Future University in Egypt
Faculty of Computers and Information Technology
Computer Science Department
Semester: Fall 2019
Course: CS213/CSC 213 Computer Programming -2
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Week 2

Tutorial Problems

1. Trace the following code using trace table on (5 , -6 , 9 , -2 , 12 , -111, 2)

```
1    package Tutorial;
2
3    import java.util.Scanner;
4    public class Problem1
5    {
6        public static void main(String[] args)
7        {
8            Double number, sum = 0.0;
9            Scanner input = new Scanner(System.in);
10           for (int i = 1; i < 50; ++i)
11           {
12               System.out.print("Enter a number: ");
13               number = input.nextDouble();
14
15               if (number <= 0.0)
16               {
17                   continue;
18               }
19               sum += number;
20               if (number == -111 )
21               {
22                   break;
23               }
24           }
25           System.out.println("Sum = " + sum);
26       }
27   }
```

2. Suppose that the tuition for a university is $10,000 this year and increases 5% every year. Write a program that computes the tuition in ten years and the total cost of four years' worth of tuition starting ten years from now.

3. Write a program that simulates cashier work. First the user will enter the name for the customer and the maximum limit for the money user have in dollars. Then the program will ask the user to enter number of pieces for each product and the price for each product. A message will appear for the user each transaction as to continue read pieces and prices or not. The reading will stop if the price exceed the limit. Finally the total price will be printed in dollars plus the taxes. The Taxes calculated if price smaller than 100 $ then taxes will be 10%, between 100 and 200 will be 12 %, greater than 200 will be 14%. The program will as the user if he need to convert to another currency with three options to EGP (17), Euro (0.9),   SAR (3.75) hint: *use switch.*

1. *Mean and standard deviation*. Write a program that reads a set of floating-point data values. Choose an appropriate mechanism for prompting for the end of the data set. When all values have been read, print out the count of the values, the average, and the standard deviation.

   The average of a data set $\{x1 \ldots xn\}$ is $x = \_xi\ n$, where $xi = x1 + \ldots + xn$ is the sum of the input values.

   The standard deviation:

   $$s = \sqrt{\frac{\sum x_i^2 - \frac{1}{n}\left(\sum x_i\right)^2}{n - 1}}$$

   You can compute this quantity by keeping track of the count, the sum, and the sum of squares as you process the input values. The user will still enter number until -999 entered.

2. Suppose you want to develop a program for a first-grader to practice subtraction. The program randomly generates two single-digit integers, number1 and number2, that $number1 >= number2$ and if not *swap* them and displays to the student a question such as "What is" After the student enters the answer, the program displays a message indicating whether it is correct. A better approach is to use the **random()** method in the **Math** class. Invoking this method returns a random double value such that, **(int)(Math.random() *100)** returns a random single-digit integer (i.e., a number between 0 and 100). Your program will ask 10 questions to the user. You have to calculate the time for user to complete the exam in **seconds,** the function **System.currentTimeMillis()** will return the current time in milliseconds and also you have to create start and end time variables. Finally you will print the total count of correct answers, total time and grade. Given that the user grade will be excellent if he answers from 8 to 10 questions, Very good from 6-7, Good from 4-6 and poor less than 4. (**hint : use switch in the grading part).**

   The output will be as follows

   ```
                       Welcome to Subtraction Quiz Example
   What is 9 – 2?
   You are correct!
   What is 3 – 0?
   You are correct!
   What is 3 – 2?
   You are correct!
   .
   .
   .

   Your correct count answers is 3
   Your grade is poor
   You achieved the test time is 1021 seconds

   Do you want another exam (Y/N): N
   Thank You
   ```

1. *(**The Drunkard's Walk**). A drunkard in a grid of streets randomly picks one of four directions and stumbles to the next intersection, then again randomly picks one of four directions, and so on. You might think that on average the drunkard doesn't move very far because the choices cancel each other out, but that is actually not the case. Represent locations as integer pairs (x, y). Implement the drunkard's walk over 100 intersections, starting at (0, 0), and print the ending location.

2. *(**Sales Commission Calculator**)* A large company pays its salespeople on a commission basis. The salespeople receive $200 per week plus 9% of their gross sales for that week. For example, a salesperson who sells $5,000 worth of merchandise in a week receives $200 plus 9% of $5000, or a total of $650. You've been supplied with a list of the items sold by each salesperson. The values of these items are as follows:

Item	Value
1	239.99
2	129.75
3	99.95
4	350.89

   Develop a Java application that inputs one salesperson's items sold for last week and calculates and displays that salesperson's earnings. There's no limit to the number of items that can be sold.

3. Write an application to pre-sell a limited number of cinema tickets. Each buyer can buy as many as 4 tickets. No more than 100 tickets can be sold. Implement a program called TicketSeller that prompts the user for the desired number of tickets and then displays the number of remaining tickets. Repeat until all tickets have been sold, and then display the total number of buyers.

4. *(Occurrence of max numbers)* Write a program that reads integers, finds the largest of them, and counts its occurrences. Assume that the input ends with number 0. Suppose that you entered 3 5 2 5 5 5 0; the program finds that the largest is 5 and the occurrence count for 5 is 4. (*Hint*: Maintain two variables, max and count. max stores the current max number, and count stores its occurrences. Initially, assign the first number to max and 1 to count. Compare each subsequent number with max. If the number is greater than max, assign it to max and reset count to 1. If the number is equal to max, increment count by 1.)

   ```
   Enter numbers: 3 5 2 2 5 5 5 0
   The largest number is 5
   The occurrences of largest number is 4
   ```

5. (*Finding the two highest scores*) Write a program that prompts the user to enter the number of students and each student's name and score, and finally displays the student with the highest score and the student with the second highest.