UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2005/2006 – 2nd Year Examination – Semester 4

IT4302 -Rapid Application Development

PART 2 - Structured Question Paper

6th August, 2006

(ONE HOUR)

To be completed by the candidate

BIT Examination Index No: .....

Important Instructions:

- The duration of the paper is **1 (One) hour**.
- The medium of instruction and questions is English.
- This paper has **3 questions** and **12 pages**.
- **Answer question 1 (**50% marks**) and any one of the other questions (**50% marks each**) only**.
- **Write your answers** in English using the space provided **in this question paper**.
- Do not tear off any part of this answer book.
- Under no circumstances may this book, used or unused, be removed from the Examination Hall by a candidate.
- Note that questions appear on both sides of the paper.
  If a page is not printed, please inform the supervisor immediately.

Questions Answered

Indicate by a cross (×), (e.g. [X]) the numbers of the questions answered.

To be completed by the candidate by marking a cross (×).	1	2	3	
To be completed by the examiners:				

Based on the following case study answer question 1.

1)

Case Study

ABC Bank

The following text describes the operations of ABC Bank.

The ABC Bank wishes to develop an information system for handling accounts. The following is a summary of interviews with employees and customers of the Bank in connection with the matter.

The Bank has three different types of account, namely Savings Account (SA), Checking Account (ChA) and Current Account (CuA). CuAs are meant for Corporate Customers and are opened in the name of the Corporation/Company/Organization. SAs or ChAs can be in the name of one person as an individual account or in the name of more than one person as a joint account. In the case of a joint account, one of the account holders is identified as the nominated customer. In the case of a CuA, the nominated customer is the Corporation/Company/Organization.

SA customers do not get Monthly Statements(MS). Instead, each SA customer has a passbook which gets updated on request after presentation. The Bank has printers and printing software in place for updating passbooks.

A Checking Account (ChA) is just like a SA, except that customers can also write cheques. Books of cheques are sold at Rs. 500/- per book of 100 cheques. When cheque #90 comes in, a notice is sent to the address of the nominated customer via mail asking whether he needs to purchase more cheques. ChAs do not have passbooks, and SAs do not have MSs.

A Current Account (CuA) works like a ChA, with a few extra features. For example, a Quarterly Statement (QS) (which is exactly the same as a Monthly Statement (MS), except that it is done for an entire quarter) is sent out, in addition to the regular MS. The QS is sent in the same envelope as the statement for that month. CuA are not joint accounts and they cannot be accessed through an ATM (Automatic Teller Machine). Furthermore, because of the different service needs of the corporate customers, they are dealt with at special branches called "Corporate Branches" which serve only corporate customers. Although corporate customers can be served at 'retail branches', they rarely do because the tellers in a retail branch do not have the necessary background to meet their special needs.

Customers are able to open and close accounts. They can withdraw money and deposit money or cheques, or get the current balance. The current balance is displayed on an account update screen, which will be part of the teller's information system. This screen displays the account number, the nominated customer's name, and the current balance of the account. An account is associated with a specific branch. Although the Bank now supports multi-branch Banking, every account is still assumed to have a 'home' branch.

More than one account can be accessible from an ATM Card issued by the Bank. Any customer except corporate customers can request for an ATM card. Customers can access their accounts using two different methods: at an ATM or at a Bank branch. ATMs enable customers to deposit to, withdraw from, and get balance statements of their accounts. They can also pay bills (this is basically a withdrawal) and transfer money between accounts (this is basically withdrawing from one account and depositing into another).

Everything that can be done at the Bank can also be done by a real live teller in a branch. The teller will have an information system that provides the screens to perform all of these functions. Additionally, tellers can also help customers to open and close their accounts, as well as print out account statements for the customer. Such account statements are just like the MSs or QSs, except that they can be for any time period. For example the customer could request a statement from the 15th August to 23rd of September, and the system should print the statement immediately.

MSs and QSs are normally printed out on the first Saturday of the following month. This is done as an automated batch job.

The Bank has started setting up ATMs into variety stores and restaurants. Every ATM, including those in the branches, are considered as branches of the Bank. This means that ATMs will have branch Ids and addresses, just like a normal branch.

To manage the Bank effectively, it is split up into collections of branches called 'areas'. An area is a group of between 10 and 30 branches. Each ATM belongs to one and only one area. Each area has a unique name and is managed by an 'Area Manager' who receives weekly transaction summary reports every Monday before 9 in the morning. This report summarizes separately the number and total amounts of all withdrawals, deposits, and bill payments performed at each branch (including ATMs) for the previous week. For branches where accounts can be opened, there is also an indication of how many accounts were opened during the week, how many accounts in total were there at the end of the week, and how many accounts were closed during the week. Finally all these figures are summarized, and will be sent to the Area Manager.

(a) Identify five classes, declare them and create instances to the classes in Visual Basic .net

(05 marks)

ANSWER IN THIS BOX

(b) What are Constructors and Destructors? How does one create a Constructor in Visual Basic .net? When will the destructor be called in Visual Basic.net?

(10 marks)

ANSWER IN THIS BOX

Constructors and destructors control the creation and destruction of objects. To create a constructor for a class, create a procedure named Sub New anywhere in the class definition.

