right click on the package or component, choose **Properties** and then click the **Security** tab. Finally, check or clear the **Enable authorizing checking** check box.
- There are three **security modes** available in **SQL Server** :
 1. **Standard** Security – uses SQL Server’s own login validation process. Connections made to databases using this security mode are known as **non-trusted**.
 2. **Integrated** Security – uses Windows NT to validate SQL Server logins. Connections made to databases using this security mode are known as **trusted**.
 3. **Mixed** Security – can use either Standard or Integrated security.

Implementing COM with Visual Basic

Interfaces are represented as contracts between clients and servers which ensure that objects always implement an interface’s functions in a standard way.

- All objects must support the **IUnknown** interface. IUnknown has three methods:
 1. **AddRef** (called when you use the **SET** statement)
 2. **Release** (called when you set an object variable = **Nothing**)
 3. **QueryInterface** (checks to see if specific interfaces are supported)
- The **IDispatch** interface is used to expose an object’s methods and properties. It also inherits the 3 functions from the IUnknown interface. *IDispatch* has 4 methods of its own:
 1. **GetTypeInfo**
 2. **GetTypeInfoCount**
 3. **GetIDsOfNames**
 4. **Invoke**
- **Late Binding** occurs when a reference to a specific object type is not made. In other words, the variable is declared as type **Object** as in the following example: **Dim objX as Object**
- Declaring a variable as **VARIANT** is also considered to be late binding.
- **Early Binding** occurs when a reference is made to a specific object type. At compile time, the compiler is able to check all object references against information in the object’s type library. The following is an example of early binding: **Dim objY As ADODB.Command**

This type of binding also allows the compiler to optimize access to the object and results in two types of early binding: **dispID** binding and **Vtable** binding. *Vtable* binding is faster and more efficient than dispID because it makes fewer method calls to the IDispatch interface.

- The proper syntax for a pop-up menu in Visual Basic is **Me.PopupMenu mnuMyMenu**. You can replace **Me** by the name of the form if you like. This code can be placed in either the form’s **MouseUp** or **MouseDown** event and the menu should be invisible initially.
- An application’s **HelpFile** can be set programmatically using the Visual Basic **APP** object.
- The **StatusBar** control has a **panels** collection that begins with index 1, not 0. It has two styles: *sbrNormal* and *sbrSimple*. When using the simple style, use the **SimpleText** prop-

erty to provide messages in the one, continuous status bar. If sbrNormal is chosen, on the other hand, use the Text property to issue messages in one or more of the panels.

- The proper syntax for the **TreeView** control is:
TreeView.Nodes.Add(Relative], [Relationship], [Key], [Text], [Image], [Selected Image])as node
- The **ListView** control can sort information by using the following properties: *Sorted*, *SortKey* and *SortOrder*.
- **DHTML** is supported by Microsoft Internet Explorer 4.x or higher. DHTML is a *client-based* solution for applications deployed over the Internet.
- Internet Information Server (**IIS**) uses **web classes** and **Active Server Pages** (ASP). IIS is a *server-side* solution for applications deployed over the Internet. Clients using web browsers make **requests** to the IIS server and the server replies with **responses** (WriteTemplate method, for example).
- DHTML applications generate a .HTM file and a compiled .DLL file. ActiveX documents generate .VBD and .DLL (or .EXE) files.
- A connection to a database must be established and **open** before any transactions or execution statements can be issued: **Cnn.Open** must precede those which follow Cnn.BeginTransCmd.Execute
- Use the **FRIEND** keyword instead of Private or Public when you want class interfaces (properties, methods) to be *accessible ONLY to other classes* in the same project.
- Private members cannot be used outside of the class.
- Friend members cannot be used outside of the component.
- Public members are available to use outside of the class and component.

Questions
Exam 70-175

1. How do you create a new package using MTS Explorer?

A: From the Packages Installed folder, Click on the Action menu. Choose New, Package. Choose Create an Empty Package, and enter a name for the package. You can also right-click on Packages Installed

2. Your company requires that you use Microsoft SQL Server as the data store for your client-server application. Your group has never developed a client-server application before. What data access libraries should you use to reduce the amount of development time required to complete the project?

A: ActiveX Data Objects

3. The Client uses RDS to retrieve disconnected recordset (rs) created by ADO. You want client application to persist changes made to the recordset without reconnecting. How is this accomplished?

*A: Dim fname as variant
fname = "c:\Mywork.txt"
rsData.UpdateBatch fname*

4. Where do you designate a control as a container?

A: The UserControl Property sheet

5. What file is created on a Client/Server project to allow a client to access a component on a network server? (allows the Package & Deployment Wizard to recognize the application has a remote component)

A: .vbr file

6. What is the proper syntax to execute a stored procedure?

*A: Set param1 = cmd.CreateParameter("vLastName", adVarChar, adParamInput, 20, _
"Smith")
cmd.Parameters.Append param1
cmd.execute*

7. You are creating a package using the Microsoft Transaction Server (MTS)Package Wizard. When the package executes, you want it to assume the identity of the person who is logged on to the server. How is this accomplished?

A: Simply run the wizard. The Interactive or current user is chosen by default when creating a package with the Package Wizard

8. Which object library must be available on a client computer before you can run a DHTML application?

A: Internet Explorer

9. What is the property of the Remote Data Control that establishes a connection?

A: DataSourceName

10. Betty is designing a three tier application in which her application will call a DBClass component on a remote server via DCOM. Using the InsertCustomer method, she will insert values such as Customer ID, Name, etc. How should Betty get these values to her component maintaining the best possible performance and compatibility?

*A: Place the customer data into a variant array and pass the array. Example:
vCustomerArray(0) = CustomerID
vCustomerArray(1) = sName*

11. Your Web application provides pictures and movies to subscribers who pay you a monthly fee with their credit card. The application uses ADO on an HTTP server to query an OLE DB-connected database for a user's login ID and password. Thousands of users log on to the service every hour. You want to minimize the time the application requires to validate each user's login ID and password. What feature of ADO should you use?

A: Prepared execution

12. What is the correct syntax to ensure that the user requesting the creation of an MTS package is a member of the Manager Role?

