ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION **SUMMER SEMESTER, 2015-2016**
DURATION: 1 Hour 30 Minutes **FULL MARKS: 50**

CSE 4401: Visual Programming

Programmable calculators are not allowed. Do not write anything on the question paper.
There are **4 (four)** questions. Answer any **3 (three)** of them.
Figures in the right margin indicate marks.

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1. a) Java is one of the most popular programming languages for software development. Briefly highlight its major strengths. 5

   b) Fill in the blanks for the followings: 4

   i. Each class declaration that begins with keyword ------ must be stored in a file that has exactly the same name as the class and ends with the .java file-name extension.
   ii. Keyword ----- requests memory from the system to store an object, then calls the corresponding class's constructor to initialize the object.
   iii. Every class in java is a subclass of ------ class.
   iv. Keyword ------ makes the class/classes available to the calling class.

   c) In the FunPaint application, you need to code classes to draw rectangles. A rectangle can have plain or rounded edges. You also need to color a (plain or rounded) rectangle. How will you define classes for creating these plain, colored, and rounded rectangles? 3

   Look at the following option to implement the required functionality:

```
class Rectangle { /* */ }
class ColoredRectangle extends Rectangle { /* */ }
class RoundedRectangle extends Rectangle { /* */ }
class ColoredRoundedRectangle extends ColoredRectangle,
RoundedRectangle { /* */ }
```

   Assuming code inside each class is valid. Explain the possible output of the above class declarations.

   d) What do you understand by 'static' method? Is it necessary to have at least one static method in a java application? Explain with suitable example code. 4.66

2. a) Consider the following scenario: 4

   "XYZ is a large bank maintaining more than one million active customers. Bank stores personal information of its customer such as: *name, date of birth, address, phone number, blood group* and *Bank Name*.
   Note that *Bank Name* is identical for all customers. This information is mainly used by the central bank for other purposes."

   Create a class *Customer* with appropriate class variables and constructors. The class should be designed efficiently. Also show the use of overloaded constructor with brief explanation.

   b) What is method overloading? Mention how java compiler distinguishes overloaded methods. Mention one application scenario that can take the benefit of method overloading. 3

   c) What is polymorphism? Mention the mechanisms in java to ensure polymorphism. 3

d) Consider the following java program and explain how the output is obtained. 6.66

```
public class testString{
public static void main(String[] args){
a ob=new a();
a ob2=new a();
a ob3;
ob3=ob2;
System.out.println("ob.toString: " + ob.toString());
System.out.println(ob);

System.out.println("ob2.toString: " + ob2.toString());
System.out.println(ob2);

System.out.println("ob3.toString: " + ob3.toString());
System.out.println(ob3);
} // end of main()
} // end of class testString

class a{
int x;
 a(){ x=0;}
} // end of class a
```

3. a) What are the essential purposes of mutator method and query method? Place a suitable example to explain them. 4

b) Declare an array of integer of size 10 both in C++ and Java. Explain the main difference. Also present suitable argument with example code to support the difference as you have mentioned. 4

c) What is enhanced for loop? Present two examples where i) traditional for loop and ii) enhanced for loop are appropriate. (write the required code only) 4.66

d) Explain the role of Override Annotation (i.e. @override) in the context of software bug fixing and testing. 4

4. a) What is the basic difference between abstract class and interface? Explain with suitable example code. 4

b) Explain the output of the following code: 6.66

```
abstract class A{
  abstract void run();
  static void runitagain(){
System.out.println("From inside static method: It may or may not
run");

}
}  // end of class A
public class B {
public static void main(String args[]){
  A.runitagain();
}
}  // end of class B
```

Note that the method `run()` is not implemented anywhere. Make necessary correction to

execute method `run()` (with any suitable code) from the `main()` method.

c) Consider the following scenario: 6

"XYZ bank maintains accounts for its customers. Each account must have a method for computing interest (`getInterest(..)`). But the bank has 3 types of account such as: *i) Savings ii) Current and iii) Business.* Each account has its own mechanism of setting the interest rate."

Your task is to create required classes with necessary related components. You are free to assume the exact method of interest calculation for each type of account. You must provide adequate explanation for your design.