KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS
Information and Computer Science Department

2011/2012 First Semester (Term 111)
ICS102: Introduction to Computing (2-3-3)

MIDTERM EXAM

Saturday, October 29th 2011, 05:30 PM – 07:30 PM

120 MINUTES

Student Information

Name:	**Key**								
ID:									

Circle your section

Bagais	SM 8:00 – 8:50 am	
Garout	SM 10:00 – 10:50 am	
Al-Turki	SM 13:10 – 14:00 pm	SM 9:00 – 9:50 am

Question No.	Maximum Score	Score
01	10	
02	15	
03	12	
04	08	
05	20	
06	20	
07	15	
TOTAL	100	

Question 1 (10 points):
Indicate if the following statements are true or false:

The statement	True/False
In a Java program, the name of the two variables Number and number are identical	**False**
It is not necessary to handle exceptions with files opened for writing	**False**
Break statement is a must in switch	**False**
Any whitespace separate multiple input for all Scanner methods except nextLine()	**True**
The do-while loop makes one more iteration than while loop	**False**
Any if-else-if statement can be replaced by a switch statement	**False**
Continue statement prevents the loop from doing any more iterations	**False**
An exception is thrown if the file is opened for writing and it doesn't already exist	**False**
Sentinel loops are the ones that stops when a certain value is encountered	**True**
The text between /* */ is for documentation purposes only	**True**

Question 2 (15 points):
Choose the correct answers in the following questions:

1. Which of the following are illegal statements:

    a. x *= 3;

    b. String s = "White" + "elephant";

    c. (y + 1)++;

    d. a = b = c = 7;

2. Which of the following is not true:

    a. a += 5 is equivalent to a = a + 5

    b. int b = (int) 9.8 is equivalent to int b = 10

    c. String c = "Ja"+"va" is equivalent to String c = " Java
       ".trim()

    d. float d = 7/2 is equivalent to float d = 3

3. Which of the following statements correctly opens the file text.txt
   for reading:

    a. Scanner obj = new Scanner(new FileInputStream("text.txt"));

    b. Scanner obj = new Scanner(System.in);

    c. PrintWriter obj = new PrintWriter(new
       FileOutputStream("text.txt"));

    d. Scanner obj = new Scanner(new FileInputStream(text.txt));

4. Which of the following are legal loop definition:
    a. for(int a = b = 0, a < 100 && b < 50 , a++, b++) { }
    b. while(int a = 0) { }
    c. do { } while(a == 0)
    d. for(; i == j; i += 2, j *= 2) { }
5. Given the following code:
   ```
   do{
       System.out.println("Inside do-while loop");
       break;
    } while(true);
   ```
   Which of these statements is true?
    a. It will not compile
    b. Inside do-while loop will print once
    c. Nothing is printed
    d. Inside do-while loop will print infinite number of times

6. Given the following code:
   ```
   for(int i = 0; i < 2; i++){
      for(int j = 1; j < 3; j++){
         if(i == j) continue;
         System.out.println("i = " + i + " j = " + j);
      }
   }
   ```
   Which of the following lines is NOT part of the output?
    a. i = 0 j = 1
    b. i = 0 j = 2
    c. i = 1 j = 1
    d. i = 1 j = 2
7. Which statement is true about the following code:
   ```
   char c = 'c';
   switch(c) {
     default:
     case 'a': System.out.println("a"); break;
     case 'b': System.out.println("b"); break;
   }
   ```
    a. this switch is illegal because only integers can be used
    b. when this code runs, the letter a is printed
    c. this switch is illegal because default must come last
    d. when this code runs, nothing is printed out

8. Which statements is true about the following code:

```java
int x = 15, y = 12, z = 18;
if(x < y)
if(x < z)
System.out.println("Salam");
else
System.out.println("Shabab");
```

   a. when this code runs, Salam is printed

   b. the code will not compile because there are no braces in if
      statements

   c. when this code runs, Shabab is printed

   (d.) nothing is printed out

9. Which of the following is a Java primitive type:

   (a.) byte

   b. String

   c. integer

   d. System

10.   Given the following code

```java
int i = 1;
do while(i < 1)
    System.out.println("i is " + i);
while(i > 1);
```

   which of the following is true:

   a. The code will not compile because it is not correct

   b. i is 1 will be printed once when the code runs

   (c.) the code is fine but nothing is printed

   d. i is 1 will be printed infinitely

Question 3 (12 points):
Find the output of the following Java code

I)

```java
int x = 5, y = 5, z = 0;
System.out.println(x++ + " and " + ++z);
z = Math.max(x,y) % 3;
System.out.println(x + " " + y + " " + z);
```

