CORK INSTITUTE OF TECHNOLOGY

INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Autumn Examinations 2012/13

Module Title: Object-Oriented Programming 2

Module Code: **COMP7013**

School: Science & Informatics

Programme Title:

Bachelor of Science in Computing – Year 3

Bachelor of Science (Honours) in Software Development & Computer Networking – Year 2

Bachelor of Science (Honours) in Software Development – Year 2

Bachelor of Science (Honours) in Web Development – Year 2

Higher Diploma in Science in Software Development – Year 5

Programme Code: **KCOMP_7_Y3**
KDNET_8_Y2
KSDEV_8_Y2
KWEBD_8_Y2
KSWDE_8_Y5

External Examiner(s): Mr Joseph Lynam

Internal Examiner(s): Ms D. M. Dunlea, Mr Denis Long

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

Duration: 2 Hours

Sitting: Autumn 2013

Requirements for this examination:

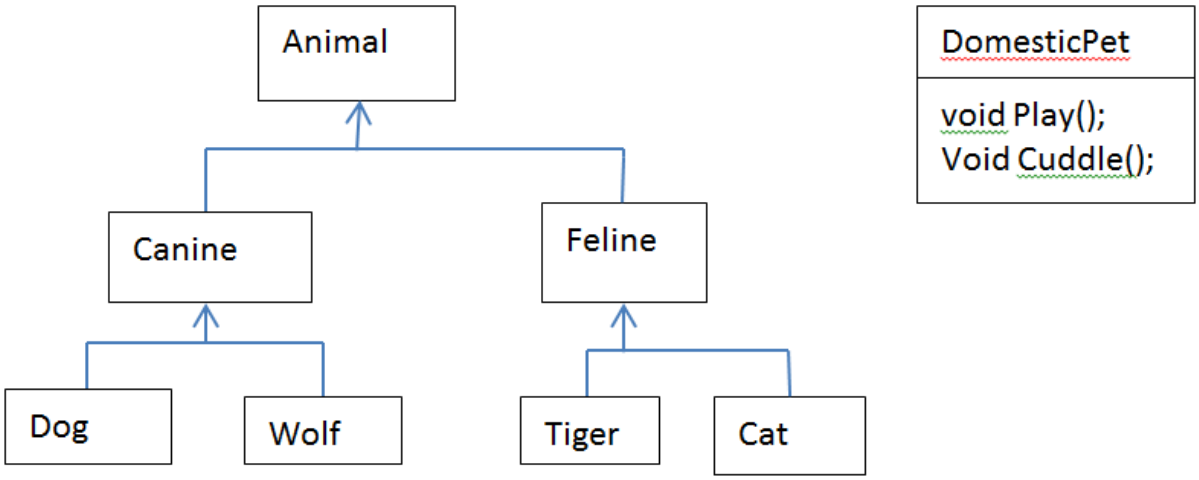
Note to Candidates: Please check the Programme Title and the Module Title to ensure that you have received the correct examination paper.
If in doubt please contact an Invigilator.

Q1.

a) What is an abstract class? What is an interface? What is the difference between an abstract class and an interface in Java?

[8 marks]

b) The following describes an animal class hierarchy and an interface. Animal, Canine and Feline are abstract classes, DomesticPet is an interface.



1) Give code to outlining this class hierarchy's implementation including dog and cat implementing the DomesticPet interface. Methods listed in the diagram must be shown in the relevant classes, details of the contents of the methods is not required. [6 marks]
2) We want to write a method that takes either CATs or Dog objects as parameters only, how do we achieve this? Give an example of a method like this. [3 marks]
3) Declare an arraylist that can only contain CATs and Dogs objects. [3 marks]

c) Describe and distinguish between composition/aggregation and inheritance. Give an example of each.

[9 marks]

d) Can a java class extend more than one other class? How does java work around this?

[3 marks]

e) Answer the following 8 short questions with a true or false answer in your answer sheet.

1) A final class that implements an interface need not implement all the interfaces methods T/F

2) An abstract class that implements an interface need not implement all the interfaces methods T/F

3) An interface may extend another interface T/F

4) An interface may have no variables T/F

5) An interface variables are both static and final variables by default T/F

6) A class can implement only one interface. T/F

7) Some interfaces have no methods T/F

8) An interface describes a role that an object can have. T/F

[8 marks]

Q2.a)

What are Anonymous inner classes and what are the advantages of using them? [6 marks]

Give two uses/examples of when they are frequently used. [4 marks]

b)

Describe the interface clonable what functionality is it meant to provide in a class. [2 marks]

What exception does cloning throw and when does it throw it? [1 marks]

What type of exception is it ? [1 marks]

Give an example of a class that implement clonable and explain why/when we might need this class to redefine object's clone method. [4 marks]

Describe an alternative way of getting a deep copy of an object without using cloning? [2 marks]

c)

An enum type is to be used in a non-Gui driven java program to control the menu options of the application. The option are ADD, DELETE, MODIFY and QUIT. Give outline java code for the enum and an outline of the menu driven java program that uses the enum. [10 marks]

Q3. a)

What is the MVC pattern? [4 marks]

Describe the classes involved in MVC as applied to a java database application. [3 marks]

What are the common problems associated with the MVC in a java Database application? [2 marks]

b)

What is a Transaction. How do we achieve a transaction in a java database application? [3 marks]

Give an example of a method that implements a transaction. [6 marks]

c)

Why would you prefer to use a database rather than a filing system to persist the data in your application?

