Institute of Technology of Cambodia

Programming and Implementation

1.

Ask a user for a number, say n. Display all sequence numbers from 1000 to n. Find the sum and average of these numbers and display the result on screen.

Input:
Enter a number: 9

Output:
1000 999 998 997 996 995 ... 11 10 9
Sum is: ....
Average is: ....

```java
import java.util.Scanner;

class Number {
    int num;

    public Number() {
        Scanner input = new Scanner(System.in);    Convert to try-with-resources
        System.out.print(s:"Enter a number: ");
        this.num = input.nextInt();
        input.close();
    }
}

public class Exercise1 {
    Run | Debug | Run main | Debug main
    public static void main(String[] args) {
        Number number = new Number();
        int n = number.num;

        if (n > 1000) {
            System.out.println(x:"Please enter a number 1000 or less.");
        } else if (n < 0) {
            System.out.println(x:"Please enter a positive number or zero.");
        } else {
            // Count from 1000 to the user's number
            for (int i = 1000; i >= n; i--) {
                System.out.print(i + " ");
            }
        }
    }
}
```

```
PROBLEMS 3   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS   SPELL CHECKER

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CodeDetailsInExceptionMessages' '-cp' 'C:\Users\U-ser\AppData\Roami
s\Lab1_9c0af690\bin' 'Exercise1'
Enter a number: 997
1000 999 998 997
```

2. Write a program to solve a quadratic equation $ax^2 + bx + c = 0$ using the following formula.

Ask the input a, b and c from the user. Then the program find roots and display them on screen.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

```
==============================
Welcome to our program
'Quadratic Equation Solver ax² + bx + c = 0'
==============================

Input a: 2
Input b: 5
Input c: 2

----------
Roots of this equation: 2x² + 5x + 2 = 0 are:
    x1 = ?
    x2 = ?
----------
```

```java
import java.util.Scanner;
class Answer {
    float a, b, c;
    public void Calculate() {
        try (Scanner input = new Scanner(System.in)) {
            System.out.println(x:"==================================================");
            System.out.println(x:"Welcome to our program");
            System.out.println(x:"'Quadratic Equation Solver ax^2 + bx + c = 0'");
            System.out.println(x:"==================================================");
            System.out.println(x:"");
            System.out.print(s:"Input a: ");
            this.a = input.nextFloat();
            System.out.print(s:"Input b: ");
            this.b = input.nextFloat();
            System.out.print(s:"Input c: ");
            this.c = input.nextFloat();
            System.out.println(x:"");
            System.out.println(x:"--------------------------------------------------");
            float D = (b * b) - (4 * a * c);
            if (D > 0) {
                float x1 = (float) ((-b + Math.sqrt(D)) / (2 * a));
                float x2 = (float) ((-b - Math.sqrt(D)) / (2 * a));
                System.out.println("Roots of this equation: " + a + "x^2 + " + b + "x + " + c + " are:");
                System.out.printf(format:"x1 = %.2f\n", x1);
                System.out.printf(format:"x2 = %.2f\n", x2);
            } else if (D == 0) {
                float x = -b / (2 * a);
                System.out.println("Roots of this equation: " + a + "x^2 + " + b + "x + " + c + " are:");
                System.out.printf(format:"Root = %.2f\n", x);
            } else {
                System.out.println("Roots of this equation: " + a + "x^2 + " + b + "x + " + c + " are:");
                float realPart = -b / (2 * a);
                float imaginaryPart = (float) (Math.sqrt(-D) / (2 * a));
                System.out.printf(format:"x1 = %.2f + %.2fi\n", realPart, imaginaryPart);
                System.out.printf(format:"x2 = %.2f - %.2fi\n", realPart, imaginaryPart);
            }
        }
    }
}
public class Exercise2 {
    Run | Debug | Run main | Debug main
    public static void main(String[] args) {
        Answer equation = new Answer();
        equation.Calculate();
    }
}
```

PROBLEMS 1 OUTPUT DEBUG CONSOLE TERMINAL PORTS SPELL CHECKER

```
 '-cp' 'C:\Users\U-ser\AppData\Roaming\Code\User\workspaceStorage\e690d49d31671adee265
ws\Lab1_9c0af690\bin' 'Exercise2'
==================================================
Welcome to our program
'Quadratic Equation Solver ax^2 + bx + c = 0'
==================================================

Input a: 5
Input b: 7
Input c: 9

--------------------------------------------------
Roots of this equation: 5.0x^2 + 7.0x + 9.0 are:
x1 = -0.70 + 1.14i
x2 = -0.70 - 1.14i
```

3. Write a program that can ask users to input 5 numbers. The program processes the input from the user and find out the minimum and maximum numbers.

Input:
7 20 100 -1 5

Output:
Among all the five input numbers (7, 20, 100, -1 and 5), min is -1 and max is 100.

```java
import java.util.Scanner;

class Number {
    int num;

    public Number() {
        try (Scanner input = new Scanner(System.in)) {
            System.out.print(s:"Enter a number: ");
            this.num = input.nextInt();
        }
    }

}

public class Exercise1 {
    Run | Debug | Run main | Debug main
    public static void main(String[] args) {
        Number number = new Number();
        int n = number.num;

        if (n > 1000) {
            System.out.println(x:"Please enter a number 1000 or less.");
        } else if (n < 0) {
            System.out.println(x:"Please enter a positive number or zero.");
        } else {
            // Count from 1000 to the user's number
            for (int i = 1000; i >= n; i--) {
                System.out.print(i + " ");
            }
        }
    }
}
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS SPELL CHECKER

```
PS C:\Users\U-ser\Documents\Sound Recordings\OneDrive\ITC-Year2\Courses\Programming Design and Implementation\Submit\Lab1>  & 'C:\Program Files\Java\jdk-25\bin\java.exe' '--enable-preview' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\U-ser\AppData\Roaming\Code\User\workspaceStorage\e690d49d31671adee265cf2186045f07\redhat.java\jdt_ws\Lab1_9c0af690\bin' 'Exercise3'
Input:
87 89 54 43 66 29
Output:
Among all the five numbers[87, 89, 54, 43, 66], min is 43 max 89.
```

4. Write a program that can check if the given input date (yyyy-mm-dd) is valid or invalid.