*A: If objContext.IsSecurityEnabled = True Then
If objContext.IsCallerInRole("Manager") Then
Allow access
Else
Deny access
End if
Else
Deny access
End if*

13. What Instancing property are free-standing objects set to?

A: MultiUse

14. Which Server Tool uses web classes and ASP, allows for light clients, browser independence, and has the ability to upgrade the application with little or no client upgrades?

A: Microsoft Internet Information Server

15. What entries are required on a client machine to allow remote component creation?

A: ProgID, CLSID, RemoteServerName

16. Which ADO objects have a CursorLocation Property?

A: Connection and Recordset

17. How do you set the properties of a new package?

A: Right-click on the package in MTS Explorer

18. How do you add a component (DLL) to a package?

A: Double-click the Packages Installed folder. Double-click on the package that you'd like to add the component to. Click on the Components sub Folder, click New on the Action menu and then choose Component, or right-click the Components Folder, click New and then select Component. In the dialog box, select Add Files (choosing the components that you would like to add to the package)

Or, drag the DLL files from Windows Explorer to the package in MTS Explorer

19. You have developed an ActiveX control that is able to save records directly to a database using a method named SaveData. The control does this by exposing an event to its container named OnBeforeUpdate. The declaration for the OnBeforeUpdate event in the General Declarations section of the control's class module is as follows: Public Event OnBeforeUpdate (ByRef blnCancel As Boolean). When the OnBeforeUpdate event is fired inside a form containing your control, it receives a reference to the blnCancel parameter in memory. Code can be written inside a form's OnBeforeUpdate event procedure that sets the value of blnCancel to True. The database should be updated only if the value of blnCancel returns as False. Which code should you write inside the SaveData procedure for your control?

A: Sub SaveData

Dim blnCancel As Boolean

blnCancel =False

RaiseEvent OnBeforeUpdate(blncancel)

If Not blnCancel Then Call UpdateDB

End Sub

20. Frank has created a parameter query that his application is going to execute every ten seconds. He knows he should implement his query as a stored procedure but he does not have permissions to create a stored procedure on the SQL Server. How can Frank code his query such that a temporary stored procedure is created and used when his query is called?

*A: Cmd.CommandText = "update SYSTEM_TIMESTAMP SET CHK_TIME=" & Now
Cmd.CommandType = adCmdText
Cmd.Prepared = True
Cmd.Execute*

21. You are developing a Visual Basic application that uses a third party control named Wickets, which is included in the file named Wickets.ocx. The company that makes the Wickets control releases a new version with a different filename, which you download from the company's Web site. After copying the new file to your system directory, you are unable to view any new properties for the control. What must you do?

A: Select the Upgrade ActiveX Controls option on the General tab of the Project Properties dialog box, register Wickets.ocx and then reload the project

22. You have placed an ActiveX Data Objects (ADO) Data control named adcEmployees on a form and set its ConnectionString property to point to a SQL Server database. When the form is opened, you want an associated bound control to display records from a SQL Server table named Employees. To which data control property should you assign the name of the Employees table?

A: RecordSource

23. What are two methods to open a recordset to allow updates of records?

*A: rs.Open sSQL, moConnection, adOpenKeyset, adLockBatchOptimistic
rs.Open sSQL, moConnection, adOpenForwardOnly, adLockOptimistic*

24. What is the syntax to have a txtUserInfo textbox highlight its text upon receiving focus?

*A: txtUserInfo_GotFocus()
txtUserInfo.SelStart = 0
txtUserInfo.SelLength = Len(txtUserInfo)*

25. You have created a data entry form for a Visual Basic database application. When the user clicks the OK button on your form, you call a procedure named FormSave that writes the modified data to a SQL Server database. When users close the form using ALT+F4, your FormSave procedure is not being called. What should you do to ensure that the FormSave routine is always called when the form is closed?

A: Call the FormSave routine from the Form_QueryUnload event

26. Your client-server system must install DCOM components on a Windows NT computer called REMSERVER. You need to create a .vbr file before using the Package and Deployment Wizard to create a setup program for the server computer. How should you create the .vbr file?

A: Select the Remote Server Files option on the Components tab of the Project Properties dialog box. This will configure Visual Basic to automatically create a .vbr file the first time the application is compiled and each time thereafter as long as the setting remains selected

27. Which file, created by compiling a UserDocument, can be dropped onto a container such as Internet Explorer to display the document, and be used in the NavigateTo statement in other UserDocuments?

A: .vbd file

28. Which threading model settings can you select for an ActiveX DLL component project?

A: Apartment Threaded or Single Threaded from the drop-down list box

29. What tool provides a local and/or central repository for components, documentation, script files and allows the developer to add these components to their local project?

A: Visual Component Manager

30. What are the characteristics of a DHTML application?

A: Leverages power of full Visual Basic language, provides a light client for the application, and secures the application's code

31. What are the advantages of DHTML?

A: Client cannot see code, runs on client side, can develop Web using VB knowledge, uses VB debugging, and source code is available

32. Chet is using a client-server database application called MarketData. The application displays a textbox and up and down arrows next to the textbox. As the up and down arrows are clicked, an ADO Recordset cursor scrolls backward and forward one record at a time. All of the columns in a table called Products are displayed in the textbox under column headings. When the form was opened, the Recordset was created with a CursorType property of adOpenKeyset. Which values can Chet view from the Products table as he clicks the up and down arrows on this form?

A: He can only view the records from the Products table that existed when the form was opened and the changes that are made by other users to records after the form is opened

33. An application's project name is MainApp.vbj. It compiles to MainApp.exe. Using the following conditional code in multiple procedures that perform database operations, what methods can be used to set the SQLDEBUG constant to True?

```
#If SQLDEBUG Then  
' code to write SQL to a file  
#End If
```

A: Choose Project, Properties, set the Conditional Compilation Arguments to: SQLDEBUG = -1 or run the following command: vb6.exe /make MainApp.vbp /d SQLDEBUG=-1

34. Under what conditions would a component's overall performance be better using a multithreaded execution model as opposed to a single-threaded execution model?

A: The component runs on a multiprocessor computer; the component's objects are often called from multithreaded clients; and the component's objects spend a high percentage of their time performing file I/O

35. You are using the DataBindings collection to bind fields on your ActiveX control to a DataSource. What property must be set so that changes will be written back to the DataSource?

