In The Name Of God

Programming In Java

Assignment 2

Professor: Dr. Lesley De Cruz
TA: Hossein Dehghanipour

October 2021

Contents

1 Basic Syntax

1.1 Print Name

Write a piece of code in the **main()** function that gets two inputs from the user **(firstName, lastName)** and prints them together like the following example:

Output:
> Enter your first name:
> Alex
> Enter your last name:
> Adams
> Welcome to MACS, Alex Adams.

```
    public class Main{

         public static void main(String[] args){
            // Write your code here
        System.out.println(”Enter your first name:”);
        String firstName = // Your Code Goes Here
        System.out.println(”Enter your last name:”);
        String lastName = //Your Code Goes Here
        System.out.println(”Welcome to MACS,” + firstName + ” ” + lastName);
         }
    }
```

1.2 Calculate Summation

Write a method named **int calculateSum(int number)** which gets a **number** as its input argument and adds all of the numbers from **zero** to the given **number** and prints the result.

Example:
calculateSum(5) -> 15 (0 + 1 + 2 + 3 + 4 + 5)
calculateSum (10) -> 55 (0 + 1 + 2 + ... + 10)

```java
public class Main{
    public static int caculateSum( int number ){
        int sum = 0 ;
        // Your Code Goes Here

        // Your Code Ends Here
        return sum;
    }
     public static void main(String[] args){
        System.out.println(calculateSum(5)) ;
        System.out.println(calculateSum(10)) ;
     }
}
```

1.3 Calculate Summation II

Modify the previous function **int calculateSum (int lowerBound, int upperBound)** in such a way that calculates the summation of numbers between the **lowerBound** and **upperBound**.

Attention

- Please be aware that the method returns **-1** as an error if the lower bound was larger than the upper bound (lowerBound > upperBound).

```java
public class Main{
    public static int calculateSum(int lowerBound, int upperBound){
        int sum = 0;
        if(lowerBound < upperBound){
        // Your Code Goes Here

        // Your Code Ends Here
            }

        else{
            sum = -1;
        }
        return (int)sum;
    }
}
    public static void main(String[] args){
        System.out.println(calculateSum(5, 10)) ;
        System.out.println(calculateSum(5, 2)) ;
    }
}
```

Output:

```
> 45 -> (5 + 6 + 7 + 8 + 9 + 10)
> -1
```

1.4 Vertical Pyramid

Write a method that gets an integer input as parameter and based on the number prints the following pattern:

```java
public class Main{
    public static void printPyramid(int number){
        // Your Code Goes Here

        // Your Code Ends Here
    }
}
    public static void main(String[] args){
        printPyramid(5);
    }
}
```

Output:

```
+
++
+++
++++
+++++
++++
+++
++
+
```

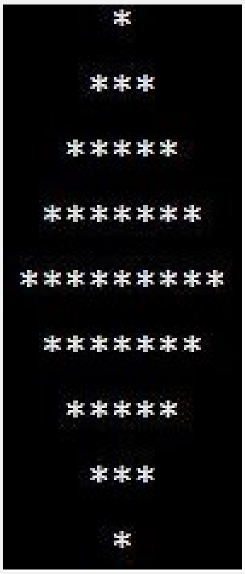
1.5 Diamond

Write a method that gets an integer and a character as input parameters and based on them prints the following pattern:

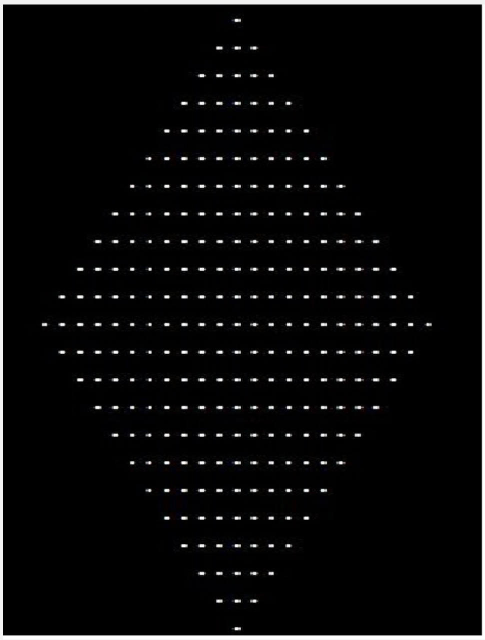
```java
public class Main{
    public static void printDiamond(int number, char symbol){
        // Your Code Goes Here

        // Your Code Ends Here
    }
}
    public static void main(String[] args){
        printDiamond(10, '*');
        printDiamond(12, '.')
    }
}
```

