

SERIAL

University of Bahrain
College of Information Technology
Department of Computer Science
First Semester, 2018-2019
ITCS 113 / ITCS 111
Computer Programming I

A

FINAL EXAM

Date: 10th January 2019

Duration: 2 Hours

STUDENT NAME													
STUDENT ID #											SECTION #		<input type="checkbox"/> ITCS111 <input type="checkbox"/> ITCS113

NOTE: THERE ARE (7) PAGES IN THIS TEST
WRITE ONLY ONE SOLUTION FOR EACH QUESTION

Question #	MARKS	SCORES
1	12	
2	13	
3	13	
4	22	
TOTAL	60	

Question 1 (12 Points) – Form A

Please choose the best correct answer from the given choices. Please choose only one.

1. After executing the code on the right⇒
what will be the values of x, y and z?

(a) x = 2, y = 6, z = -7
(b) x = 2, y = 5, z = -7
(c) x = 2, y = 6, z = 3
(d) x = 2, y = 5, z = 3

```
int x, y, z;  
x = 1;  
y = 5;  
z = 0 - (++x) + y++;
```

2. To check if a string s starts with "Java", you write _____.

(a) if (s.equals("Java")) ...
(b) if (s.indexOf("Java") == 0) ...
(c) if (s.charAt(0) == "Java") ...
(d) if (s.compareTo("Java") == 0) ...

3. After executing the code on the right⇒
what will be the values of a and c?

(a) a = 10, c = 10
(b) a = 11, c = 10
(c) a = 10, c = 11
(d) a = 11, c = 11

```
int a=10, b=5, c=10;  
if (a>b && a<=c)  
    a = a + 1;  
else  
    c = c + 1;
```

4. After executing the code on the right⇒
what is the output?

(a) Boy
(b) Man
(c) Girls
(d) Woman

```
boolean male = false;  
int age = 30;  
  
if( age <= 30 && male)  
    if( age < 20 )  
        System.out.println("Boy");  
    else  
        System.out.println("Man");  
else  
    if( age< 20 )  
        System.out.println("Girl");  
    else  
        System.out.println("Woman");
```

5. After executing the code on the right⇒
what is the output?

(a) 6 3 0
(b) 6 3
(c) 3 0
(d) 3 0 -3

```
int number = 6;  
while (number > 0) {  
    number -= 3;  
    System.out.print(number + " ");  
}
```

6. After executing the code on the right⇒
what is the output?

(a) y=1
(b) y=3
(c) y=4
(d) y=5

```
int y=0;  
for (int x=1; x <= 4 ; x++)  
    y=x;  
System.out.println("y=" + y);
```

7. After executing the code on the right⇒
what will be the content of s2?

(a) one
(b) two
(c) onetwo
(d) twoone

```
String s1 = "one";  
String s2 = s1.concat("two");
```

8. After executing the code on the right⇒
what is the output?

(a) ADC
(b) ADCD
(c) AD
(d) A

```
char x = 'A';  
while(x != 'D') {  
    switch(x) {  
        case 'A': System.out.print(x);  
                x = 'D';  
        case 'B': System.out.print(x);  
                x = 'C';  
                break;  
        case 'C': System.out.print(x);  
                x = 'D';  
        default: continue;  
    }  
}
```

9. Suppose **num** is a private integer. Which of the following is its accessor (get) method?

(a) `public void getNum() {
 System.out.println(num);
}`
(b) `public void getNum(int newNum){
 num = newNum;
}`

(c) `public int getNum() {
 return num;
}`
(d) `public int getNum(int newNum) {
 return num+newNum;
}`

10. What happens if you do not create a constructor for a class?

(a) Java will not compile the program
(b) Java will create a default constructor
(c) Java will display a warning
(d) None of the above

11. Consider the class defined on the right ⇒
to create an object from this class we write:

(a) `Trees = new "palm"`
(b) `new t = Trees ("palm");`
(c) `Trees t = new Trees("palm");`
(d) `Trees "palm" = new Trees;`

```
class Trees {  
    String name;  
    public Trees(String name) {  
        this.name = name;  
    }  
}
```

12. The program on the right ⇒ has a compile error
Where is the error?

(a) Line 2
(b) Line 3
(c) Line 8
(d) Line 9

```
1. public class Test {  
2.     private int x = 4;  
3.     public int y = 5;  
4. }  
5. public class Main {  
6.     public static void main(String args[]) {  
7.         Test t = new Test();  
8.         t.x++;  
9.         System.out.println("y = " + t.y);  
10.    }  
11. }
```