A: PropertyChanged

36. How do you unregister an ActiveX EXE?

A: MyCom.exe / unregserver.exe

37. Brenda is creating a Cookie class. Each cookie type has a unique ID stored in a database field named CookieID. When designing her Cookie class, what should represent CookieID?

A: Property

38. You are manually copying the contents of a multiple .cab package for a diskette deployment. What two files must be on the first diskette?

A: setup.exe and setup.lst

39. What is the best implementation of load balancing for a large corporation, with several COM Components on multiple servers?

A: Implement a referral component that clients connect to and pass back the servername for the clients to create the component on. Store the servername in a central database. The client can request the servername and then request the creation of the component on that server

40. What is the syntax to process two Recordsets?

A: *Set rs = cmd.Execute
Set rs = rs.NextRecordset()
rs.Close
(***no need to close between records)*

41. You are using the Package and Deployment Wizard to create a standard setup package for a desktop application that will be distributed to users over a network. Which task must be completed during the packaging phase but before the deployment phase?

A: *selection of a .cab file size, creation of start menu group names and icons, and selection of a folder where the package files should be stored*

42. What three options can be used to register an in-process ActiveX DLL?

A: *Compile it, Regsvr32.exe dllname.dll, or Use a set-up program*

43. Your application will use events to coordinate operations between a client application and an ActiveX component. The client application that will implement the events is called ClientApp and the ActiveX class that will fire the events is called ServerClass. You first declare a ServerClass object variable named mobjServerClass inside ClientApp. What else must you do to program an event called MyEvent?

A: *Inside ClientApp, write a sub procedure called mobjServerClass_MyEvent. Declare MyEvent as an Event in ServerClass. Fire MyEvent in ServerClass using a RaiseEvent statement*

44. What three options can be used to register an out-of-process ActiveX EXE?

A: *exeName.exe /regserver.exe, Run it, or Compile it*

45. How do you unregister an ActiveX DLL?

A: *Regsvr32 /u dllName.dll*

46. You copy a Visual Basic project, including all of its files, from SystemX to SystemY. When you open the project on SystemY, you receive an error message stating that one of the ActiveX controls cannot be loaded. What should you do?

A: *Run Regsvr32.exe to register the control before opening the project*

47. Why would variables not be displayed in the Watch Window?

A: *If the context of the expression isn't in scope, the current value isn't displayed*

48. How do you view properties of all controls in Break Mode?

A: *Expand Me in Locals Window*

Expand Expression(Form1) in Watch Window

- 49. The technical support group in your company is having problems managing the locations of the .ini files associated with your application on users' computers. How else could the information contained in .ini files be managed by your application?**

A: You can store the application information in the Registry under HKEY_CURRENT_USER \Software \VB and VBA Program Settings. You can then create a section for your application and use the GetSettings and SaveSettings functions to manage the data that was previously stored in the .ini file

- 50. Which template do you use for a Multi-Tier Application using the same instance of COM?**

A: Active X EXE

- 51. What type of constant do Client-side cursors with ADO support?**

A: Static

- 52. Your application uses anObjectContext variable to maintain its connection to objects created an MTS component package. The name of the ObjectContext variable is objMyContext. One of the operations that was to be performed by the transaction fails. You want to deactivate the object context because you do not need to maintain state information. However, you wish to retain the reference to the object so that you can use it again without reconnecting. Which command should you use to roll back all actions that are part of the transaction?**

A: objMyContext.SetAbort

- 53. How do you deploy a COM component?**

A: Package & Deployment Wizard

- 54. Which combination of controls and properties can you use in Visual Basic to emulate the Windows Explorer program with the modes Large Icons, Small Icons, List and Details?**

A: A TreeView control can be used to display the drives on the system, and a ListView control can be used to display the storage and file objects. The View property of the ListView control can be used to change between Large Icons, Small Icons, List and Report modes

- 55. What is the correct syntax to use a connection object with transactions with ADO?**

*A: Cnn.Open
Cnn.BeginTrans
[Set Command or Cmd.Execute]*

Cnn.CommitTrans

56. How do you set up a connection to a database named DB1 in a server named Voyager?

A: strConnect = "Provider=SQLOLEDB;" & "Data Source=Voyager;" & "Initial Catalog=DB1"

57. How do you check ADO error collection to see if a timeout error occurred?

A: Cnn.Errors(0).Number

58. What is the syntax if when there is a transaction in a COM, it should use it, if not, it should run without transaction?

A: Transaction Mode - Uses Transaction

59. Given the following table, what is the SQL syntax to display records for donors who have given donations?

Donor	DonorID, FirstName, LastName, Phone, Address, City, State, Zip
Donation	DonationID, DonorID, DonationDate, Amount

A: Inner Join Donation on Donation

60. As above, except Donors who have not given donations?

A: Left Outer Join

61. When would you use Unattended Execution?

A: When there's no visible form. i.e. DLL/EXE without forms

62. Your application contains a form named MyForm. After MyForm is closed, you want the binary version of the procedures inside MyForm to be unloaded from memory. What is the proper syntax?

A: Set MyForm =Nothing

63. In an ASP application, when the user clicks the Submit button on the page, Frank wants his application to retrieve the value in each field and store the value in a database. What line of code will return the user's first name from an element called txtFName into a variable called strFName?

A: strFName =Request.Form("txtFName")

64. How is Visual Source Safe code compiled?

A: Manually Compiled, before it's installed

65. What is the syntax to place a control in container with the control caption shown as the container name?

*A: Sub Control_InitProperties ()
 On Error Resume Next
 lblCaption.Caption = Extender.name
End Sub*

66. Using the least amount of code, what two attributes of Error object are needed to re-use a custom Help File?

A: Err.HelpContextID and Err.HelpFile

67. What is the correct cursor and location to populate a Combo-box, and then discard the Recordset?

A: Client side, forward only (adUseForwardOnly)

68. Which Microsoft Transaction Server (MTS) package defines which users can create, delete and change objects?

A: The System package

69. You are developing an *n*-tier application. On the client computer you have the UI and business objects. The server includes the data objects and the database. Where should you use the GetData method to retrieve data from the database?