Output:



```
    *
   ***
  *****
 *******
*********
 *******
  *****
   ***
    *
```



```
                      -
                    - - -
                  - - - - -
                - - - - - - -
              - - - - - - - - -
            - - - - - - - - - - -
          - - - - - - - - - - - - -
        - - - - - - - - - - - - - - -
      - - - - - - - - - - - - - - - - -
    - - - - - - - - - - - - - - - - - - -
  - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - -
  - - - - - - - - - - - - - - - - - - - - -
    - - - - - - - - - - - - - - - - - - -
      - - - - - - - - - - - - - - - - -
        - - - - - - - - - - - - - - -
          - - - - - - - - - - - - -
            - - - - - - - - - - -
              - - - - - - - - -
                - - - - - - -
                  - - - - -
                    - - -
                      -
```

1.6 Remove Character Occurrences

Write a method called **public static String removeOccurences(String sentence, char c)** that removes all of the occurrences of a character inside a String and returns the remaining sentence.

Attention

- Please search about a class called ”String Builder” before proceeding to solve the problem.

```java
public class Main{
    public static String removeOccurences(String sentence, char c){
        StringBuilder newSentence = new StringBuilder();
        // Your Code Goes Here

        // Your Code Ends Here
        return newSentence.toString();
    }
}
    public static void main(String[] args){
        removeOccurences(”AppliedComputerScience”, 'e');
    }
}
```

Output:

```
ApplidComputrScinc
```

1.7 Remove Occurrences of Character Array

Write a method called**public String removeOccurences(String sentence, char[] characters)** that removes all of the occurrences of the characters inside a String and returns the remaining sentence.

Attention

- ’T’ and ’t’ are considered totally different characters.

```java
public class Main{
    public static String removeOccurences(String sentence, char[] c){
        StringBuilder newSentence = new StringBuilder();
        // Your Code Goes Here

        // Your Code Ends Here
        return newSentence.toString();
    }
}
    public static void main(String[] args){
        String modifiedOne = removeOccurences(”We Work In The Darkness To Serve The Light”, ['t','e']);
        System.out.println(modifiedOne);

        String modifiedTwo = removeOccurences(”You are great”, ['a']));
        System.out.println(modifiedTwo);

        char[] mustBeRemoved = ['A','B','C','D','E','f','g'] ;
        String originalSentence = ”ABCDEfghAAA”;
        removeOccurences(originalSentence , mustBeRemoved);
    }
}
```

Output:

```
”W Work In Th Darknss srv Th ligh”
”You re gret”
”h”
```

1.8 Remove Word Occurrences

Write a function called **public static String removeWords(String sentence, String word)** that removes all of the occurrences of the given word inside a String and returns the remaining sentence.

```java
public class Main{
    public static String removeWords(String sentence, String word){
        StringBuilder newSentence = new StringBuilder();
        // Your Code Goes Here

        // Your Code Ends Here
        return newSentence.toString();
    }
}
    public static void main(String[] args){
        String result = removeWords(”The Sheeps Ship Cheap Sheets by Ship”, ”Ship”);
        System.out.println(result);
    }
}
```

Output:
”The Sheeps Cheap Sheets by”

2 Intermediate Level

2.1 Celsius to Fahrenheit Conversion

Write a method that gets an integer as a temperature in Celsius and returns its equivalent in Fahrenheit.

Attention

- **(C° × 9/5) + 32 = F°**
- Online Celsius to Fahrenheit Calculator

```java
public class Main{
    public static double celsiusToFahrenheit(int cel){
        double fahrenheit = 0 ;
        // Your Code Goes Here

        // Your Code Ends Here
        return fahrenheit;
    }
}
    public static void main(String[] args){
        double fahrentheitValueOne = celsiusToFahrenheit(5);
        System.out.println(fahrentheitValueOne);


        double fahrentheitValueTwo = celsiusToFahrenheit(21);
        System.out.println(fahrentheitValueTwo);
    }
}
```

Output:

```
41
69.8
```

2.2 Fibonacci Using Loops

Write a method that gets an integer as input and calculates the nth Fibonacci number of **n = input number** using loops.

