

Name: _____ Student Number: _____ Mark: _____/100

There are 4 sections to this exam. The exam total is 100 marks. There is 90 minutes allotted for writing this exam.

Source: <http://www.csc.uvic.ca/~csunion/exams/c110mt02.pdf>

Section 1: Multiple choice and short answer(40 marks)

1. Which statement most accurately describes the signature of a method:
 - a. The number of parameters.
 - b. The number and order of parameters.
 - c. The number, order and type of the parameters.
 - d. The number, order and type of the parameters, and the return type.
 - e. The return type.
 - f. None of the above.

2. In the line of code:

```
if ( x <= y) ...
```

The Boolean expression `x <= y` can be replaced by which of the following:
 - a. `(x == y) && (x < y)`
 - b. `x > y`
 - c. `x < y`
 - d. `x == y && x < y`
 - e. None of the above.

3. How many bits are there in 3 bytes? _____

4. How many unique items can be represented by 4 bits? _____

5. Which expression will generate a random integer from 1 to 49 inclusive?
 - a. `Math.random() * 50 - 1`
 - b. `Math.random() * 49 + 1`
 - c. `(int)(Math.random() * 49)`
 - d. `((int)(Math.random()))*49 + 1`
 - e. `(int)((Math.random()*49)+ 1)`

6. List all the primitive data types of the Java programming language:

7. We've discussed four different types of commenting in the Java programming language; give a brief example of each:

8. Given the following code:

```
for (int a = 3; a >= n; a--)  
    System.out.print ("a");  
    System.out.print("A");  
System.out.println();
```

If n has the value of 1, what would be printed?

- a. aAaAaA
 - b. aaaA
 - c. aaa
A
 - d. aaaAAA
 - e. None of the above.
9. Given the following code:

```
int a = 5;  
while ( (++a) <= 9);  
{  
    System.out.println(a);  
}
```

What is the output?

- a. 6789
 - b. 10
 - c. nothing – there is an infinite loop
 - d. 56789
 - e. 5678910
 - f. None of the above.
10. The code fragment below is intended to add the integers from 1 to 5 inclusive. Which of the following statements (replacing the comment in the code fragment) does NOT do this correctly?

```
int sum = 0;  
for (int k=1; k <= 5; k++) {  
    int n = k;  
    // STATEMENT GOES HERE  
}
```

- a. sum = sum + n;
- b. sum += n;
- c. sum += n++;
- d. sum += ++n;
- e. sum += n--;

Section 2: Flow graphs (20 marks)

For each code fragment below, construct its corresponding flow graph.

(a)

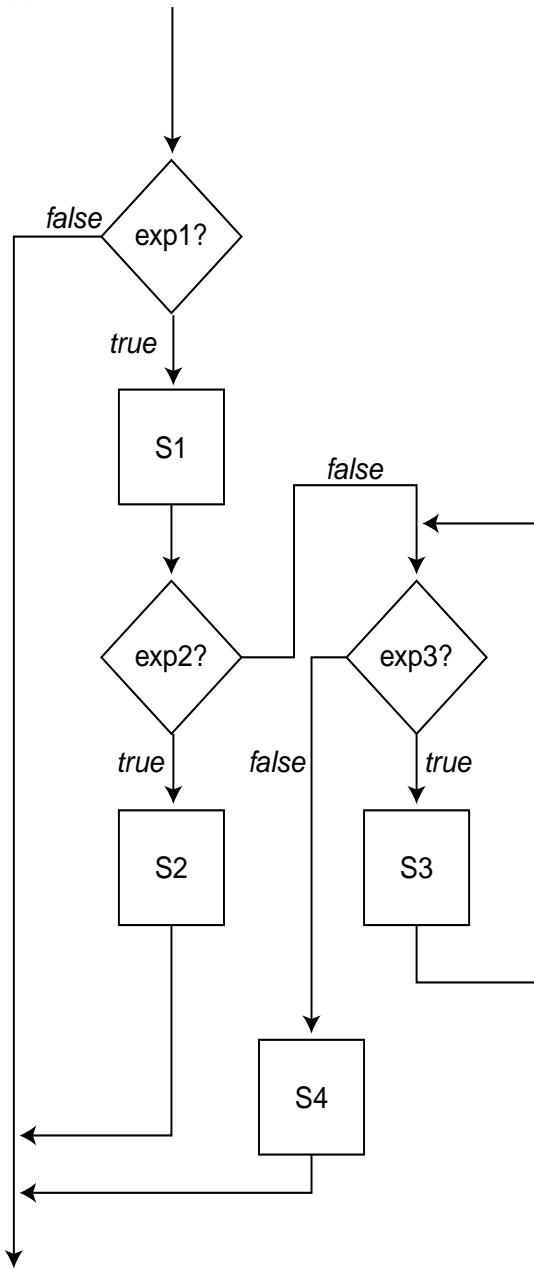
```
do {
    if (exp1) {
        S1;
    } else {
        S2;
    }
    S3;
    while (exp2) {
        S4;
    }
} while (exp3);
```

(b)

```
if (exp1) {
    if (exp2) {
        if (exp3) {
            S1;
        }
    } else {
        S2;
    }
} else {
    S3;
}
```

Given the following flow graph, re-construct the code fragment. Show all work, and list all assumptions.

(c)



Section 3: Pex (20 marks)

Write a program that reads in integer values entered by the user until a value of 0 is entered. After the 0 is entered, the program should print out the number of numbers that were greater than 0 and the number of numbers entered that were less than 0. You do NOT have to error check the input: you may assume that the values entered by users are correctly entered and valid. Use the application framework given.

```
import cs1.Keyboard;

public class Myclass {

    public static void main (String[] args) {

        } // end main

    } // end class
```

Section 4: Pex (20 marks)

Design and implement a class called `Clock`. It is to have a set of methods that help you keep time. You want to be able to initialize a `Clock` to a given time in hours, minutes and seconds. Include a method `tick()`, which advances the clock one second. Use 24-hour time so midnight is hour 0 and noon is hour 12. Include a method `toString()` which returns the current time converted to a string (i.e. "23:59:30").

END OF EXAM