بسم الله الرحمن الرحيم

King Fahd University of Petroleum and Minerals
College of Computer Science and Engineering
Information and Computer Science Department
Second Semester (093)
ICS 102 - Introduction to Computing I

Major Exam 01
Tuesday, July 20, 2010
Time: 100 minutes

Name: _____

ID#: _____

Please circle your section number below:

Section	01	02
Instructor	Salah	EL-Sayed
Day and Time	SUMT 9:20 - 10:10	SUMT 1030 - 11:20

Question #	Maximum Marks	Obtained Marks
1	16	
2	20	
3	12	
4	12	
5	12	
Total	**72**	

~Good Luck ~

Q1. [4 * 4 = 16 marks] Solve the following short answer questions:

a) Give an example of each of the following errors

- Run time error

  Ex. Division by 0

- Logical error

  Ex. To use a wrong formula in your program

- Syntax error

  Ex. Forgot to end a statement by a semicolon;

b) Convert the following mathematical expression to java.

$$y = \left| x + \frac{5\sqrt{x+1}}{11} + x + x/4 + 5x \right| \bmod 7$$

```
y = Math.abs(x + 5 * Math.sqrt(x+1)/11 + x + x/4 + 5 * x) % 7;
```

c) Show all the errors in the following program.

```
int k = 6;
if(k < 10)  → forgot to write "{" here
  System.out.println(k+10);
K++; → forgot to write "}" here
else
      System.out.println (k-10);
k--;
```

d) Give the value assigned to the variables first, second and third.

```
boolean first  = 2 * 5 / 9 == 3 * 5 / 9;
boolean second = 3.0 * 5/9 + 6 % 2 == 3.0 * (5/9) + 100 % 2;
boolean third = !first && second || first && true;
```

The values are:

first = true

second = false

third = true

Q2. **[5 * 4 = 20 marks]** Give output for each of the following program segments in the space provided:

Code	Output

`int x = 9;`
`double y = x/2;`
`double z = y++ + y;`
`System.out.println(x + " " + y + " " + z);`
`System.out.println(4 % 4 * 5 – 3 / 2 * 5);`
	`9 5.0 9.0`
	`-5`

`int x = 99;`
`if(x > 90)`
`  System.out.println("A");`
`if(x >80)`
`  System.out.println("B");`
`if (x > 70 )`
`  System.out.println("C");`
`else`
`  System.out.println("D");`
	A
	B
	C

`char grade = 'D';`
`switch (grade)`
`{`
`  case 'A': System.out.println("Great!");`
`  case 'B': System.out.println("V. Good");`
`  break;`
`  case 'C': System.out.println("Good");`
`  break;`
`  case 'D': System.out.println("Try Hard");`
`  case 'F': System.out.println("Poor!");`
`  break;`
`  default : System.out.println("Dropped!");`
`}`
	Try Hard
	Poor!

`{`
`  int x1;`
`  String s1, s2, password;`
`  Scanner keyboard = new Scanner(System.in);`
`  System.out.println("Enter your first name, age, ID#: ");`
`  s1 = keyboard.next();`
`  x1 = keyboard.nextInt();`
`  s2 = keyboard.next();`
`  password = s1.substring(0, 2) + (x1 % 7) + s2.charAt(3);`
`  System.out.println("Your password is: " + password);`
`}`
 	
Assume that the user types: **Mustafa 20 200912340**
	Your password is: Mu69

`System.out.println( 2/3 == 0 && !true && 5/2*3+1 >= 3 && 6 – 2 * (3 + 1) > 1 && 10 > 2 || true);`	true

String Class Cheat Sheet

- `length()`
- `compareTo(String)`
- `compareToIgnoreCase(String)`
- `equals(String)`
- `equalsIgnoreCase(String)`
- `toLowerCase()`
- `toUpperCase()`

Cont...

- `indexOf(String)`
- `indexOf(String, int)`
- `lastIndexOf(String)`
- `charAt(int)`
- `substring(int)`
- `substring(int, int)`
- `trim()`

Math Class Cheat Sheet

- `PI , E`
- `pow(double, double)`
- `abs(double)`
- `min(double, double)`
- `max(double, double)`
- `round(double)`
- `sqrt(double)`

Q3. **[12 marks]** Design and write a Java program that prompts the user to enter a year and then it prints whether the year is a leap year or not. (A year is a leap year if it is divisible by 4 and not by 100, or it is divisible by 400.) For example, if the user enters the year N and the year N is a leap year then the output of your program must be:

The year N is a leap year

If N is not a leap year then the output of your program must be:

The year N is NOT a leap year

```
import java.util.Scanner;

public class Ex01 {
	public static void main(String [] args)
	{
		Scanner kb = new Scanner(System.in);
		System.out.println("Please enter a year: ");
		int year = kb.nextInt();
		if( year % 400 == 0 || year % 4 == 0 && year % 4 != 0)
			System.out.println(" The year " + year + " is a leap year.");
		else
			System.out.println(" The year " + year + " is NOT a leap year.");
	}
}
```

Q4. **[12 marks]** Write a java program that prompts the user for an integer value between 1000 and 9999 inclusive. The program then prints the product (multiplication) of the non-zero digits of the number. The program must print an error if the input number is not between 1000 and 9999.

```
import java.util.Scanner;

public class Ex01 {
	public static void main(String [] args)
	{
		Scanner kb = new Scanner(System.in);
		System.out.println("Please enter a number between 1000 and 9999: ");
		int num = kb.nextInt();
		if( num < 1000 || num > 9999 )
			System.out.println(" You entered a wrong number");
		else {
			int n = num;
			int p = 1;
			int q = n % 10;
			if(q > 0) p = p * q;
			n = n / 10;
			q = n % 10;
			if(q > 0) p = p * q;
			n = n / 10;
			q = n % 10;
			if(q > 0) p = p * q;
			n = n / 10;
			q = n % 10;
			if(q > 0) p = p * q;
			System.out.println(" The product of the digits of " + num + " is " + p);
		}
	}
}
```

Q5. **[12 marks]** Write a java program that does the following:

1. Reads 4 integers from a file called “input.txt”;
2. Then outputs in to a file called “outout.txt”:
    a. All the 4 numbers
    b. Their minimum,
    c. Their maximum,
    d. Their sum, and
    e. Their average.

For example, if your input file contains the numbers 2, 3, 4, and 5, your output file must be:

The 4 numbers are: 3, 2, 5, 4
The minimum number is: 2
The maximum number is: 5
Their Sum is: 14
Their average is: 3.5

```
import java.util.Scanner;
import java.io.*;

public class Ex01 {
        public static void main(String [] args) throws IOException
        {
                Scanner fin = new Scanner(new FileInputStream("input.txt"));
                PrintWriter fout = new PrintWriter(new FileOutputStream("output.txt"));
                int n1 = fin.nextInt();
                int n2 = fin.nextInt();
                int n3 = fin.nextInt();
                int n4 = fin.nextInt();
                int mn = Math.min(n1, Math.min(n2, Math.min(n3, n4)));
                int mx = Math.max(n1, Math.max(n2, Math.max(n3, n4)));
                int sum = n1 + n2 + n3 + n4;
                double avg = sum/4.0;
                fout.println("The 4 numbers are: " + n1 + " " + n2 + " "+ n3 + " " + n4);
                fout.println("The minimum number is: " + mn);
                fout.println("The maximum number is: " + mx);
                fout.println("Their Sum is: " + sum);
                fout.println("Their average is: " + avg);
                fout.close();
        }
}
```