THE UNIVERSITY OF ZAMBIA
School of Natural Sciences
Department of Computer Science

FINAL EXAMINATION

CSC 2000
Computer Programming

Date: 1st September 2017
Time: 09:00hrs – 12:00hrs
Duration: 3 Hours
Venue: AP1

Instructions

1. There are **two (2) sections** in this exam paper.
2. *Answer all the questions in **Section A** and choose any three (3) questions from **Section B***

SECTION B (60 marks)

Answer any three (3) of the five (5) questions. Each question carries **20 marks**

1.

a) Consider the following code snippet.

```
if (aNumber >= 0) {
    if (aNumber == 0) {
        System.out.println("first string"); }
    else {System.out.println("second string"); }
    }System.out.println("third string");
```

i.   What output do you think the code will produce if "aNumber" is 3? **[2 marks]**

ii. Write a test program containing the previous code snippet; make "aNumber" 3. What is the output of the program? Explain why the output is what it is i.e what is the control flow for the code snippet? **[4 marks]**

iii. Using only braces, spaces and line breaks, reformat the code snippet to make the control flow easier to understand. **[3 marks]**

b) Consider the following class:

```
public class IdentifyMyParts {
    public static int x = 7;    Class Meth
    public int y = 3;    un Hauce

}
```

iv. What are the class variables? **[1 mark]**   Global unt x = 7

v.   What are the instance variables? **[1 mark]**   unt y = 3

c) What is the output from the following code:[2 marks]

```
IdentifyMyParts a = new IdentifyMyParts();

IdentifyMyParts b = new IdentifyMyParts();

a.y = 5;

b.y = 6;

a.x = 1;

b.x = 2;

System.out.println("a.y = " + a.y);

System.out.println("b.y = " + b.y);

System.out.println("a.x = " + a.x);

System.out.println("b.x = " + b.x);

System.out.println("IdentifyMyParts.x = " +
IdentifyMyParts.x);
```

d) What's wrong with the following program? Write a corrected version of the program.

[3 marks]

```
public class SomethingIsWrong {

    public static void main(String[] args) {

        Rectangle myRect;

        myRect.width = 40;

        myRect.height = 50;

        System.out.println("myRect's area is " +
myRect.area());

    }

}
```

e) The following code creates one array and one string object. How many references to those objects exist after the code executes? Is either object eligible for garbage collection? How does a program destroy an object that it creates? [4 marks]

```
...
String[] students = new String[10];

String studentName = "Peter Parker";

students[0] = studentName;

studentName = null;

...
```

2. Write a class to represent a Lecturer at the University of Zambia.

   a) Each lecturer has a first name, last name, age and man number which is an integer e.g. 009945. [8 marks]

   b) All lecturers have the same pay day e.g. 6 which indicates which day of the month they get paid and in this case meaning the 6th day of each month. [2 marks].

   c) Your class should have three constructors: one default constructor, one constructor that initializes the man number and another that initializes the firstname, lastname and man number. [6 marks].

   d) Furthermore, your class should have a printLecturer method that prints out details of the Lecturer when invoked e.g. if you have a lecturer called Pumpkin Zulu who is a female aged 20 and man number 009945 and payday 5, your method should print her details as: "Firstname: Pumpkin; Lastname: Zulu; Age: 20; Sex: Female; Man number: 009945; Payday: 5" excluding the quotes. [4 marks].

3.

   a) What is wrong with the following interface? Fix the code. [4 marks]

```
public interface SomethingIsWrong {

    void aMethod(int aValue){

        System.out.println("Hi Mom");

    }

}
```

b) Is the following interface valid? [2 marks]

```
public interface Marker {

}
```

c) Suppose you have written a time server that periodically notifies its clients of the current date and time. Write an interface the server could use to enforce a particular protocol on its clients for setting date, setting time, setting date and time and also accessing the local date and time. [6 marks]

d) Write a class that implements the interface in 3.c. [8 marks]

4.

a) What is a thread? [2 marks]

b) Illustrate and explain the states of a java thread. [4 marks]

c) What is a java socket? [2 marks]

d) Write two classes, one for a client and the other for a server. The server should be threaded so as so accommodate multiple client connections. The communication between the client and server should be a simple echo protocol. [12 marks]

5.

a) What is JDBC? [2 marks]

b) Explain basic steps in writing a Java program using JDBC. [6 marks]

c) Explain the four main types of JDBC Drivers. [4 marks]

d) What are the two different types of statements in JDBC? Give a performance analysis of the two. [4 marks]

e) A JDBC connection is made using the following method:

```
getConnection(String url, String userName, String password);
```

The method establishes a connection to specified database url. It takes following three string types of arguments:

url: Database url where stored or created your database,

userName: User name of your DB,

password: Password of DB.

Write a code block to make a connection and create statement. [4 marks]