```
Input: 2024-12-32
Output: invalid

Input: 2020-02-29
Output: valid

Input: 2002-14-20
Output: invalid

Input: 1991-02-28
Output: valid
```

```java
import java.util.Scanner;

public class Exercise4 {
    Run main | Debug main | Run | Debug
    public static void main(String[] args) {
        try (Scanner input = new Scanner(System.in)) {
            while (true) {
                System.out.print(s:"Input: ");
                String date = input.nextLine();

                String[] parts = date.split(regex:"-");

                if (parts.length != 3) {
                    System.out.println(x:"Output: invalid");
                    continue;
                }

                int year, month, day;    Variable year is never read
                try {
                    year = Integer.parseInt(parts[0]);
                    month = Integer.parseInt(parts[1]);
                    day = Integer.parseInt(parts[2]);
                } catch (NumberFormatException e) {
                    System.out.println(x:"Output: invalid");
                    continue;
                }
                if (month < 1 || month > 12) {
                    System.out.println(x:"Output: invalid");
                    continue;
                }
                int[] daysInMonth = {31, 28, 31, 30, 31, 30, 31, 31, 30, 31, 30, 31};
                if (day < 1 || day > daysInMonth[month - 1]) {
                    System.out.println(x:"Output: invalid");
                    continue;
                }

                System.out.println(x:"Output: valid");
            }
        }
    }
}
```

```
PROBLEMS 2  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS  SPELL CHECKER

PS C:\Users\U-ser\Documents\Sound Recordings\OneDrive\ITC-Year2\Courses\Prog
plementation\Submit\Lab1>  & 'C:\Program Files\Java\jdk-25\bin\java.exe' '--
+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\U-ser\AppData\Roaming\C
rage\e690d49d31671adee265cf2186045f07\redhat.java\jdt_ws\Lab1_9c0af690\bin'
Input: 2007-2-29
Output: invalid
Input: 1300-13-07
Output: invalid
Input: 2025-05-24
Output: valid
Input:
```

5. Write a program that can display all prime numbers from 2 to n, where n is an input number by user.

```
Input n:  10

Output:
 All prime numbers from 2 to 10:  2  3  5  7
```

```java
class PrimeNumberChecker {

    public static boolean isPrime(int number) {
        if (number <= 1) return false;
        for (int i = 2; i <= Math.sqrt(number); i++) {
            if (number % i == 0) return false;
        }
        return true;
    }

    Run main | Debug main | Run | Debug
    public static void main(String[] args) {
        try (Scanner input = new Scanner(System.in)) {
            while (true) {
                System.out.print(s:"Input n: ");
                int n = input.nextInt();

                if (n < 2) {
                    System.out.println(x:"Output: No prime numbers less than 2.\n");
                    continue;
                }

                System.out.print("Output: All prime numbers from 2 to " + n + ": ");
                for (int i = 2; i <= n; i++) {
                    if (isPrime(i)) {
                        System.out.print(i + " ");
                    }
                }
                System.out.println(x:"\n");
            }
        }
    }
}
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS  SPELL CHECKER

PS C:\Users\U-ser\Documents\Sound Recordings\OneDrive\ITC-Year2\Courses\Programming Design and Implementation\Submit\Lab1>  & 'C:\Program Files\Java\jdk-25\bin\java.exe' '--enable-preview' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\U-ser\AppData\Roaming\Code\User\workspaceStorage\e690d49d31671adee265cf2186045f07\redhat.java\jdt_ws\Lab1_9c0af690\bin' 'PrimeNumberChecker'
Input n: -17
Output: No prime numbers less than 2.

Input n: 28
Output: All prime numbers from 2 to 28: 2 3 5 7 11 13 17 19 23

Input n:
```

6. Write a program that prompt users for inputting scores of 4 subjects for Math, English, Physics, and Programming.

a. Which courses the students got max score, min score?

b. What are the average score of this student

Input your scores of 4 subjects (Math, English, Physics, and Programming) : 90 80 65 90

Output:
Max score is: 90 (Math and Programming courses).
Min score is: 65 (Physics course).
Average score of this student is: 81.25

```java
import java.util.Scanner;

public class Exercise6 {

    Run main | Debug main | Run | Debug
    public static void main(String[] args) {
        try (Scanner input = new Scanner(System.in)) {
            System.out.println(x:"Input your scores of 4 subjects (Math, English, Physics, Programming):");
            int score1 = input.nextInt();
            int score2 = input.nextInt();
            int score3 = input.nextInt();
            int score4 = input.nextInt();

            int maxScore = Math.max(Math.max(score1, score2), Math.max(score3, score4));
            int minScore = Math.min(Math.min(score1, score2), Math.min(score3, score4));
            double average = (score1 + score2 + score3 + score4) / 4.0;

            System.out.println("Maximum score is: " + maxScore);
            System.out.println("Minimum score is: " + minScore);
            System.out.println("Average score of this student is: " + average);
        }
    }
}
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS SPELL CHECKER

```
Input your scores of 4 subjects (Math, English, Physics, Programming):
72
60
45
40
Maximum score is: 72
Minimum score is: 40
Average score of this student is: 54.25
```