A: Server-side objects

70. You are designing a three-tier application. You already know that the user interface and business object server components will execute on client computers. You also know that data objects and the database system will execute on a central server computer. Each of ten different code modules contains a different procedure that is used to save data. Each of these procedures is named SaveData. A SaveData procedure will be called when data changes are to be committed to the database. The particular SaveData procedure that will be called depends on which part of the application needs to commit changes to the database. In which of the following should the physical design of the application locate procedures such as SaveData?

A: business object code

71. You have converted frmCustomers to docCustomers (an Active Document) and frmOrders to docOrders (an Active Document). You need to modify the code in a button click event procedure that opened frmOrders so that it now opens docOrders. What is the correct code to use?

A: UserDocument.Hyperlink.NavigateTo docOrders.vbd

72. What method of the Request object (in ASP) accesses information sent from the Server?

A: .ServerVariables

73. What file is distributed by using a file with a .vbd extension?

A: An ActiveX document user interface file

74. With more than one WebClass, how do you find the correct URL?

A: URLFor(WebItem) - returns address of webitems

75. You have written a procedure named MyCallback, the address of which you want to pass to EnumWindows. At run time, you want EnumWindows to call MyCallback. What must you do next to make EnumWindows call MyCallback?

A: Call EnumWindows and pass the address of MyCallback using the AddressOf operator

76. Your form contains a combo box named cboMyCombo. The Style property for cboMyCombo is set to Dropdown Combo. The text "Enter My Own Value" is displayed for one of the selections in the combo box list. When the users select this item from the list, you want the text portion of the combo box to be cleared so that the users can enter their own values. What should you do?

A: Set the cboMyCombo.Text value to an empty string in the cboMyCombo_Click event if the cboMyCombo.Text property has "Enter My Own Value" as its value

77. What is the syntax of that shows the order of third party control events, and supports all types of controls?

A: Dim WithEvents Obj As VBControlExtender

78. Which type of ADO Recordset object should you use if read only data is needed, and to reduce time and the amount of resources that will be consumed by computing resources?

A: Forward-only

79. Database with various fields, which three columns are most likely to be properties of an address business object?

**AddressID
City
Street**

Created By
Create Date
TimeStamp

A: City, Street and Created By

80. In a Client/Server application, how do you minimize network traffic?

A: Ensure processing is done on Server

81. You are developing an employee security application using a data management form named frmSecurity. There is a text box control on this form named txtSSN. There are three security classifications for employees at the client site. If the security classification for an employee is marked as "SECRET," then a Social Security number must be entered in the form. However, if the security classification is not marked as "SECRET," then you want the Social Security number field to be disabled. The integer value of a "SECRET" classification in the Classification field of the underlying table is equivalent to a constant value of CLSF_SECRET. All of the data for this form will be retrieved using a static recordset named rsSecurityData. What is the line of code to enable or disable the Social Security number field on the form?

A: If rsSecurityData!Classification =CLSF_SECRET Then frmSecurity.txtSSN.Enabled =False

82. You have different classes using the Save/Update/Delete methods. Each one uses it in a unique way. How should it be designed so that duplication of code is minimized?

A: Construct a template class that contains the common method. Use the Implements keyword in the other classes to cause them to contain these Methods

83. You want to add a status bar to your form. In this status bar you want to display various items such as the time, the date and a Caps Lock key indicator. What should you do?

A: Create a Panels Collection. Set the Style property for each Panel object based on what each panel should display

84. Barney is developing a distributed application with three layers. Which two layers should be used to validate security information for applications?

A: Business services, and Data services

85. In a COM called Account with a method called Savings, how do you enter Break Mode when Savings is executed?

A: Set a breakpoint in Savings method

86. You want to trap information about any event fired by an ActiveX control on one of your forms. Which line of code should you use to declare the object variable that will reference the ActiveX control?

A: Dim WithEvents ctlMyControl As VBControlExtender

87. You are designing a trading application. You do not want the Execute method of the Trade object to complete if the MarginPresent property is equal to False. How should you physically implement the part of the logical design that causes the Execute method to fail when the MarginPresent property is equal to False?

A: Raise an error in the Execute method. In the client application that called the Execute method, handle the error appropriately

88. What is the syntax of RDO with rdAsyncEnabled?

A: Rdors.StillExecuting

89. You are developing an Internet electronic commerce application that will simultaneously utilize several ActiveX components on various computers. A customer management component will read and write customer names, addresses and telephone numbers. The SQL Server database table for customers includes the fields FirstName, LastName, PhoneNumber, CreatedBy, CreatedDate and Timestamp. Which three of these fields would typically be exposed by an ActiveX business object component?

A: FirstName, LastName, and PhoneNumber

90. With RDO, when do you use rdExecDirect?

A: When you don't want temporary stored procedures created

91. Where are Multi-Tier Applications, with often-changing details, best stored?

A: In the Database where changes can be made without recompiling

92. Your form contains a text box control named txtMyDate. In the LostFocus event for txtMyDate, you want to test whether or not the value that the user entered is a valid date. Which code can you use to display the message "Invalid Date "if the text box entry does not contain a valid date?

A: If Not IsDate(txtMyDate)Then MsgBox "Invalid Date"

93. What methods are used to tell MTS that an object can be pooled?

*A: .SetComplete (can commit transaction updates)
.SetAbort (failed – rolled back to original state)*

94. How do you name the ObjectContext in MTS?

*A: Dim ob As ObjectContext
Set ob = GetObjectContext*

95. What is the thread property of a COM DLL with MTS?

A: Must be Apartment-Threaded

96. What are the requirements for installing MTS on a server?

A: Windows NT with Service Pack 3 and Windows 95 with DCOM support

97. How are objects referenced to their respective ObjectContext?

A: GetObjectContext function

98. How do you create an MTS Object Context?

A: set objExample = GetObjectContext.CreateInstance("Sample.Class")

99. What is the instancing property for business objects (DLL class module)?

A: MultiUse

100. You develop an ActiveX component named AudioWorks. Inside AudioWorks there is a class module named Amp and a class module named Stereo. When a client application creates a Stereo object, you want it to automatically create an Amp object internally using the SetAmp method of the Stereo class module. The user can then access the properties and methods of the Amp object for the new Stereo object even though they cannot create an Amp object externally. Which of the following code segments should you add to the Stereo class module?

