King Fahd University of Petroleum and Minerals

College of Computer Sciences and Engineering

Information and Computer Science Department

**First Semester 2014/2015 (142)**

**ICS 102 - Introduction to Computing-I**

Midterm Examination

Wednesday, 1st April 2014

Time: 120 minutes

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| ***Name:*** |  |

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***Please circle your section number below:***

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| Section | 01 | 03 | 04 |  |
| Instructor | Said | Said | Said |  |
| Day and Time | UT  08:00-08:50 | UT  09:00- 09:50 | UT  11:00 - 11:50 |  |

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| --- | --- | --- |
| Question # | Maximum Score | Score |
| 1 | 22 |  |
| 2 | 18 |  |
| 3 | 15 |  |
| 4 | 20 |  |
| 5 | 25 |  |
| **Total** | **100** |  |

***~Good Luck~***

**Question#1 [22 points: 2\*2 + 3 \*6]**

1. A Java **.class** file contains an intermediate machine language representation called

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Convert the given mathematical equation into an equivalent Java statement:

|  |  |
| --- | --- |
| **Mathematical Equation** | **Java Statement** |
|  |  |

1. Show the correct order of evaluation for the Java operators in the following expression:

x != 3 || y < 3 + 2 && x \* 2 > 6

1. Convert the following switch statement into an equivalent if-structure statement

|  |  |
| --- | --- |
| Switch statement | Equivalent if-structure |
| int x = scanner.nextInt( );  switch(x){  case 4: case 6:  System.out.printf("even");break;  case 5: case 7:  System.out.printf ("prime");break;  default:  System.out.printf("Wrong input");  } |  |

1. Convert the following while loop into an equivalent do-while loop:

|  |  |
| --- | --- |
| while-loop | Equivalent do-while loop |
| x = scanner.nextInt();  while(x <= 0){  System.out.println("Error ! ");  x = scanner.nextInt();  } |  |

1. A Scanner object **kbScanner** is used to read a value of type **double** from the keyboard. Write Java program fragment which uses a try-catch block that will terminate the program if there is an InputMismatchException; otherwise it displays the entered value on the screen.

1. How many times is the **System.out.print** statement executed in the following nested loops:

for(int k = 7; k >= 1; k--)

for(int m = 3; m <= k; m++)

System.out.print("A ");

1. Write two printf statements to have the output shown below the program fragment. Each square represents one space. Note: Don’t use blank characters in the format strings.

double x = 742.167;

int k = 358;

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|  |  | **7** | **4** | **2** | **.** | **2** |  |  |  | **3** | **5** | **8** |  |  |  |
|  | **3** | **5** | **8** |  | **7** | **4** | **2** | **.** | **1** | **6** | **7** | **0** |  |  |  |

**Question#2 [18 points]**

What is the output of each of the following Java program fragments? If a fragment will cause an error, mention the error.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Program Fragment | Output | |
| 1. | int k = 12;  if(k > 10)  System.out.print("K");  if(k > 6)  System.out.print("F");  if(k > 9)  System.out.print("U");  else if(k > 7)  System.out.print("P"); |  | |
| 2. | int x = scanner.nextInt();  switch(x) {  case 4:  case 2: x = x + 1;  System.out.print(x + " ");  case 5:  case 0: x = x + 2;  case 3:  case 1: x = x + 3;  break;  default: x = x + 4;  }  System.out.print(x); | Value input in x | output |
| 4 |  |
| 2 |  |
| 5 |  |
| 3. | int x = 20;  if (x > 15)  x = 3;  System.out.println(x + 2);  else  System.out.println(x + 4); |  | |
| 4. | int number = 562, digits = 0,sum = 0;  do {  sum = sum + number%10;  number = number/10;  digits++;  System.out.printf("%d %d%n",digits,sum);  }while(number>0); |  | |
| 5. | int m;  for(int k = 1; k <= 5; k++){  m = k;  while(m <= 5){  System.out.print(k + 3);  m++;  }  System.out.println();  } |  | |
| 6. | String str1 = "He-was-a-teacher";  int k = str1.lastIndexOf('a');  System.out.println(k);  String str2 = str1.substring(k);  System.out.println(str2);  String str3 = str1.substring(0, k);  System.out.println(str3); |  | |

**Question#3 [15 points]**

Write a *complete* interactive Java program that prompts the user to enter three different integer numbers. If the numbers are not different the program displays an appropriate error message and terminates; otherwise the program prints on the screen the sum of the two larger numbers in the format shown in the sample run below.

Note: Assume that the program will not generate **InputMismatchException**.

Sample program run:

**Enter three distinct integers: 5 3 8**

**5 + 8 = 13**

**Question#4 [20 points]**

Write a Java program that prompts for and reads an integer **n**. As long as **n** is zero or negative the program displays an error message and then prompts again for an integer **n**; otherwise, if n > 0, the program displays all the divisors of n.

Note: Assume that the program will not generate **InputMismatchException**.

Sample program run:

**Enter an integer > 0: 10**

**The number 10 has the following divisors:**

**1 2 5 10**

**Question#5 [25 points]**

Write a complete Java program that reads a textfile **input.txt** it then writes to a file **output.txt** the non-blank lines of **input.txt** with the shortest line length together with their line numbers. Your output must be in the format given in the sample **output.txt** given below. Assume that the maximum line length in **input.txt** is 80.

**Note:** Your program must display an appropriate error message and terminate if **input.txt** is empty.

Sample **input.txt**:

|  |
| --- |
| ICS 102 is a programming course  and this is the midterm examination.  The examination is easy.  I hope that you do well.  After you finish all your examinations,  please come to visit us. |

Sample **output.txt**:

|  |
| --- |
| The shortest non-blank line length is 24  The line/lines with this length is/are:  Line# Line  4. The examination is easy.  6. I hope that you do well.  9. please come to visit us. |

Note: Your program must be general; it must work for any **input.txt**