Name : MUCHAMMAD NABIL HAYKAL WIDARTO
Class : SIB-1G
NIM : 2341760152

**https://github.com/muchnabil/daspro-josheet11.git**

Experiment 1

```java
public class Gratitude14 {

    Run | Debug
    public static void main(String[] args) {
        sayThankyou();
    }
    public static void sayThankyou(){
        System.out.println("Thank you for being the best teacher in the world. \n" +
        "You inspired in me love for learning and made me feel like i could ask you anything.");
    }
}
```

**Question!**

1. Does function with no parameter always have void datatype?
2. Is it possible for sentence "**Thank you for.....dst**" to be displayed, without using **sayThankyou()** function? Modify the program so that it displays the sentence without using function!
3. What are the benefits of using functions in a program?

ANSWER

1. Not always

2. Yes its possible

```java
public class Gratitude14 {

    Run | Debug
    public static void main(String[] args) {
            System.out.println("Thank you for being the best teacher in the world. \n" +
            "You inspired in me love for learning and made me feel like i could ask you anything.");
        }
    }
```

3. so the code is easy to read, understand, and can be corrected if something is errors easily.

Experiment 2

```java
public class Gratitude14 {

    Run | Debug
    public static void main(String[] args) {
        sayThankyou();
        String expression = "Thankyou...wish you all the best!!";
        sayAdditionalGreetings(expression);
    }
    public static void sayThankyou(){
        System.out.println("Thank you for being the best teacher in the world. \n" +
        "You inspired in me love for learning and made me feel like i could ask you anything.");
    }
    public static void sayAdditionalGreetings(String greeting){
        System.out.println(greeting);
    }
}
```

## Question!

1. What is the use of a parameter in a function?
2. Is parameter similar to variable? Please explain!
3. In the Java programming language, is parameter only used for passing input data? What about output data?

ANSWER

1. Get input data comes from the outside of the function

2. Same, because each can store data

3. No, parameter can be used for output data

Experiment 3

```java
import java.util.Scanner;
public class Greetings14 {
    Run | Debug
    public static void main(String[] args) {
        String name = getGreetingRecipient();
        System.out.println("Thank you " + name + " May the force be with you!");
    }
    public static String getGreetingRecipient(){
        Scanner sc = new Scanner(System.in);
        System.out.print(s:"Input the name of people you want to greet : ");
        String recipientName = sc.nextLine();
        sc.close();
        return recipientName;
    }
}

```

## Question!

1. Explain when do we need to create a function that requires a return value?
2. Can a **System.out.println** statement be added inside a function with a return value? What is its impact?
3. Can a function without a return value be called inside the main function without being passed to a variable? Like in experiment 1? Explain!

Answer

1. When we want to return a value for further processing

2. Yes it can, the impact is that the code will print before the function is completed

3. Yes it can, functions can be called inside the main function as long as there is no return value or functions with void

Experiment 4

```java
import java.util.Scanner;
public class ExpressingGratitude14 {
    public static String getGreetingsRecipient(){
        Scanner sc = new Scanner(System.in);
        System.out.print(s:"Input the name of people you want to greet : ");
        String recipientName = sc.nextLine();
        sc.close();
        return recipientName;
    }
    public static void sayThankyou(){
        String name = getGreetingsRecipient();
        System.out.println("Thank you " + name + " for being the best teacher in the world. \n" +
        "You inspired in me love for learning and made me feel like i could ask you anything.");
    }
    Run | Debug
    public static void main(String[] args) {
        sayThankyou();
    }
}
```

## Question!

1. Based on experiment 4, which function will execute first? Please explain!
2. Which is the correct way to write a function inside a class? Above the main function or below the main function? Please explain!

3. Modify the above program by adding the function **sayAdditionalGreetings**() with a String input parameter. The **sayAdditionalGreetings**() function contains additional remarks or greetings that you want to convey to the greeting recipient.

