**CORK INSTITUTE OF TECHNOLOGY**
**INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ**

**Semester 1 Examinations 2011/12**

# Module Title: Object-Oriented Programming 2

**Module Code:** COMP7013

**School:** Science & Informatics

**Programme Title:** BSc in Computing (ACCS)

**Programme Code:** KCOME_7_Y3

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**Instructions:** **Answer three Questions. Question 1 is mandatory.**

**Duration:** 2 Hours

**Sitting:** Winter 2011

**Requirements for this examination:**

**Note to Candidates:** Please check the Programme Title and the Module Title to ensure that you have received the correct examination paper.
If in doubt please contact an Invigilator.

## SECTION A

**Q.1**

a) Write a class for IDCard that inherits from the card class below. An IDCard is a card that holds a name and an ID number. The ID number of an IDCard is guaranteed to be unique. It should be possible to get the name and identifier of a card. To achieve this you should implement a method on IDCard that returns a string showing the name and id of the card as follows:

Cardholder: Susan
ID: 12

```
public class Card
{
    private String name;

    public Card()
    {
        name = "";
    }
    public Card(String n)
    {
        name = n;
    }
    public String getName()
    {
        return name;
    }
    public String toString()
    {
        return "Cardholder: " + name;
    }
}
```

[10 marks]

b) Write a program that creates an ArrayList that contains both types of card and then iterates over the list to output the toString() method.

[8 marks]

c) What is generic programming?
Write a generic class called Pair that stores a pair of references of any type. The class should have two accessors getFirst and getSecond to access each of the references.

[12 marks]

d) Polymorphism is a key element of object-oriented programming. Using examples give a detailed description of it. [10 marks]

## SECTION B

**Q.2**

a) Give some sample code to test your class using the following GUI components.

- A label with "Please enter a String"
- A text field for the String
- A Button to reverse the String
- A Button to check if the String is a palindrome
- A Button to exit the system

Please use the code fragment below [15 marks]

```
public class Frame1 extends JFrame // or Frame
{
 //Enter the code here

 //Construct the frame
 public Frame1()
 {
   enableEvents(AWTEvent.WINDOW_EVENT_MASK);
   try
   {
     jbInit();
   }
   catch(Exception e)
   {
     e.printStackTrace();
   }
 }

 //Component initialization
 private void jbInit() throws Exception
 {
    //Enter the code here
 }

 //Overridden so we can exit when window is closed
 protected void processWindowEvent(WindowEvent e)
 {
    super.processWindowEvent(e);
    if (e.getID() == WindowEvent.WINDOW_CLOSING)
    {
       System.exit(0);
     }
```

```
  }
//do the actions here

}
```

b) When do you create a class, a subclass, an abstract class and an interface? [10 marks]

c) Explain giving an example why we would use interfaces. [5 marks]

**Q.3**

a) A mySQL database exists on a server called mc-Admin. Write a program to show that a user name "dbadmin" can connect with a password of "students". What might cause your program to throw an exception?

[10 marks]

b) Show the code required to allow the user to enter a string and store that string in a text file.

[10 marks]

c) Describe how you would write an object to a file. [10 marks]

## Q.4

a) A lift service company needs to keep track of customer service requests as they come in. Each caller's name is recorded and eventually a service representative returns the call and handles the request.

Write a class `ServiceRequests` that keeps track of the names of the callers. The class should have the following methods:

- `ServiceRequests(maxListSize)` – constructor that sets up a list with a maximum size.
- addName(name) – adds a name to the list of names. Throws a `ServiceBackupException` if there is no free space in the list.
- removeName(name) – removes a name from the list. Throws a `NoServiceRequestException` if the name is not in the list.
- getName(n) – returns the $n^{th}$ name in the list.
- getNumber() – returns the number of service requests.

Provide class definitions for `ServiceBackupException` and `NoServiceRequestException`. [20 marks]

b) What is an exception? A program can be designed to process an exception in one of three ways. What are these? Identify and explain the key mechanism used by Java when dealing with exceptions? What is the difference between a Checked and UncheckedException? Give one example of each.

[10 marks]