The destructor is called just before the component is destroyed by garbage collection and its memory is reclaimed. In Visual Basic .net, Finalize method is created as the destructor.

(c) You have been given an MS SQL server 2000 database called Bit_Exam. The Figure 1 is the login form for the application. Names given for Textboxes are TextBox1 and TextBox2. The Name for the database server is Bit_Server. Users are created on the MS SQL server. When one enters the application through login, he has to check whether the user exists on the Server. Having checked whether user's User name and Password are correct, the second form in the figure 2 is shown. Use structured exception to provide the error message for incorrect User Name and Password. Write the syntax for the above scenario if the name of the form in second figure is frmAdd.vb (Code can be activated clicking the Login button). The name for the SqlConnection is myConn.

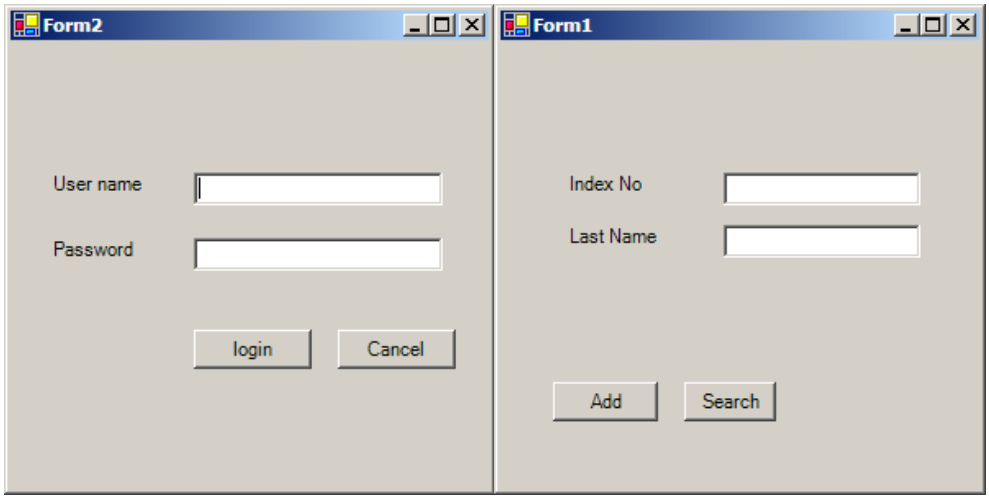

Figure 1 **Figure 2**

(15 marks)

ANSWER IN THIS BOX

```
Imports System.Data.SqlClient

Dim myConn as SqlConnection
Dim myConnectionString as String
myConnectionString = "Initial Catalog=bit_exam" _
& ";Data Source=bit_Server;user ID = " & me.Textbox1.text & ";" _
& "password =" & me.TextBox2.text & ";"

myConn = New SqlConnection(myConnectionString)
```

Continued…

```
Try
  myConn.open()
  Dim myAddfrm as new myAdd
  myAdd.show()
Catch ex as Exception
Messagebox.show ("incorrect password or User Name")
End try
```

(d) In the Bit_Exam database, a table which is called "Names" has been created. The schema for the Names table is given below.

Names (**IndexNo**, LastName)
Data Type of IndexNo and Lastname are VarChar (10) and VarChar (50) respectively. When one clicks the add button, data in IndexNo and Last Name will be inserted into Names table. Write the code for the above scenario using the SqlConnection made in the part (c).

Hint: If SqlDataAdapter is used the object variables ***da*** for SqlDataAdapter and ***cmd*** for SqlCommand will be declared. The names for the two textboxes are txtIndexNo and txtLastName. The Variable for Sql query is strSql.

(15 marks)

ANSWER IN THIS BOX

```
Imports System.Data.SqlClient
Dim da as SqlDataAdapter = new SqlDataAdpater
Dim cmd as SqlCommand
Dim strSql as String
strSql = "Insert into Names (IndexNo,LastName) Values _
(@IndexNo,@LastName)"
```

Continued…

```
cmd = new SqlCommand (strSql,myConn)

cmd.Parameters.add ("@IndexNo",SqlDbType.VarChar, 10,"Indexno"). _
Value =  me.txtIndexNo.text
cmd.Parameters.add ("@LastName",SqlDbType.VarChar, 50,"LastName"). _
Value = me.LastName.text
da.InsertCommand =cmd
cmd.ExecuteNonQuery()
```

(e) Briefly describe what the following methods return.

(i). ExecuteNonQuery()
(ii). ExecuteScalar()
(iii). ExecuteReader()

(05 marks)

ANSWER IN THIS BOX

ExecuteNonQuery() :This method does not return any result, yet it can be

used for Insert, Update and Delete queries when one requires such actions.

ExecuteScalar () : This method retrieves a single result value.

ExecuteReader () : This method returns forward-only and read only

records with SqlDataReader.

2) (a) Describe DataSet in ADO.net.

(10 marks)

ANSWER IN THIS BOX

Datasets store data in a disconnected cache. The structure of a dataset is similar to that of a relational database; it exposes a hierarchical object model of tables, rows, and columns. In addition, it contains constraints and relationships defined for the dataset.