*A: Private mAmp As Amp
Public Property Get Amp()As Amp
Set Amp =mAmp
End Property
Friend Sub SetAmp(ByVal NewAmp As Amp)
Set mAmp =NewAmp
End Sub*

101. How do you add, import, or create a package in MTS?

A: Package Wizard

102. How do you establish MTS security?

*A: If ObjCont.IsSecurityEnabled = True Then
If ObjCont.IsCallerInRole("RoleName") Then*

103. You are developing a client application called MyApp that will trap custom events from an ActiveX component called MyServer. MyServer will raise the event from a class called MyClass. Which of the following statements must be used inside of MyApp when declaring a server object variable named mobjMyServer?

A: Public WithEvents mobjMyServer As MyClass

104. How do you display a Pop Up menu mnuPopUp on Form1 in an application?

A: Form1.PopUpMenu mnuPopUp

105. How is access designed in Visual Component Manager?

A: If developers have access to a repository database, they have access to all shared components in it. Everyone with permission to access the share can access the components in it

106. What is the syntax for an Active Document to communicate with its container?

A: strName= TypeName (UserDocument.Parent)

107. How do you communicate an error from a remote COM component?

A: Use Err.Raise and handle the error on the client

108. Sharon is writing a client-server application using ActiveX Data Objects (ADO). She has written much of the data manipulation and retrieval code on Microsoft SQL Server 6.5 as stored procedures. One of these stored procedures is named GetPartsLists. GetPartsLists requires two input parameters and often returns more than one result set. Sharon has written the following code to retrieve the first result set:rstMyResults.Open "EXECUTE GetPartsLists 5,15" . What must Sharon do to retrieve subsequent result sets returned by GetPartsLists?

A: Retrieve subsequent result sets as Recordset objects using the NextRecordSet method. Continue until a recordset that is equal to Nothing is returned

109. How to add an ActiveX Control to the Toolbar?

A: Choose Project, Components. Check the appropriate control

110. What event persists when you close a UserControl?

A: WriteProperties

111. When an application runs from a browser, what is the difference between debugging a DLL vs. an EXE?

A: DLL - one instance, in-process EXE - two instances, out-of-process

112. During conditional compilation, what occurs with the following line of code, using Win 95?

```
#If Win32 Then
    Declare function Xfunc Lib "XLib" as Long
#Else
    Declare function Xfunc Lib "YLib" as Integer
#EndIf
```

A: Function XFunc will compile from XLib

113. In adding a record of ADO to HierarchicalFlexGridControl, what is the missing code?

A: Set MSHFlexGrid1.DataSource = rs

114. What is the default property for Class?

A: MultiUse

115. You have an ActiveX DLL Project with a Global variable "StudentName". During debugging, how do you know when "StudentName" is changed to the value of "Frank"?

A: Set Watch Expression to StudentName = "Frank" and "Break When Value Is True"

116. To prevent existing applications from using the new version of an updated application, which compatibility should you use?

A: No Compatibility

117. What are three ways to copy an object on the Client to the Server, with the least amount of Network traffic?

A: Send it in Variant Array, send it as a disconnected ADO Recordset, and Write it to database and open database from Server

118. A form has six command buttons on it. How do you force the third command button from the top of the form to receive the focus when the form is loaded?

A: By setting the TabIndex property of the third command button to zero

119. What can developers do with a component that has been published with the Visual Component Manger?

A: Find and reuse it

120. You are writing a business object component that will expose database information about your customers. Each customer has an identification code called CustomerID. You want programmers to be able to determine a CustomerID for an object, but you do not want them to be able to change it. How should you write code to expose the CustomerID for the object?

A: As a Public Property Get procedure

121. How do you debug an ActiveX control, line-by-line?

A: Add a Standard EXE to the project group, and place an instance of the control on a form in this new project

122. What cursor type and location is used for a stored procedure that returns several large recordsets?

A: AdUseServer & AdOpenDynamic

123. There are four tables in a database. The first three are populated with data from the fourth. This transaction must take place. How do you do this?

A: Create one stored procedure, execute this procedure using ADO Transactions and Err.Raise

124. How do you track errors on a COM EXE server in Unattended Mode?

A: App.LogPath & App.LogMode

125. What is the syntax to perform logging to a file by specifying LogPath and LogMode in the StartLogging method?

*A: With App
.StartLogging "C:\temp\logtest.log", vbLogToFile
.LogEvent "Specified Path File Logging" & Now, vbLogEventTypeInformation
End With*

126. You are developing an MTS Component to install in an MTS package. Early binding is required. You want to access the component in MTS Explorer from VB IDE. How can this be accomplished?

A: Add Project Reference to MTS Component (reference MTS component DLL)

127. You want users to be able to install an application from a Web site. What should you do?

A: Use the P & D Wizard to publish your application to the appropriate site

128. How do you minimize development time when connecting an application with data-bound controls to an SQL database?

A: ADO direct to SQL

129. How do the following major locking models affect concurrency and consistency?

A: When compared with a pessimistic model, an optimistic locking model increases concurrency but reduces consistency

130. You are designing the properties, methods and events for a component. What would you specify the Component's ID number as?

A: Property

131. You have used the Package & Deployment Wizard to update an existing application. You want it to be updated when user runs "Setup.EXE". How do you do this?

A: Increment Version Number of project before rebuilding your application

132. You are writing an ASP application that uses token-prefixed tags to generate a report for the user. You write code in the ProcessTag event procedure to format the user's report. Which method will cause the ProcessTag event to fire for each tag?

A: WriteTemplate

133. You are creating a Visual Basic data project using a Data Environment Designer named envProducts. Under the cnxProducts Connection object, you have created a Command object named cmdProducts, which has a ProductID and a ProductName field. In the Data View window, you have created a Data Link named DBProducts, which points to the same Products table used to create the Products Command object in the Data Environment Designer. You want to display on a form the values from the ProductName field in the Products table. How should you set the data-related properties for the txtProductName text box?