Answer

1. sayThankyou function, because that function is in the main function, when that function is executed, the getGreetingRecipient function will be executed

2. Above or below will not affect the code as long as the function is called in the main function, but it would be better if the function is placed under the main function so that the main function is easy to find

3.
```java
import java.util.Scanner;
public class ExpressingGratitude14 {
    public static String getGreetingsRecipient(){
        Scanner sc = new Scanner(System.in);
        System.out.print(s:"Input the name of people you want to greet : ");
        String recipientName = sc.nextLine();
        sc.close();
        return recipientName;
    }
    public static void sayThankyou(String greet){
        String name = getGreetingsRecipient();
        System.out.println("Thank you " + name + " for being the best teacher in the world. \n" +
        "You inspired in me love for learning and made me feel like i could ask you anything.");
        System.out.println("The Blade is " + greet);
    }
    Run | Debug
    public static void main(String[] args) {
        sayThankyou(greet:"Me");
    }
}
```

Expermient 5

```java
public class Experiment5_14 {
    static void show (String str, int...a){
        System.out.println("String : " + str);
        System.out.println("Number of arguments/parameters : " + a.length);

        for(int i : a){
            System.out.print(i + " ");
        }
        System.out.println();
    }
    Run | Debug
    public static void main(String[] args) {
        show(str:"Programming Fundamentals 2023", ...a:100, 200);
        show(str:"Information Technology", ...a:1, 2, 3, 4, 5);
        show(str:"Informatics");
    }
}
```

## Question!

1. Explain why the parameter in experiment 5 is written as **int... a**!
2. Mention the example of varargs in implementing code to solve real-world problems! (at least 3)
3. Can we use two different data types for varargs in one function? Provide an example!

Answer

1. Because the value in parameter is more than one

2. sum multiple values, add multiple values to an array, create multiple messages

3. we cannot  add two varags with the same or different data types and the varags must be in the final parameter

```
(String str, int...a String...b){
```

Experiment 6

```
import java.util.Scanner;
public class Experiment6_14 {
    Run | Debug
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int p, l, t, L, vol;
        System.out.print(s:"Input length : ");
        p = sc.nextInt();
        System.out.print(s:"Input width : ");
        l = sc.nextInt();
        System.out.print(s:"Input height : ");
        t = sc.nextInt();

        L = calculateArea(p,w:1);
        System.out.println("Area of the rectangle : " + L);
        vol = calculateVolume(p,l,t);
        System.out.println("Volume of the rectangle : " + vol);
    }
    static int calculateArea (int l, int w){
        int area = l*w;
        return area;
    }
    static int calculateVolume (int l, int w,int h){
        int vol = calculateArea(l, w) * h;
        return vol;
    }
}
```

## Question!

1. Explain the execution steps for experiment 6 above!
2. What is the output of the program below, then explain the steps of the program!

```java
public class programKu {
    public static void TampilHinggaKei(int i) {
        for (int j = 1; j <= i; j++) {
            System.out.print(j);
        }
    }

    public static int Jumlah (int bil1, int bil2) {
        return (bil1 + bil2);
    }

    public static void TampilJumlah (int bil1, int bil2) {
        TampilHinggaKei(Jumlah(bil1, bil2));
    }

    public static void main (String[] args) {
        int temp = Jumlah(1, 1);
        TampilJumlah(temp, 5);
    }
}
```

3. When do we need to create a function with and without parameters? When do we need to create a function with and without return value? Explain!

Answer

1. First will input for length, width, height and will execute the caluclateArea function which is stored in the L variable with variable parameters p(length) and l(width) then will print the L variable, then will execute the calculateVolume function which is stored in the vol variable with variable parameters t(height), p(length), l(width) then will print the vol variable.

