

King Fahd University of Petroleum and Minerals
 College of Computer Sciences and Engineering
 Information and Computer Science Department
Second Semester 2009/2010 (092)
ICS 102 - Introduction to Computing I

Major Exam 01
 Thursday, 25th March 2010
 Time: 120 minutes

Name:

ID#:

--	--	--	--	--	--	--	--	--	--

G:

Please circle your section number below:

Section	01	02	03	04	05
Instructor	Ghouti	Ghouti	Zhioua	Adil Al-Suhaim	Almuhammadi
Day and Time	SM 07:00-07:50	SM 08:00-08:50	SM 09:00 - 09:50	SM 13:10-14:00	SM 10:00-10:50

Question #	Maximum Marks	Obtained Marks	Remarks
1	15		
2	20		
3	20		
4	15		
5	15		
6	15		
Total	100		

~Good Luck~

Q1. [5 + 10 = 15 marks]

- a) What's wrong with the following code fragment? Circle all ***syntax*** (compilation) errors. Underline all ***logical*** and ***run-time*** errors. (Do not scratch inside the box otherwise)

```
Scanner kb = Scanner(System.in);
System.out.print ("Enter two positive integers: ");
int a = kb.Int();
int b = kb.nextLine();
System.out.println("The average = " + a + b / 2);
System.out.println("The ratio = " + a / b );
```

- b) Correct the errors in the above statements and rewrite them below (Do not change the types of the variables or add new statements)

Q2. [20 marks] Determine the output of each of the following code fragments:

	Code Fragment	Output
a)	<pre>int a = 2; int b = 9; double x = a + b / a * 2.0; System.out.println(x);</pre>	[2 marks]
b)	<pre>int c = 11, d = 3; int e = 3+d++; c %= ++d; System.out.println(c + "+" + d + "=" + e);</pre>	[6 marks]
c)	<pre>int a = 10, b = 2; String x = "-123-0"; System.out.println(x + a + b); System.out.println(a + b + x);</pre>	[4 marks]
d)	<pre>String x = "*JavaIsFun*"); String y = "Who-like-it?"; int n = x.length(); System.out.println(n); String z = x.substring(1, 5); System.out.println(z); String w = y.substring(3, 8); String t = x.substring(n - 3); System.out.println(x.charAt(5) + w + z + t);</pre>	[8 marks]

Q3. [4 * 5 = 20 marks] Convert the following algebraic expressions to JAVA statements. Define and initialize all needed variables as shown below.

- a) The volume of a sphere with radius r : $volume = \frac{4}{3} \pi r^3$ (where $r = 2.5$)
- b) $voltage = x^2 + 2xy + y^{2.5}$ (where $x = \sqrt{\pi}$ and $y = 1/3$)
- c) $x = \sqrt[3]{\frac{a}{b}}$ (where $a = 2$ and $b = 3$)
- d) $c = \frac{e^{\left(-\frac{1}{2}(a+1)\right)}}{\sqrt{2\pi a}}$ (where $a = 2$)

a)	
b)	
c)	
d)	

Q4. [15 marks] Write a program that reads an integer between 0 and 1000 and adds all the digits in the integer. For example, if an integer is 947, the sum of all its digits is $9 + 4 + 7 = 20$.

Example execution:

Please enter an integer: **947**

The sum of the digits of 947 is: **20**

Hint: $947 / 100 = 9$ and $947 \% 10 = 7$

```
public class AddDigits {  
    public static void main(String[] args) {
```

```
    }  
}
```

Q5. [15 marks] Write a program that reads the following information from the user:

Employee's name (for example **Muhammad**),

Number of hours worked in a week (for example **20**),

Hourly pay rate (for example 50),

Tax rate (for example 15%).

Then, the program computes the weekly salary (which is the number of hours multiplied by hourly rate) and outputs a payroll statement as in the following example:

Example of execution and output:

Please enter the name: **Muhammad**

Enter the number of hours: **20**

Enter the pay rate: **50**

Enter the tax rate: **15**

Employee's name: Muhammad

Weekly salary: 1000 SAR

Tax deduction: 150 SAR

```
public class Employee {  
    public static void main(String[] args) {
```

```
    }  
}
```

Q6. [15 marks] Write a program that reads a word from the user. Any word entered by the user is assumed to start with a **consonant** (not a vowel!). Then, the program moves the consonant to the end of the word and moves all the remaining characters forward and adds at the end of the word "**ay**". For example, if the user enters **bad**, the program prints **adbay**. Moreover, if the user enters the word **groovy**, the program, then, prints **roovygay**.

Hint: Make sure to convert the inputted word to lower case before processing it.

Example execution:

Please enter a word:

Bad

The encoded word is:

adbay

```
public class WordEncoder {  
    public static void main(String[] args) {
```

```
    }  
}
```