A: Set the DataSource property equal to envProducts, set the DataMember property equal to cmdProducts, and set the DataField property equal to ProductName

134. How do you prevent Component configurations from being modified on one of your packages?

A: Set DisableChanges option

135. In which two layers can you map permissions to roles to support design of a Client/Server application with both Windows and Web-based interfaces?

A: In the database and in the user interface code

136. To ensure only one user at a time can access a record from a database, which locking strategy do you use?

A: Pessimistic

137. Which layer of *n*-tier design provides security information to the User Interface?

A: Server objects and Business object

138. You are developing a database application for the Alpha Corporation. You are using the Data Environment designer, and you want to build your initial data maintenance forms quickly. Which of the following steps should you take to build your forms as quickly as possible?

A: Configure the existing Connection object. Create a Command object. Drag and drop a Command object from the Data Environment designer to your form.

139. The user account for the Sales package is MTSSales and the user account for the Orders package is MTSOrders. Barb now wants to test the operation of the Orders package. For Barb to be able to invoke all of the methods in the Sales package, including those that call methods in the Orders package, how must the security settings be configured?

A: Barb's user account must belong to the appropriate Roles in the Sales package, and the MTSSales account must belong to the appropriate Roles in the Orders package

140. You are designing an *n*-tier solution with five layers, Database, Data Objects, Business Objects, Server Objects and UI. You wish to enable/disable controls in UI according to whether user security permits access. Which layer in the logical model provides security settings to the UI?

A: Server object

141. Your Internet order entry system uses a credit card validation object provided by the Vericard Corporation whose database server and application servers are located in another city. The Vericard Corporation uses Microsoft Transaction Server to provide credit card validation objects. How should you package the credit card validation object?

A: By using Business Services

142. What items can you store in a Repository Database?

A: The Component itself, documentation relating to the component, and project templates

143. Where do you install the .pak file (MTS package file)?

A: On the computer running IIS

144. How do you ensure users place the database file in the specified path and not another location?

A: Create an ODBC Data Source Name (DSN) for your database and refer to the DSN in code

145. What should you do to make recordset read-only?

A: Set the LockType property of the recordset equal to adLockReadOnly

146. Why would you not be able to see a control, that is not a VB default control, on the Toolbox at run-time?

A: Not added to project

147. How do you ensure that a client handles events fired by a COM component?

A: Must declare variable using WithEvents keyword

148. What are the criteria for using the Data Environment designer with an existing stored procedure?

A: Map each field of the result set to a specific type of control and Add a Command to reference existing stored procedure

149. When binding controls to data using the Data Environment designer, what must be set?

A: Set the DataMember property to the name of the Data Environment designer Command

150. What is the syntax to display or hide a checkmark next to a Log Errors command?

A: mnuToolsLogErrors.Checked = Not mnuToolsLogErrors.Checked

151. What coordinates transactions over multiple resource managers, ensuring the all-or-nothing transaction processing rule?

A: Microsoft Distributed Transaction Coordinator

152. A server-side COM component is about to delete. An event(OnBeforeDelete) is raised just before deletion. If no action is taken by the client, then deletion takes place. Which code fires the event?

A: RaiseEvent OnBeforeDelete(bContinue)

153. What is the syntax to save a Recordset's contents to a file on the local computer and return to it later without reconnecting to the data source?

*A: Recordset.Save FileName
PersistFormat Recordset.Open FileName*

154. Which statement should you use to close the Recordset object when you have finished accessing it?

A: rsMyData.Close

155. What do you have to install on the client for it to run your application using MTS?

A: DCOM and the executable

156. Using the following code, how many instances of Class1 is created?

```
Dim a as Class1  
Dim b as New Class1  
b.MyProperty = True  
Set a = New Class1
```

A: 2

157. What is defined for a new package when you are using the Microsoft Transaction Server (MTS) Package Wizard?

A: The name of a package, the username for an account that will be used to execute a package, and the password for an account that will be used to execute a package

158. What is required for early binding?

A: Type Library (New keyword if two answers are asked for)

159. Which property of Err object gives you an idea of where the error has occurred?

A: Source

160. Given the following code, what will be the output?

```
Private Sub Mysub() as integer  
    Static Count as integer  
    If Count >= 4 Then  
        Exit Sub  
    Else Mysub  
    End If  
End Sub
```

A: Out of stack error

161. You want to release your application without debug code. How can you accomplish this?

A: Use Conditional Compilation

162. You want to optimize compilation. In your application you never compare Floating Point Data for equality. Which compiler option would optimize your application?

A: Allow Unrounded Floating Point Operations

163. You want to use methods and properties of a class as if they were VB methods and properties. What instancing should you use for this class?

A: GlobalMultiUse

164. You create a form that contains graphics and text. You want to ensure that the form will be automatically repainted after it is resized or is listed by another object. How do you accomplish this?

A: Set the Autodraw property of the form to true

165. In a project, you have Form1 with PictureBox1 (AutoRedraw = False), Label1 and TextBox1. The following code is executed while the form is minimized. What will the user see after maximizing the form?

```
Text1.text = "ABC Company"  
Label1.Caption = "Name"  
Picture1.Print "Invoice #100 $500.00"
```

A: "ABC Company" "Name"

166. You are building a client/server application. The client will access only some of the data in the result set. You want to minimize network traffic. Which database cursor type should you use?

A: dynamic server-side cursor

167. IIS server receives HTTP request from web client using Post method. Which collection contains the data?

A: form

168. You are using VSS 6. You wish to ensure that your VSS code is always compiled. What should your developers do to ensure code is always compiled?

A: Manually compile their projects before check-in

169. In a Standard EXE with forms as in the table below, what is the value of Forms.Count?

Form Name	Form Type
Form1	Standard Form
Form2	Standard Form
MDIParent	MDIParent
MDIChild1	MDIChild
MDIChild2	MDIChild

```
Sub Main
Dim nForm as new Form1
MDIParent.Show
MDIChild1.Show
MDIChild2.Show
Form1.Show
Form2.Show
Form2.Hide
nForm.Show
```

A: 6

170. If a client object creating a new Pricing object exists within a transaction context, then the Pricing object should also exist within a transaction context. If a client object creating a new Pricing object does not exist within a transaction context, then the Pricing object should not exist within a transaction context. What property should be selected on the Transaction tab for the Pricing component property sheet?

