

EASTERN UNIVERSITY, SRI LANKA
Second Examination in Science First Semester (2003/2004)

OC206

Java Programming

Time :2 Hours

Answer all questions

Q1.

- i. Describe briefly, why Java language is popular. [15 marks]
- ii. List the primitive data types available in Java. [15 marks]
- iii. What are the three types of comments in Java. [15 marks]
- iv. Describe typecasting in Java with example. [15 marks]
- v. Explain the difference between value and reference with regard to the way primitive and object variables are handled in Java. [15 marks]

vi. What output is produced by the following program?

```
public class Mystery{
    public static void main(String args[]){
        int row =10, column;
        while(row>=1){
            column=1;
            while(column<=10){
                System.out.println(row%2==1?"<":">");
                ++column;
            } --row;
            System.out.println();
        }
    }
}
```

[25 marks]

Q2.

Describe what is an array data structure? How can you get the size of an array in Java Language? [16 marks]

What should be the output of the following code?

```
String s = "whatever",
System.out.println( s.charAt(3));
System.out.println( s.length());
```

[16 marks]

i. Write a "while" statement that is equivalent to the following "for" statement.

```
int n=10, t=0;
int[] a = new int[n];
for(int i=0; i<n; i++)
    t=t+a[i];
```

[16 marks]

ii. Implement a method that fills an array with consecutive integer numbers starting from the length of the array down to 1. For example, if the array is of length 5, then it should be filled with the values 5, 4, 3, 2, 1.

```
/**
 * Fill the array with integer numbers from N down to 1.
 * N is determined by the length of the array.
 */
public void fillArray(int[] intArray){
```

[24 marks]

iii. Write a method that returns true if the parameter is a palindrome, a word is spelled the same both forwards and backwards eg. radar

```
public Boolean isPalindrome(String word) {
```

```
}
```

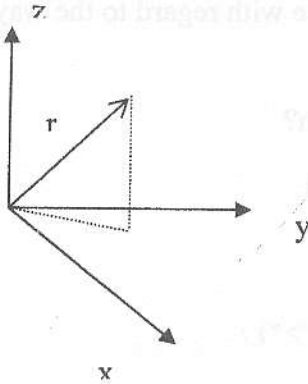
[28 marks]

Q3.

(a) Explain the role of constructors, assessors and modifiers. [24 marks]

(b) What is the difference between an instance method and a static method? [16 marks]

(c) A vector, in three-dimensional space is a set of three coordinates, denoting a position in space. The coordinates are (x,y,z) in Cartesian space.



Develop a class for a three dimensional vector. [20 marks]

Include member functions

1. to add a pair of vectors

2. to form the cross product between a pair of vectors. [20 marks]

Hint: Let $\underline{a} = (a_x, a_y, a_z)$ $\underline{b} = (b_x, b_y, b_z)$ [20 marks]

If cross product of a vector \underline{a} and \underline{b} is vector \underline{c} :

$$\underline{c} = \underline{a} \times \underline{b}$$

$$\text{Let } \underline{c} = (c_x, c_y, c_z)$$

Where,

$$c_x = a_y b_z - a_z b_y$$

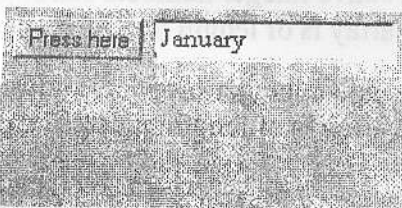
$$c_y = a_z b_x - a_x b_z$$

$$c_z = a_x b_y - a_y b_x$$

Q4.

i. What does an interface contain? Can a class have more than one interface? [20 marks]

ii. Construct a Graphical User Interface (GUI) with one textfield and one button. When the button is pressed, a message should appear in the textfield, like this:



The message can be whatever you like. [40 marks]

iii. Modify your program so that it cycles through several different messages: each time the button is pressed, the next message in the cycle is displayed. E.g. the names of the months in year one by one. [40 marks]