Question 2 (13 Points)

Write a program that reads multiple blood sugar rates for a patient for multiple visits to a hospital and stops reading when the user enters a negative number or zero. While reading blood sugar rates, if any rate is outside the range 2.5—15.0 print the range followed by the message “is critical”. After reading all the rates, the program is required to print the average rate and the number of critical cases. See sample input/output on the right side ⇨

SAMPLE INPUT/OUTPUT

Enter sugar rates (negative or zero to stop)

17.4 6.7 5.8 1.5 9.3 0

17.4 is critical

1.5 is critical

Average = 8.14

Critical Cases = 2

```
import java.util.Scanner;

public class Main {

    public static void main(String[] args) {

        System.out.println("Enter sugar rates (negative or zero to stop): ");

        Scanner sc = new Scanner(System.in);
        double sugarRate=sc.nextDouble();

        int totalCount=0, criticalCount=0;
        double totalSum=0;

        while (sugarRate>0) {

            if (sugarRate<2.5 || sugarRate>15.0) {
                System.out.println(sugarRate+" is critical");
                criticalCount++;
            }
            totalCount++;
            totalSum+=sugarRate;
            sugarRate=sc.nextDouble();
        }

        System.out.println("Average = " + (totalSum/totalCount));
        System.out.println("Critical Cases = " + criticalCount);

    }

}
```

Question 3 (13 Points)

Write a program that reads the number of lines of a printed shape. If the number of lines is negative, convert it to positive. The program is required to print on each line some *'s followed by the line number. See the sample input/output on the right for an example of a shape consisting of 4 lines.

SAMPLE INPUT/OUTPUT

Enter number of lines: 4

```
****1
***2
**3
*4
```

```
import java.util.Scanner;

public class Main {

    public static void main(String[] args) {

        System.out.print("Enter number of lines: ");

        Scanner sc = new Scanner(System.in);
        int lines=sc.nextInt();

        if(lines<0){lines*=-1;}

        for (int i = lines; i > 0; i--) {
            for (int j = 0; j < i; j++) {
                System.out.print("*");
            }
            System.out.println(lines - (i-1));
        }

    }

}
```

Question 4 (17+5 Points)

Part (1) Define a class with the following specification:

- Create a class called **Building** that has three private data members: **name** (String), number of **flats** (int) and **roomsPerFlat** (int).
- Write a constructor that accepts only the name of the building as an input parameter. The constructor sets the data member **name** to the input parameter and initializes **flats** and **roomsPerFlat** to **0**.
- Provide only one accessor (get) method for the **name** data member.
- Provide a method **setBuildingDetails** that sets both **flats** and **roomsPerFlat** data members from input parameters. Any of the input parameters is negative leave its corresponding data member unchanged.
- Define a method called **calculateCapacity()** which calculates and returns the capacity (double) of the building. The capacity is calculated using the formula: $capacity = \frac{flats \times roomsPerFlat}{factor}$, where factor is equal to 0.75.
- Define a method called **displayBuildingDetails()** to display on the screen all the building's details as in the following sample:

Name: Andalus Flats: 20, Rooms: 3, Capacity: 80
--

```
public class Building{

    private String name;
    private int flats;
    private int roomsPerFlat;

    Building(String name){
        this.name = name;
        this.flats = 0;
        this.roomsPerFlat = 0;
    }

    public String getName() {
        return name;
    }

    public void setBuildingDetails (int flats, int roomsPerFlat){
        if(flats>0){ this.flats = flats; }
        if(roomsPerFlat>0){ this.roomsPerFlat = roomsPerFlat; }
    }

    public double calculateCapacity(){
        return (flats*roomsPerFlat)/0.75;
    }

    public void displayBuildingDetails(){
        System.out.println("Name: " + name);
        System.out.println("Flats: " + flats + ", Rooms: " + roomsPerFlat
            + ", Capacity: " + calculateCapacity());
    }

}
```

Part (2) Write a Java application to do the following:

- a. Create an object called **b1** from the class **Building** and initialize its name to “Awal”.
- b. Set the number of flats of **b1** to 12 and the number of rooms per flat to 3.
- c. Display the building details for **b1**.

```
public class Main {  
  
    public static void main(String[] args) {  
        Building b1 = new Building("Awal");  
        b1.setBuildingDetails(12, 3);  
        b1.displayBuildingDetails();  
    }  
  
}
```