A: Supports transactions

171. Your ASP application passes data to a user's browser. As the user navigates to other Web pages, you want to store some of this data in memory on the user's computer. This way, if the user returns to your Web page, the data that they previously entered can be displayed. Which Active Server Pages collection can you use to do this?

A: The Cookies collection of the Response object

172. You do not want your component to be reloaded into memory each time a client application instantiates an object from your class module. Which instancing settings for a Visual Basic class module can you use to accomplish this?

A: MultiUse, or GlobalMultiUse

173. You have a UserControl project which you attempt to open on different computer. You get an error message “Can't see control in project”. What caused this error?

A: Component not installed

174. How can you enable Dynamic Load balancing in MTS with JIT-activated MTS components?

A: Create an MTS component named LoadBalancer which uses your load balancing algorithms. Ensure all components call SetComplete

175. How do you guarantee a new thread every time you create an object in an ActiveX EXE?

A: Set threading model to Thread Per Object

176. You are implementing a distributed in-process ActiveX component. You want to register the component in the clients. How should this be accomplished?

A: Run the Package and Deployment Wizard and create a .cab file and put it on the Intranet server

177. An active X component is creating a problem when used under certain conditions. You want to inform developers on your team about the conditions. How do you inform other developers?

A: Publish using Visual Component Manager and right-click control and select Properties, Use Annotations tab to enter workaround

178. You want to add help to controls in your form and you need the form to show specific help when you press F1. What do you need to specify?

A: Specify a HelpContextID for each control and add it to the help file and Specify a Help-File for the project

179. What advantages do you get when you compile to p-code instead of native code?

A: Compile will be faster, executable will be smaller

180. You want to debug a class module. You want execution to stop when a method in the class is executed. How is this accomplished?

A: Add a Standard EXE project to your group and set it as the starting project, add your component to the group and set a breakpoint

181. The MTSTransactionMode property will determine the transactional context used by MTS for a Visual Basic component object. To which of the following can the MTSTransactionMode property be applied?

A: A Visual Basic class module

182. You are creating an Active X document application. What is the syntax to navigate to a new location when the user clicks on the link?

A: UserDocument.Hyperlink.NavigateTo "http://www.troytec.com"

183. You are designing a Client/Server n-tier application. You have the UI, Server Objects, Business Objects and Database layers. You want to pass data from the Database layer to the UI. What is the flow?

A: The database layer passes data to the Business Objects then to the Server objects then to the UI

184. You are developing an n-tier application that has four layers. The layers are UI, BO, DO, and DB. You want to pass data from the DB to controls on the UI form. What should you do?

A: Populate the DO with data from the DB. Populate the BO with data from the DB. Populate the controls with values retrieved from the BOs

185. You want to minimize traffic in a network. Which type of cursor should you use?

A: Server side cursor

186. You are using the Data Environment Data Report. You have Customers Orders and Items. You set parent properties for Orders and Items. You execute the report and find that you can see orders but not items. What is wrong?

A: The parent property for Customers is not set

187. You want to process all items returned from an ADO cursor. What cursor should you use?

A: Dynamic with AdUseServer

188. How can you determine programmatically whether your ActiveX document is currently being accessed from Internet Explorer or from Microsoft Office Binder?

A: Check the Parent property of the UserDocument object

189. You want to instance an MTS object with a new transaction every time. What transaction attribute value must you use?

A: Requires a new transaction

190. You are implementing a COM server that contains components. Each component must execute within a separate MTS transaction. What transaction attribute value must you use?

A: Requires a transaction

191. How would you display your web site map?

A: Treeview

192. In a Command1 click, you trigger Command2. In Command click, you set the Command1 value to true. What will happen?

A: A stack overflow

193. A Data Link is represented in the Data Environment by which object?

A: Connection

194. How do you test an ActiveX DLL?

A: Open the DLL project, Add a New Project and then choose Standard EXE. A template for this new project will be added to the Project Group window. Right-click on the Standard EXE project and choose Set as Start Up. Add a reference to the ActiveX DLL project by clicking on Project in the Visual Basic menu bar and then choosing References

195. How do you test an ActiveX EXE?

A: You must open a second (separate) instance of VB because ActiveX EXE's run out-of-process

196. An ActiveX DLL is to be used by a multi-threaded client. Any thread in client must be able to create an instance of the component on the client's thread. What should you do?

A: Set instancing to MultiUse

197. Which steps configure permissions for the COM server on the computer where COM server is installed?

*A: Allow access to Bob's domain user account
Allow launch permission to Bob's domain user account*

198. What is the proper syntax for declaring a component running MTS, if all objects created should be in transaction?

*A: Dim "A" as Object Context
Dim "B" as Bank.Account*

*Set "A" = GetObjectContext()
Set "B" = "A".CreateInstanceC"Bank.Account"*

199. A distributed application requires dynamic load balancing. You want dynamic load balancing to occur on a method by method basis. How should this be accomplished?

A: Develop both client application and server component as entirely stateless entities

200. You develop a COM server that uses DCOM in a distributed environment. You want to change the name of the computer on which the server will execute. What should you do?

A: Use the DCOMCNFG utility

201. You have previously used the package and deployment wizard to create a setup program to install version 1 of your distributed application from a Web page. You now want to install version 2 of your application. You use the P&D Wizard with all of the saved scripts to deploy the associated application. You do not receive any errors. However a tester reports that some of the parts to be installed via Web page are upgrading your application to the newer version. What is the most likely cause of the problem?

A: The version number on the make of the Project Properties dialog box has not been set to 2

202. What are the advantages of using the Package & Deployment script?

A: Scripts can run in silent mode, you can save settings for similar projects to use as enhancement of further developments

203. Which debugging windows can be used to change the value of a variable directly?

A: The Locals window, and the Watch window

204. A COM component freezes on the server. You want to handle the error. How should you accomplish this?

A: App object logging

205. Your database application runs on a server, but it does not use Webclasses. You want errors generated by the application to be written to a log file. What is the easiest way to do this?