2. 1234567, First will run the sum function to add up with parameters (1,1) which means 1 + 1, after that, the function TampilJumlah will be run with parameters (2,5) then inside this function is to call the function TampilHinggaKei with parameters (sum(2, 5)) because the sum function is called then 2 + 5 = 7 so the value of the parameter for the function TampilHinggaKei is 7. After that the function TampilHinggaKei is executed which contains a loop with the condition j <= i, j = 1 and i = 7 (from the sum of 2 + 5 in the sum function) the loop will print the value of j until it is 7.

3. A. Function with parameters is useful when you want to pass information

B. Function without parameters is useful when the function does not require any external input to perform its task.

C. Function with return value is used when you want to return an output/value for furtherprocessing

D. Function without a return value is used when the function's purpose is to perform an action but doesn't need to provide any result to the caller

Assignment

## 3. Assignment

### Time: 100 minutes

1. Create a new class named **CubeStudentIDNumber** that has function to calculate area and volume!

2. Create a program to manage the weekly grades (there are 7 weeks) of 5 students. The data must be implemented using 2 dimensional array as follows:

| | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 |
|---|---|---|---|---|---|---|---|
| **Sari** | 20 | 19 | 25 | 20 | 10 | 0 | 10 |
| **Rina** | 30 | 30 | 40 | 10 | 15 | 20 | 25 |
| **Yani** | 5 | 0 | 20 | 25 | 10 | 5 | 45 |
| **Dwi** | 50 | 0 | 7 | 8 | 0 | 30 | 60 |
| **Lusi** | 15 | 10 | 16 | 15 | 10 | 10 | 5 |

Add functions to retrieve information from the above data with the following details:

a. Function to input students' grade data.

b. Function to display all student grades from the first week to the seventh week.

c. Function to find the week that has the highest grade from all students.

d. Function to find the student with the highest grade (also display the grade information for each week).

3. Modify assignment number 2 above by getting the user input to determine the number of students and the number of weeks!

Answer

1.

```java
import java.util.Scanner;
public class CubeStudent14 {
    public static int area(int s){
        int a = 6 * s * s;
        System.out.println("The area of the cube is : " + a);
        return a;
    }
    public static int volume (int s){
        int v = s * s * s;
        System.out.println("The volume of the cube is : " + v);
        return v;
    }
    Run | Debug
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.print(s:"Enter the side of cube : ");
        int s = input.nextInt();
        area(s);
        volume(s);
    }
}
```

```
Enter the side of cube : 7
The area of the cube is : 294
The volume of the cube is : 343
```

2.

```java
import java.util.Scanner;
public class Assignment2_14 {
    public static int[][] inputScore(String[] student){
        Scanner input = new Scanner(System.in);
        int[][] score = new int[student.length][7];

        System.out.println(x:"Input student score : ");
        for (int i = 0; i < student.length; i++){
            System.out.println("Enter student score for " + student [i] + " for 7 week : ");
            for (int j = 0; j < 7; j++){
                System.out.print("Week " + (j + 1) + " : ");
                score[i][j] = input.nextInt();
            }
        }
        return score;
    }
    public static void displaySales (String[] student, int[][] score){
        System.out.println(x:"Student score data : ");
        for (int i = 0; i < student.length; i++){
            System.out.println(student[i] + " ");
            for (int j = 0; j < 7; j++){
                System.out.println("Week " + (j + 1) + " : " + score[i][j]);
            }
            System.out.println();
        }
    }
    public static void weekWithHighestScore (int[][] score){
        int highScore = 0;
        int highWeek = 0;
        for (int week = 0; week < 7; week++){
            int totalScore = 0;
            for (int std = 0; std < 7; std++){
                totalScore += score[std][week];
            }
```

```
            if (totalScore > highScore){
                highScore = totalScore;
                highWeek = week + 1;
            }
        }
        System.out.println("Week with the highest total score : Week " + highWeek + " (Total score : " + highScore + ")");
    }
    public static void srudentWithHighestGrade (String[] student, int[][] score){
        int highestScore = 0;
        int highestStudent = 0;
        for (int i = 0; i < student.length; i++){
            int totalScore = 0;
            for (int j = 0; j < 7; j++){
                totalScore += score[i][j];
            }
            if (totalScore > highestScore){
                highestScore = totalScore;
                highestStudent = i;
            }
        }
        System.out.println(x:"\nStudent with the highest total score : ");
        System.out.println("Name : " + student[highestStudent]);
        System.out.println("Total score : " + highestScore);
        for (int j = 0; j < 7; j++){
            System.out.println("Week " + (j + 1) + " : " + score[highestStudent][j]);
        }
    }
```

```
    Run | Debug
    public static void main(String[] args) {
        String[] student = {"Sari", "Rina", "Yani", "Dwi", "Lusi"};
        int[][] score = inputScore(student);
        displaySales(student, score);
        weekWithHighestScore(score);
        srudentWithHighestGrade(student, score);
    }
}
```

