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B.Sc./HD CIT 4th Semester 29 September 2011 (Afternoon)

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Information Technology (CIT)

SEMESTER FINAL EXAMINATION **SUMMER SEMESTER, 2010-2011**

DURATION: 3 Hours **FULL MARKS: 100**

CIT 4401: VISUAL PROGRAMMING

Programmable calculators are not allowed. Do not write anything on the question paper.

There are **8 (eight)** questions. Answer any **6 (six)** of them.

Figures in the right margin indicate marks.

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1. a) Consider the terms variable, type, object, and class. These are fundamental concepts related to data representation in computer programming. Discuss these terms. What are the relationships among them? What are the differences? 5

   b) Identify errors in the following program and state the reason. 4

```
private class demo {
        public void main(String[] args) {
                int x = 10;
                byte b;
                if (x) {
                        byte y = b * 3;
                        float f = 3.567;
                        System.out.println(x + " " + y);
                        b = f;
                }
                System.out.println(x + " " + y);
        }
}
```

   c) Consider the following piece of code: 4

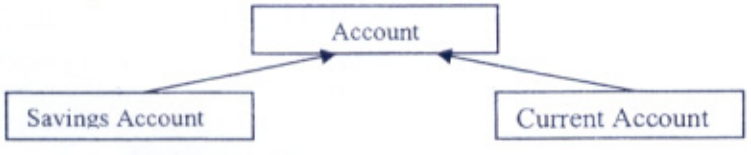
```
Employee E1 = new Employee("Karim", 5001);
Employee E2 = new Employee(E1);
```

   What are the values of the expressions `E1.equals(E2)` and `E1 == E2`? Give explanations.

   d) What is wrapper class? Write down the name of the wrapper classes in java. 1+2.66

2. a) What is a Collections Framework? Write the benefits of the Java Collections Framework. 1+2

   b) You have to design a class hierarchy as shown below: 9.66



   The parent class contains the general information about an account and an abstract method to calculate the yearly interest. For savings account, the interest rate is 10% and for current account the interest rate is 6%. All the data members of the Account class are initialized through a parameterized constructor. Your program should be able to deposit and withdraw money from a saving account. Perform the same operation on a current account.

   c) What are the two ways to traverse collections? Write with examples. 4

3. a) Write a Java code segment that will display the contents of a directory. 4

b) Here is a simplified class for representing books owned by library: 8.66

```
class Book {

        String title, author;  // title and author
        String  callNumber;  //call  number,  such  as
"QA567.23 P23"

}
```

Suppose that a library owns 27,532 books and that information about all the books has already been stored in an array

```
Book[] books = new books[27532];
```

i. Let's say that a science book is one whose call number begins with the letter 'Q'. Write a code segment that will count the number of science books owned by the library.

ii. Does the library own more books by "Isaac Asimov" or more books by "William Shakespeare"? Write a code segment that will find out. Print the answer with `System.out.println()`.

c) Suppose you have two sets **S1** and **S2**. Using Set interface of the collection API perform the **Union, Subset, Intersection, and Set difference** operations. 4

4. a) Suppose that you have the following list object which contains 100 `ProductDTO` objects. Attributes of the `ProductDTO` are id, name, quantity and price. 10.66

```
ArrayList<ProductDTO> productList ;
```

Now write a complete java class to display the products detail in a JTable. [*Hint: Use DefaultTableModel class to set the new model of the JTable*]. Also print the details of a product into the console when user will click on a particular row of the JTable.

b) What listener would you implement to be notified when a `JCombobox's` value has changed? How would you get the `JCombobox's` current value? Write a simple class to answer this question. 6

5. a) What are the two methods by which threads can be stopped? Describe these methods. 3

b) Write a program that will create two threads named `one` and `two` from the main thread. Each of the thread will display the message "Thread name Starting", where name is the name of the thread. Each thread will then print a message "Hello from thread name" 3 times on the screen. Here, name is the name of the child thread. After each write on the screen it will sleep for 500 milliseconds. Main thread should wait for the termination of the child threads. 10.66

c) How can threads be synchronized? 3

6. a) Explain how you would go about publishing your applet on the World Wide Web. Also explain what this means, and why you might want to publish your applets on the Web. 5

b) Complete the following little applet. When it starts up, the applet should display the message "Hello World." When the user clicks on the applet, the message should change to "Goodbye 7.66

World." If the user clicks again, it should change back to "Hello World," and so forth. Use the `paint()` method to display the strings. You will need to add an instance variable to keep track of the message that is currently displayed.

```
class Greetings extends Applet implements MouseListener {

                public void init() { // (No need to change this.)
                   addMouseListner(this);
                }
                public void paint(Graphics g) {

                };

                public void mousePressed(MouseEvent evt) {

                };

               // Junk required by the MouseListener interface.
               public void mouseReleased(MouseEvent evt) { }
               public void mouseEntered(MouseEvent evt) { }
               public void mouseExited(MouseEvent evt) { }

} // end class Greetings
```

c) What restrictions are imposed to client PC to a Java Applet? 4

7. a) What is socket? Write the name of the elements of a socket 1+2
   b) Write a Class name `Server` with the following capabilities: 11.66

   i. Server will run at port 3360
   ii. Server will serve multiple clients simultaneously.
   iii. Server will retrieve a message from each client and
   iv. Server will again send the message retrieved in previous task to the client.

   Write another java class name `Client` with the following functionality:
   v. Client will connect to the server with name "MY_SERVER" and port 3360.
   vi. Client will send a message to the server after establishing the connection and also retrieve the message sent by the server.

   c) What is the use of `InetAddress` class? 2

8. a) Write a class `DBConnection`. In the constructor of the class pass the database url, username, password and driver path. Using those information implement a function public Connection `getDBConnection()`. Write a main method to test your database connection. 5.66
   b) Suppose you have a database table *Student_marks(id, name, subject_id, mid, final, quiz)*. Your boss has asked you to do the following tasks: 11
      i. Prepare a report that presents the total marks of subject id CIT-4401 for all students.
      ii. Insert a new row into the Student_marks table.

   To complete your task write two Java class `StudentMarks` and `StudentMarksService`. For database connection use `DBConnection` class of question 8.a).