A: Write an On Error Goto statement at the beginning of your sub procedures and call a centralized error handler. Use the LogEvent method of the App object from the centralized error handler

206. A multi-tier Internet commerce application utilizes ActiveX Data Objects (ADO) on an Internet server to communicate with a SQL Server database running on another computer. The user interface is browser-based and uses Active Server Pages (ASP). When users want to view product catalogs in their browser, ASP calls a procedure named DataGet. The DataGet procedure then accesses the database using ADO and returns the data to the calling procedure in the ASP application. Where would you handle errors?

A: Use an event in the component that contains DataGet. Attempt to handle the error in the DataGet procedure

207. You are designing a VB application. Data will change over time. Where should you store a list of valid types?

A: In the Database table

208. How can you map a textbox's text property to a control text property?

*A: Public Property Get Text()
Text = Textbox.Text
End Property
Public Property Let Text(ByVal Strtext As String)
Textbox.Text = Strtext
End Property*

209. Your server side component uses ADO to access a MS SQL server database. You want to handle errors that occur in this component when the Load method accesses the data. What should you do?

A: Raise an error to the object that called this component. Write code in the calling component that passes the error back to the user interface and handles the error

210. You are creating a component that has a property named CodeID. You want CodeID to be read/write from within the component, but read only to the client. What is the correct syntax?

*A: Public Property Get CodeID()
Friend Property Let CodeID(ByVal Strtext As String)*

211. You have written an application that hosts an ActiveX document file named MyDoc.vbd. The compiled COM server executable for MyDoc.vbd is called MyServer.exe. Both MyDoc.vbd and MyServer.exe are located in the folder C:\MyDoc. You want to test the ActiveX document using Internet Explorer. How can you do this?

A: In the Debugging tab of the Visual Basic Project Properties dialog box, select Start Browser with URL and type "C:\MyDoc \MyDoc.vbd" into the URL textbox. Then, run the project

212. You are making use of pass by reference. How will you optimize numeric calculation?

A: Remove FDIV checks and Remove floating point error checks

213. You have written a distributed application that will be compiled into two different versions. The English version will use data and currency filters that are different from the French version. You have written several code branches that use the following format:

```
#If VER_ENGLISH Then
'<code specific to English version>
#Else
'<code specific to French version>
#EndIf
```

You want to compile an English version of your application. What should you do to set the value of the VER_ENGLISH constant using Visual Basic code?

A: Declare VER_ENGLISH as a Boolean constant in each code module where it is used. Use the #Const statement to do this and set VER_ENGLISH equal to -1.

214. What are two methods for adding MTS components?

A: Create a blank package and add component to it or add a pre-built package which contains a component by dragging the .pak file from Windows Explorer to the new computer in MTS Explorer

215. What are two methods to declare an object for early binding?

```
A: Dim Obj as New Project1.Class1
Dim Obj as Project1.Class1
```

216. What should you map a Data Control to?

A: Data Object

217. When does optimistic locking in an ADO lock?

A: During update method

218. To execute SQL commands repeatedly for better performance what should you do?

A: Prepared property of Command Object set to true (Use Command Object)

219. How do you add a tool bar to a CoolBar control?

A: Set child property of CoolBar to handle to window of toolbar

220. Where is the Callback function for Enum procedure window function defined?

A: In Standard module

221. You are creating a four layered solution. It includes UI, client side objects, server side objects, and database. Now you want to populate a combo box in the UI with data in the database. How is this accomplished?

A: Send the data from database to server side objects, from server objects to client objects, and then to the ComboBox in UI

222. How do you reduce network traffic?

A: Use stored procedures, disconnected Recordsets and server side cursors

223. You want to bind a TextBox control named txtFieldText to the Field column of the Land table in a database. The data source name of the database is Meadow. You want to bind by using an ADO Data control named adoData. What four steps are necessary?

A: Set the DataField property of txtFieldText to "Field". Set the DataSource property of txtFieldText to adoData. Set the RecordSource property of adoData to "Select Field from Land". Set the ConnectionString property of adoData to "Meadow".

224. You are implementing two COM components in the same project. They are named CClub and CMembership. You want applications to be able to use instances of both components. But, you want only CClub to create instances of CMembership. What instancing property does CMembership have?

A: PublicNotCreatable

225. How can you use Visual Basic to associate a topic from your Help file with a custom error?

A: Set the HelpFile property and the HelpContext property of the Err object. Assign values to these properties each time you want to display a custom error message

226. You want to initiate an MTS transaction from a component. What must you do?

A: Instantiate an instance of theObjectContext object by using the GetObjectContext method

227. You want to create a COM for use in an MTS. Which project type must you use?

A: ActiveX DLL

228. You want to enter break mode on the next line of code when the user types “Halt” in a text box named Text1. Which value should you enter in the Expression box?

A: Text1.Text = “Halt”

229. You develop an ActiveX DLL. Your UserDocument will run inside Internet Explorer. You want to retrieve a reference to the instance of IE that is hosting your UserDocument. What is the syntax?

*A: Dim Obj As WebBrowser
Set Obj = UserDocument.Parent*

230. How do you set of a default property in a class module?

A: In the Procedure Attributes dialog box, set the Procedure ID to (Default) for the property

231. You are developing an MTS packaged named Clients. Components in Clients are being designed to use components in an existing MTS package named Delivery. You want the Clients components to be able to retrieve information from the Delivery components. How should you configure the security to allow this?

A: Add the Windows NT domain account information of the users who will be using the component to the appropriate roles

232. What type of cursor should you use that will allow users to have unrestricted data manipulation and browsing? You do not need the local recordset to detect records added to the database by other users, but you need to detect any changes made to its own records.

A: Keyset

233. How do you configure client computers to allow the use of an application that uses DCOM?

A: Use the P & D Wizard to create a setup program

234. How should property routines handle a disallowed attempt by the container to update a given property?

A: Raise an error during a method

235. A credit card company serves many customers all over the world. You are developing an application to authorize the use of credit card transactions. What is the best method to do this?

A: n SQL server, n MTS

236. A Business object contains Signal and Score properties, and the Save method. How do you prevent updates on the Score property if the Signal is set to True?

A: Raise an error during the Save method