OUTPUT

```
5 and 1
6   5   0
```

II)

```java
int x = 6, y = 10;
if ( x > 10 & x-- > 5 )
x = 2 * y;
if ( ++y < 10 && y++ > x || x != 4)
y = x / 2;
if( ! (x == 10) || (y + x) <= 2 * y)
y = 10;
System.out.println(x + "\t" + y);
```

OUTPUT

```
5   10
```

IV)

```java
String s = "";
for(int n = 1; n <= 4; n++){
  for(int m = 1; m <= n; m++)
      s += "*";
  s += "\n";
}
System.out.print(s);
```

OUTPUT

```
*
**
***
****
```

V)

```java
int num = 18;
for(int i = 0; i <= num; i++) {
  if(i % 5 == 0)
     System.out.println();
  System.out.print(i + "\t");
}
```

OUTPUT

```
0    1    2    3    4
5    6    7    8    9
10   11   12   13   14
15   16   17   18
```

Question 4: (8 points)

Consider the following Java code. What will be the output for the different values of x and y typed by the user?

```java
Scanner input = new Scanner(System.in);
int x = input.nextInt();
int y = input.nextInt();
switch(x) {
    case 5: if ( y > x )
              y = y - x;
              x = x - y;
              break;
    case 4: x += 2;
    case 0: y -= 3;
    case 1: break;
    case 3: if ( !(x < y) || (y == 5) )
              y = x + y;
              break;
    default: if ( x >= y )
               if ( x % 3 > 0 )
               y -= x % 3;
               else
               y = x--;
               x = y++;
    }
System.out.println(x + "\t" + y);
```

User Input	Program Output
3 4	3 4
4 5	6 2
5 1	4 1
2 2	0 1

Question 5: (20 points)

Write a Java program that counts and print on the screen how many times the word "the" appears in the file "text.txt". Assume that the file has unknown number of words.

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

public class Count{
   public static void main(String []args) throws FileNotFoundException {
      Scanner f = new Scanner(new FileInputStream("text.txt"));

      int c = 0;
      while(f.hasNext()){
        if(f.next().equals("the"))
          c++;
      }
      System.out.println("There are "+c+"\"the" in the file);
      f.close();
   }
}
```

Question 6: (20 points)
Write a java program that reads a simple expression from the user. The expression consists of two integer operands and an operator (+, -, *, /) between them like 15 * 3. Your program evaluates the expression and prints its result.

Sample output:
Enter your expression: 15 * 3
Result: 15 * 3 = 45

```java
import java.util.Scanner;

public class ExpEval{
    public static void main(String []args) {
        Scanner k = new Scanner(System.in);
        int o1, o2, result;
        String op;
        System.out.print("Enter the expression: ");
        o1 = k.nextInt();
        op = k.next();
        o2 = k.nextInt();
        if(op.equals("+"))
            result = o1 + o2;
        else if(op.equals("-"))
            result = o1 - o2;
        else if(op.equals("*"))
            result = o1 * o2;
        else if(op.equals("/"))
            result = o1 \ o2;
        else {
            System.out.println("Invalid operator");
            System.exit(0);
        }
        System.out.println("Result: "+ o1 + op + o2 + result);
    }
}
```

Question 7: (15 points)

Write a program that reads the coordinates of two points (x1, y1) and (x2, y2) and displays the distance between them using the following formula:

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

```java
import java.util.Scanner;

public class Dist{
   public static void main(String []args) {
      Scanner k = new Scanner(System.in);
      int x1, y1, x2, y2;
      System.out.print("Enter first point coordinates");
      x1 = k.nextInt();
      y1 = k.nextInt();
      System.out.print("Enter second point coordinates");
      x2 = k.nextInt();
      y2 = k.nextInt();
      double d = Math.sqrt((x1-x2)*(x1-x2) + (y1-y2)*(y1-y2));
      System.out.println("Distance between points is "+d);
   }
}
```