MIDDLE EAST TECHNICAL UNIVERSITY, NORTHERN CYPRUS CAMPUS
CNG443 – Worksheet for Lecture 2

Purpose:
In this work sheet, you will get hands-on experience with Java basics including creating, compiling, and executing simple Java programs, arguments, data types, loops, strings in Java, arrays in Java and Mathematical functions.

Tasks:

1. Write a Java program that displays the following messages "Welcome to Java", "Programming is fine", "Need to learn mutliple languages", "Turkish proverb says "One language one person"". Try to also write these in different lines and try to display different data types.
2. Write a program that converts the centimetres entered to inches. The program will be a command line program so the command line should include the input. One centimetre is 0.3937 inches. Here is a sample run:

```
>Java Converter 5
>5 centimetres is 1.9685 inches
>Bye!
```

3. Write a program that reads the investment amount, annual interest rate, and number of years and displays the future investment value using the following formula:

$$futureInvestmentValue = investmentAmount\ x\ (1 + monthlyInterestRate)^{numerOfYears*12}$$

For this exercise, make use of Math class[1]. A sample run is as follows:

```
Enter investment amount= 1000
Enter monthly interest rate= 4.25
Enter number of years= 1
Accumulated value is 1043.34
```

4. Given an airplane's acceleration a and take-off speed v, you can compute the minimum runway length needed for an airplane to take off using the following formula:

$$length = \frac{v^2}{2a}$$

Write a program that prompts the user to enter v in meters/second (m/s) and the acceleration a in meters/second squared (m/s^2), and displays the minimum runway length. Here is a sample run:

```
Enter v and a = 60 3.5
The minimum runway length fort his airplane is 514. 286.
```

5. An ISBN (International Standard Book Number) consists of 10 digits d_1 d_2 d_3 d_4 d_5 d_6 d_7 d_8 d_9 d_{10}. The last digit d_{10} is a checksum which is calculated from the other 9 digits using the formula.

$$(d_1x1 + d_2x2 + d_3x3 \ldots\ldots + d_9x9)\ \%\ 11$$

[1] https://docs.oracle.com/javase/8/docs/api/java/lang/Math.html

If the checksum is 10, the last digit is denoted with X according to the ISBN convention. Write a program that reads the first 9 digits and displays the 10-digit ISBN. A sample run is as follows:

```
Enter 9-digit ISBN = 013601267
Full ISBN = 0136012671
```

6. Write a program that prompts the user to enter an integer from 2 to 20 and displays a pyramid. A sample run is as follows:

```
Enter a limit: 25
You have to enter between 2-20
Enter a limit: 7
Output:
```

```
            1
          2 1 2
        3 2 1 2 3
      4 3 2 1 2 3 4
    5 4 3 2 1 2 3 4 5
  6 5 4 3 2 1 2 3 4 5 6
7 6 5 4 3 2 1 2 3 4 5 6 7
```

7. A prime number is called a Mersenne prime if it can be written in the form of 2^p-1 for some positive integer p. Write a program that finds all Mersenne primes with p<25 and displays the output as follows:

p	2^p-1
2	3
3	7
…	…

8. Write a program that prompts the user to enter the number of students, the student's names, and their scores, and prints student names in increasing order of their scores.
9. Write a program that randomly fills in 0s and 1s into a TicTacToe board, prints the board, and finds the rows, columns and diagonals with all 0s and 1s. Use a two-dimensional array to represent a TicTacToe board. Here is a sample run of the program:

```
Board is created which is as follows:
001
001
111

Statistics:
All 1s on row 2
All 1s on column 2
```

10. Write a program that has a method that takes a String value and returns the number of lowercase letters in the string.