THE UNIVERSITY OF ZAMBIA

School of Natural Sciences

Department of Computer Science

FINAL EXAMINATION

COMPUTER PROGRAMMING
CSC 2000

Date:	9th SEPTEMBER 2016
Time:	09:00hrs – 12:00hrs
Duration:	3 Hours
Venue:	API

Instructions

1. *Answer **all** the questions in Section A.*
2. Choose ***any two** (2) questions from Section B.*

SECTION A
ANSWER ALL QUESTIONS IN THIS SECTION

1. Analyse the java code below and answer all the questions that follows;

```
public class Animal{
   private double height;
  public String name;
  int number;
  static String species;

 public Animal(String name, int number, String species){
    this.name = name;
   this.number = number;
  this.species = species;
 }

 public void do(){
   int a = 3;
   a = a * 3;
  System.out.println(a);
 System.out.println(height);
 System.out.println(species);
 }
}//end Animal class

public class AnimalTest{
    public static void main(String args[]){
       Animal a1 = new Animal("Snake",1,"Reptile");
       Animal a2 = new Animal("Monkey", 2,"primate") ;
      a1.do();
    }
}//end AnimalTest class
```

a) What is a difference between a local variable and an instance variable? **[1 Mark]**

b) Identify all the instances variables and local variables in the Animal class above **[4 Marks]**

c) Identify and explain all the access modifiers used by the instance variables in Animal class **[3 Marks]**

d) What is the difference between a class and an object? **[1 Mark]**

e) Identify all the classes and objects in the above code **[2 Marks]**

f) What is the output when AnimalTest runs? **[3 Marks]**

2. Study a piece of a java code below and answer all the questions below;

```
int i = 30;
while(i >= 0){
 if(i % 2 > 0){
   continue;
 }
 System.out.println(i);
 i--;
 }
```

a) What is the output of the above code? **[2 Marks]**
b) Rewrite the above code using the for loop **[2 Marks]**
c) Rewrite the above code using the do while loop **[2 Marks]**

3. Discuss how deadlock can be avoided in threads. **[4 Marks]**

4. Explain the use of the following in java coding statements: **[4 Marks]**
   - this.
   - this()

5. What does it mean for a class to be immutable? Give TWO examples from the JDK. **[4 Marks]**

6. What is the differences between Inheritance and Interface in the Java Platform? **[4 Marks]**

7. The Java programming language includes features for multithreading. It helps with operating system scheduling and concurrency programming. Give a brief description of multithreading. **[4 Marks]**

TOTAL 40 MARKS

SECTION B
ANSWER ANY TWO QUESTIONS IN THIS SECTION
[Each question is worth 30 Marks]

QUESTION 1

a) Write a program in Java that displays the grade of a mark. The grade system is as follows;

90 – 100 A+
80 – 89 A
70 – 79 B+
60 – 69 B
50 – 59 C+
45 – 49 C
0 – 44 D

Your program must not allow marks below 0 and above 100. Use the command line both for prompting the user for a mark and displaying the grade. **[20 Marks]**

b) Describe the following Swing components:

I. JColorChooser **[2 Marks]**

II. JComboBox **[2 Marks]**

III. JFrame **[2 Marks]**

IV. JPasswordField **[2 Marks]**

V. JProgressBar **[2 Marks]**

QUESTION 2

a) Create a class that holds 10 grades in an array data structures. **[2 Marks]**

a) Loop through the data structure and compute the sum of grades **[2 Marks]**
b) Loop through the data structure and compute the average of grades **[4 Marks]**
c) Loop through the data structure and print the biggest grade **[4 Marks]**
d) Loop through the data structure and print the lowest grade **[4 Marks]**
e) Print the grades in the descending order of indexes **[4 Marks]**

b)

I. Briefly explain the role InputStreamReader plays in System.in. **[2 Marks]**

II. State the reason for using a BufferedReader object. **[2 Marks]**

III. Interpret the Java statements below: [3 Marks]

```
BufferedReader br = new BufferReader(new InputStreamReader(System.in));
String line = br.readLine();
```

IV. Given File inputFile = new File(args [0]);

a. Create an input stream object to read from the inputFile. [2 Marks]

b. Construct a channel for the stream object. [1 Marks]

QUESTION 3

a) Write a java program that prompts a user for two (2) integers. Read the numbers using the Scanner class and divide the two integers and print the quotient. Handle all the possible exceptions in your code using the try and catch. If an exception occurs, your program must give an appropriate error message to the user and loop through again to ask the user to re-enter the numbers. If no exception occurs, the program must print the quotient and exit.

[20 Marks]

b) Given the following CHESSCLUB table:

CHESSCLUB

memberID	name	grade
10	Peter	1900
11	Allan	2350

Write a Java statement or statements to perform the following tasks:

i. Create a Statement object so that you can execute SQL statements. [2 Marks]

ii. Retrieve the grade of Peter from the table. [4 Marks]

iii. Remove the member with memberID 11. [4 Marks]

END OF PAPER