Attention

- fib(0) = 0,fib(1) = 1, and fib(n) = fib(n-1) + fib(n-2)
- For more info about Fibonacci Series click here
- Online Fibonacci Calculator
- Fibonacci Series: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, ...

```java
public class Main{
    public static int fib(int n){
        int calculatedFib = 0 ;

        if ( n == 0 ){
            return 0;
        }

        else if ( n == 1 ){
            return 1;
        }

        else{

            // Your Code Goes Here
            int loopCounter = // Your Code Goes Here ;
            for (int i = 0 ; i < loopCounter ; i++){


            }
            // Your Code Ends Here
        }
        return calculatedFib;
    }
}
    public static void main(String[] args){
        System.out.println(fib(0));
        System.out.println(fib(1));
        System.out.println(fib(2));
        System.out.println(fib(3));
        System.out.println(fib(5));
        System.out.println(fib(6));
        System.out.println(fib(10));
    }
}
```

Output:

```
0
1
1
2
5
8
55
```

2.3 Fibonacci Using Recursion

Write a method called recursiveFib that calculates the exact same thing in Question 2 but without using loops. (By using only recursion)

```java
public class Main{
    public static int recursiveFib(int n){
        int calculatedFib = 0 ;

        if ( n == 0 ){
            return 0;
        }

        else if ( n == 1 ){
            return 1;
        }

        else{

            // Your Code Goes Here
            // You should not use any loops in here


            // Your Code Ends Here
        }
        return calculatedFib;
    }
}
    public static void main(String[] args){
        System.out.println(recursiveFib(0));
        System.out.println(recursiveFib(10));
    }
}
```

Output:

```
0
55
```

2.4 Factorial Using Recursion

Write function that takes a number and calculates its factorial by using recursion.

“

Example: -) -> 5 * 4 * 3 * 2 * 1 = 120

Attention

- Factorial of 0 is 1
- For negative numbers, the method should return -1 as an error.
- n! = n * (n-1) * (n-2) * ... * 1
- Online Factorial Calculator

```java
public class Main{
    public static int calculateFactorial(int n){
        int calculatedFact = 1 ; // Why not zero?

        if ( n == 0 ){
            return 1;
        }
        else if ( n < 0 ){
            return -1;
        }
        else{
            // Your Code Goes Here
            // You should not use any loops in here


            // Your Code Ends Here
        }
        return calculatedFact;
    }
    public static void main(String[] args){
        System.out.println(calculateFactorial(5));
    }
}
```

Output:

```
120 -> 1 * 2 * 3 * 4 * 5
```

2.5 Binary To Decimal Conversion

Write a function takes a number in binary and converts it to decimal and returns the calculated value.

Attention

- To check your answer, you can use this link.

```java
public class Main{
    public static int binaryToDecimal(String binary){
        int decimalForm = 0 ;
        // Your Code Goes Here


        //Your Code Ends Here
        return decimalForm;
    }
    public static void main(String[] args){
        System.out.println(binaryToDecimal(”10001”));
        System.out.println(binaryToDecimal(”10001101”));
    }
}
```

Output:

```
17
141
```

2.6 Decimal To Binary Conversion

Write a function takes a number in decimal and converts it to binary and returns the calculated value.

```java
public class Main{
    public static String decimalToBinary(int decimal){
        StringBuilder binaryForm = new StringBuilder();
        // Your Code Goes Here


        //Your Code Ends Here
        return binaryForm.toString();

    }
    public static void main(String[] args){
        System.out.println(decimalToBinary(17));
        System.out.println(decimalToBinary(141));
    }
}
```

Output:

```
”10001”
”10001101”
```

2.7 Is It A Prime Number?

Write a function that takes a number and if it was prime returns **“true”**. Otherwise, it returns **“false”**.

Attention

- You don’t know what a prime number is?? Google it then :D
- Method signature should be: **public static boolean isPrime(int number)**

2.8 Is It A Perfect Number?

Write a python program that takes a number and checks if it's a perfect number or not. If the number was perfect, the function returns **true**, otherwise, it returns **false**.

Attention

- You don't know what a Perfect number is?? Google it then :D
- Method signature should be: **public static boolean isPerfect(int number)**

2.9 Question

2.10 Question

3

3.1 Sample

3.1.1 Sample

Problem

```java
public class Main{
    public static void func(){

    }
    public static void main(String[] args){
        System.out.println();
    }
}
```

Output:

Attention

-