

**UNIVERSITY OF LONDON**

**GOLDSMITHS COLLEGE**

**FOR INTERNAL STUDENTS**

**B. Sc. Examination 2006**

**COMPUTING AND INFORMATION SYSTEMS**

IS52014A (CIS220) GRAPHICAL OBJECT ORIENTED AND INTERNET  
PROGRAMMING IN JAVA

**Duration: 3 hours**

**Date and time:**

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*There are TEN questions on this paper. Answer SIX questions.*

*Full marks will be awarded for complete answers to SIX questions.*

*You must answer THREE questions from section A and THREE questions from section B.  
You must answer at least ONE question on Prolog in Section B.*

*There are 150 marks on this paper.*

*Electronic calculator may be used. The make and model should be specified on the script  
and the calculator must not be programmed prior to the examination.*

## SECTION A

### Question 1

- a) What are the purposes of threaded objects.

[4 Marks]

- b) Explain the purpose and functionality of the methods *run()* and *start()* in a threaded Object.

[4 Marks]

- c) Name 4 differences between implementing the interface *Runnable* and *extending* the class *Thread*.

[4 Marks]

- c) Complete the classes *Runner* and *Race* so that “Keep running ...” is printed continuously as soon as an object *Race* is created.

```
public class Runner extends Thread{
    private boolean keepAlive;
    Runner(){
        run(){
    }
    public class Race {
        private Runner racer1;
        private Runner racer2;
        Race(){
    }
}
```

[10 Marks]

- d) How would you make the two racers from Question b stop, ie: Stop them printing “Keep running ...”.

[3 Marks]

## Question 2

- a) Explain each of:
- i. Inheritance for extension. [3 Marks]
  - ii. Inheritance for specialisation. [3 Marks]
  - iii. Inheritance for specification (abstraction). [3 Marks]
- b) Explain the difference between recursive and iterative methods, give examples. [4 Marks]
- c) *Data abstraction, inheritance* and *composition* are three main concepts in Java and other Object Oriented programming languages. Outline briefly the main concepts in each. [6 Marks]
- d) Describe (not implement) a recursive method that searches through a directory and its subdirectories for a file, give pseudocode examples to support your answer. [6 Marks]

### Question 3

a) Explain the following keywords:

i. Public

[2 Marks]

ii. Private

[2 Marks]

iii. Package

[2 Marks]

b) Implement a class that has the following behaviour:

Note: Your answer should be as precise as possible but does not have to be compilable source code.

i. It displays a rectangle, of size 20x40 in centre of a JFrame of size 400x400.

[5 Marks]

ii. The frame will also contain two Buttons with labels "Resize" and "Fill Random Colour".

[6 Marks]

iii. Add the following functionality to the Buttons:  
When Button "Resize" is pressed the rectangle should be resized to a random size and when Button "Fill Random Colour" is pressed it should be filled with a randomly generated colour.

[8 Marks]