



Information and Computer Science Department

Spring Semester 152

ICS 102 - Introduction to Computing I

Final Exam

Wednesday, May 18, 2016

Duration: 120 minutes

Name:

ID#:

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Section#:

Instructor:

Question #	Max Score	Score
1	12	
2	48	
3	10	
4	18	
5	12	
Total	100	

Question # 1

What is the output of the following programs?

Programs	Output
<pre> public class FinalQ1A { public static void main(String[] args) { int a = 18; change(a); System.out.println(a); } public static void change(int a) { a = 2; } } </pre>	
<pre> public class FinalQ1B { public static void main(String[] args) { String exam = "Midterm"; change(exam); System.out.println(exam); } public static void change(String exam) { exam = "Final"; } } </pre>	
<pre> public class FinalQ1C { public static void main(String[] args) { System.out.println(calc(152)); } public static int calc(int n) { int d = 0; while (n > 0) { d++; n /= 10; } return d; } } </pre>	
<pre> public class FinalQ1D { public static void main(String[] args) { int[] array = {10,20,30,40}; for (int i = 1; i < array.length; i++) array[i] += array[i-1]; for (int i = 0; i < array.length; i++) System.out.println(array[i]); } } </pre>	
<pre> public class FinalQ1E { public static void main(String[] args) { int[][] mat = {{10,20,30}, {40,50,60}, {70,80,90}}; for (int i = 1; i < mat.length; i++) System.out.println(mat[i][i]); } } </pre>	

Question # 2

Consider the following code which shows the first few lines of a class called Square.

```
public class Square {  
    private int side;  
    •  
    •
```

Write a constructor for the class Square with one parameter to initialize the side of a square.

Write a copy constructor for the class Square.

Write a set (mutator) method **setSide**.

Write a get (accessor) method **getSide**.

Write an instance method **getArea** to calculate the area of a square.

Write a static method **getArea** that takes a square as a parameter to calculate the area of a square.

Write the **toString** method that returns a string representing a square. For a square with side 10, the method returns "square(10)".

Write the **equals** method that compares two squares and returns true if they have the same side.

Complete the SquareTest class to produce the shown output.

Code	Output
<pre>public class SquareTest { public static void main(String[] args) { // create a square s1 with side as 10 // create a square s2 with the copy constructor // update the side of s2 to 20 // print s1 using the toString method // print s2 using the toString method // compare s1 and s2 using equals method // print the area of s1 using the instance method // print the area of s2 using the static method } }</pre>	<pre>square(10) square(20) s1 equals s2? False area of s1 = 100 area of s2 = 400</pre>

Question # 3

The following code has some errors. Underline each one and briefly describe it under error column.

Code	Error
<pre>import java.util.Scanner; public class ArrayOfScores2 { /** Reads in 5 scores and shows how much each score differs from the highest score. / public static void main(String[] args) { Scanner keyboard = new Scanner(System.out); double[] score = double[5]; int index; boolean max; System.out.println("Enter " + score.length + " scores:"); score[0] = keyboard.next(); max = score; for (index = 1; index <= score.length; index++) { score[index] = keyboard.next(); if (score[index] > max) max == score[index]; } System.out.println("The highest score is " + max); System.out.println("the scores are"); for (index = 0; index < length; index++) System.out.println(score[index] + " differs from max by " + (max - score[index])); } } }</pre>	

Question # 4

Write a method **swapEnds** that takes an array of integers, swaps the first and last elements in the array.

`swapEnds([1, 2, 3, 4]) → [4, 2, 3, 1]`

`swapEnds([1, 2, 3]) → [3, 2, 1]`

`swapEnds([8, 6, 7, 9, 5]) → [5, 6, 7, 9, 8]`

Complete the main method that calls **swapEnds**.

```
public class FinalQ4 {  
    public static void main(String[] args) {  
        // create an integer array x containing the elements [1, 2, 3, 4]  
  
  
        // call the method swapEnds  
  
  
        // print the array x  
  
  
    }  
}
```

Question # 5

Write a method **rowsAverage** that will return an array **average** containing the average of each row in the input 2D integer array **grades**.

Note: The input array could be a ragged 2D array.

For example:

grades	→	2	3	4	5		
		10	20	30			
		12	13	14	12	13	14

average	→	3.5	20.0	13.0
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