3.

```java
import java.util.Scanner;
public class Assignment2A_14 {
    Run | Debug
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.print(s:"Enter the number of student : ");
        int numStudent = input.nextInt();

        System.out.print(s:"Enter the number of weeks : ");
        int numWeeks = input.nextInt();

        String[] student = new String[numStudent];
        for (int i = 0; i < numStudent; i++){
            System.out.print("Enter the name of student " + (i + 1) + " : ");
            student[i] = input.next();
        }
        int[][] scores = inputScore(student, numWeeks);
        displayStudent(student, scores, numWeeks);
        weekWithHighestScore(scores, numWeeks);
        studentWithHighestGrade(student, scores, numWeeks);
    }
    public static int[][] inputScore(String[] student, int numWeeks){
        Scanner input = new Scanner(System.in);
        int[][] scores = new int[student.length][numWeeks];
        System.out.println(x:"Input the student score : ");
        for (int i = 0; i < student.length; i++){
            System.out.println("Enter score for " + student[i] + " : ");
            for (int j = 0; j < numWeeks; j++){
                System.out.print("Week " + (j + 1) + " : ");
                scores[i][j] = input.nextInt();
            }
        }
        return scores;
    }
```

```
34      public static void displayStudent(String[] student, int[][] scores, int numWeeks){
35          System.out.println(x:"Student score data : ");
36          for (int i = 0; i < student.length; i++){
37              System.out.println(student[i] + " : ");
38              for (int j = 0; j < numWeeks; j++){
39                  System.out.println("Week "+ (j + 1) + " : " + scores[i][j]);
40              }
41              System.out.println();
42          }
43      }
44      public static void weekWithHighestScore(int[][] scores, int numWeeks){
45          int highScore = 0;
46          int highWeek = 0;
47          for (int week = 0; week < numWeeks; week++){
48              int totalScore = 0;
49              for(int student = 0; student < scores.length; student++){
50                  totalScore += scores[student][week];
51              }
52              if (totalScore > highScore){
53                  highScore = totalScore;
54                  highWeek = week + 1;
55              }
56          }
57          System.out.println("Week with the highest score : Week " + highWeek + " (Total score : "+ highScore + ")");
58      }
```

```
59      public static void studentWithHighestGrade(String[] student,int[][] scores, int numWeeks){
60          int highestScore = 0;
61          int highestStudent = 0;
62          for (int i = 0; i < student.length; i++){
63              int totalScore = 0;
64              for (int j = 0; j < numWeeks; j++){
65                  totalScore += scores[i][j];
66              }
67              if (totalScore > highestScore){
68                  highestScore = totalScore;
69                  highestStudent = i;
70              }
71          }
72          System.out.println(x:"\nStudent with the highest total score : ");
73          System.out.println("Name : " + student[highestStudent]);
74          System.out.println("Total score : " + highestScore);
75          for (int j = 0; j < numWeeks; j++){
76              System.out.println("Week " + (j + 1) + " : " + scores[highestStudent][j]);
77          }
78      }
79  }
```