[6 marks]

d)

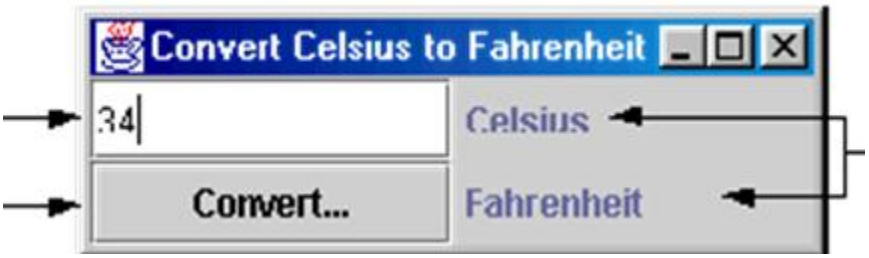
What is the finally clause used for in Database applications? [3 marks]

Give two examples of where a finally should be used in a database application. [3 marks]

Q.4.

a) What are the two most important imports in a java based GUI driven application, what relationship do these imports have to one another? [1 marks]

1. Describe three elements that you see in the contentpane of the following JFrame. [2 marks]



2. Describe the ActionListener interface. [2 marks]

b)

Describe two different ways to associate a method with an event in a graphical user interface. [4 marks]

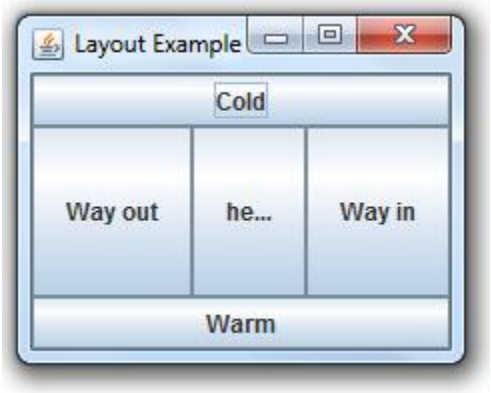
Give code missing to associate methods (guessMethod and resetMethod) with events in the program in appendix A. [5 marks]

c)

How does java allow the programmer to control the layout of a GUI. [3 marks]

Describe four main layouts used in applications. [6 marks]

d) i)What layout is described in as follows:



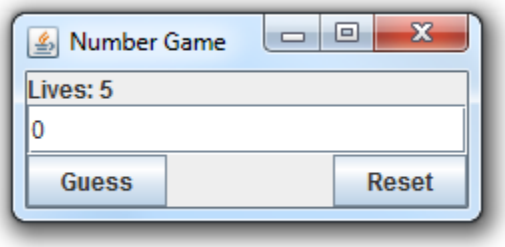
What happens when you resize the JFrame. [2 marks]

ii)

Give the code that needs to be added to appendix A so as to achieve the layout described below.

Where lives5 is above the box with the 0, the box with the 0 is above the line with “Guess “ and “Reset”.

“Guess “ and “Reset” are always on the same line.



[5 marks]

Appendix A

```
public class SimpleGame
{
   private Random randomNumbers = new Random();
   private JButton guess, reset;
   private JLabel lives;
   private JFrame frame;
   private JTextField choice;
   private int counter=5;
   private int specInt = 1+randomNumbers.nextInt(20);
   private JPanel buttonPanel = new JPanel();//compound container
   private JPanel everyPanel = new JPanel();//compound container




   public static void main (String [] arqs)
   {
      SimpleGame gui = new SimpleGame();
      gui.go();
   }

   public void go()
   {
      frame = new JFrame("Number Game");
      lives = new JLabel("Lives: " + counter + "                    ");
```

```
        choice = new JTextField("0", 10);
        guess = new JButton("Guess");
        reset = new JButton("Reset");

       //      Create a layout and
        //    add the elements to the GUI

     //   Missing code  for layout
        //   Missing code  for listeners
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE) ;
        frame.setSize (220,200);
        frame.setVisible(true);
    }
// Code classes , Methods etc for listeners should be here
    public void Guessmethod (){    …  }
    public void resetmethod (){    …  }
}
```