(b) Assume that one has been given an MS SQL server 2000 Database with two tables. The name of the database is Bit_Students. Two tables are ***Student_info*** table and the other is ***marks*** table. The following is the part schema of the Student_info table.

Student_Info(NicNo,Lastname,FirstName)
MyConn is the active SqlConnection. Write down the syntax for creating a new DataSet with SqlDataAdapter. The new DataSet (object name is ds and the name is "Student") must be populated with Student_Info table.
Consider also the following for the answer.
(cmd = SqlCommand, strSql = "Select * from Student_info" da = SqlDataAdapter)

(15 marks)

ANSWER IN THIS BOX

```
Imports System.Data.SqlClient
Dim da as SqlDataAdapter = new SqlDataAdapter
Dim cmd as SqlCommand
Dim ds as new DataSet

cmd = new SqlCommand (strSql, MyConn)
```

Continued…

```
da.SelectCommand = cmd

da.Fill(ds,"Student")
```

(c) strSql of the above question 2(b) has been modified and the new SQL query with parameter is given below.

strSql = "Select * from Student_Info where NicNo = @NicNo.
Data type of NicNo is varchar(50).

Write the syntax for adding a parameter and rewrite the same code to answer (b) and mark where the new code is inserted. @NicNo is mapped to strNicNo and must be declared as well.

(12.5 marks)

ANSWER IN THIS BOX

```
Dim da as SqlDataAdapter = new SqlDataAdapter

Dim cmd as SqlCommand

Dim ds as new DataSet

Dim strNicNo as String

cmd = new SqlCommand (strSql, MyConn)

cmd.Parameters.Add ("@NicNo",SqlDbType.VarChar,50,_

"NicNo").Value= strNicNo

 da.SelectCommand = cmd

  da.Fill(ds,"Student")
```

(d) Describe SqlDataReader and explain why it must be used carefully.

(12.5 marks)

ANSWER IN THIS BOX

SqlDataReader: **One can use the ADO.NET DataReader to retrieve a read-only,**

forward-only stream of data from a database. Results are returned as the query

executes, and are stored in the network buffer on the client until one requests them

using the Read method of the DataReader. Using the DataReader one can increase

application performance by retrieving data as soon as it is available, rather

than wait for the entire result of the query to be returned, and (by default)

storing only one row at a time in memory, reducing system overhead.

SqlDataReader must be used cautiously since if it is not closed as soon as it is

finished using , it can tie up connection object allowing no other operations' to

execute against it.

3) (a) Describe Structured and Unstructured Exception Handling.

(12.5 marks)

ANSWER IN THIS BOX

Structured Exception Handling:

In structured exception handling, blocks of code are encapsulated, with each block having one or more associated handlers. Each handler specifies some form of filter condition on the type of exception it handles. When an exception is raised by code in a protected block, the set of corresponding handlers is searched in order, and the first one with a matching filter condition is executed. A single method can have multiple structured exception handling blocks, and the blocks can also be nested within each other.

The Try...Catch...Finally statement is used specifically for structured exception handling.

Unstructured Exception Handling:

The On Error statement is used specifically for unstructured exception handling.

In unstructured exception handling, On Error is placed at the beginning of a block of code. It then has "scope" over that block; it handles any errors occurring within the block. If the program encounters another On Error statement, that statement becomes valid and the first statement becomes invalid.

(b) Describe the following functions:

(i) Len()
(ii) UCase and LCase
(iii) Ctype()
(iv) StrComp

(12.5 marks)

ANSWER IN THIS BOX

(i) Len()

Returns an integer containing either the number of characters in a string or the number of bytes required to store a variable.

(ii) UCase and LCase

UCase() Returns a string or character containing the specified string converted to uppercase.

LCase() : Returns a string or character converted to lowercase.

(iii) Ctype()

Returns the result of explicitly converting an expression to a specified data type, object, structure, class, or interface

(iv) StrComp

Returns -1, 0, or 1, based on the result of a string comparison

(c) Describe what a Namespace is.

(05 marks)

ANSWER IN THIS BOX

Namespaces organize the objects defined in an assembly. Assemblies can contain multiple namespaces, which can in turn contain other namespaces.

Continued…

Namespaces prevent ambiguity and simplify references when using large groups of objects such as class libraries.

(d) Describe what a Hashtable Collection is and declare an integer array with 50 elements(the name of the array is myArray). Resize the Integer array to 70 elements preserving the content of the earlier array.

(10 marks)

ANSWER IN THIS BOX

Hashtable Collection

The Hashtable class is based on the IDictionary interface, and therefore each element in the collection is a key-and-value pair

Dim myArray(49) as Integer and

ReDim preserve myArray(69) .

(e) Describe Polymorphism in Visual Basic .net.

(10 marks)

ANSWER IN THIS BOX

Polymorphism **means that one can have multiple classes which can be used interchangeably, even though each class implements the same properties or methods in different ways. Polymorphism is essential to object-oriented programming because it allows one to use items with the same names, no matter what type of object is in use. It is uses to implement Polymorphism by using Interfaces as well as inheritance.**

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