Object Oriented Lab:

Assignment 01:

Problem (1 – 16):

Objectives:

- Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
- Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- To be aware of the important topics and principles of software development.
- To be able to use the Java SDK environment to create, debug and run simple Java programs.
- To implement classical problems using java programming.
- Write arithmetic expressions to accomplish a task.
- Use casting to convert between primitive types.
- Use a value-returning library method and a library constant.
- Communicate with the user by using the Scanner class or dialog boxes
- Use String methods to manipulate string data.
- Be able to document a program.
- To be familiar with syntax and structure of Java programming.
- To knowing, how to perform input/output of all basic data types in problem 1.
- To learn how to solve any problem in Java programming language with their given problem's information.
- To solving problem 1, we know about Integer, Character, Byte, Short, Long, Double, Boolean, etc data types.
- To know how to enter two numbers and find out their sum in problem 2. Like,

  Result = number1 + number2;

- To doing problem 3, we gain our knowledge about two numbers and perform all arithmetic operations like Addition, Subtraction, Multiplication, Division, Modulo.

  Addition = a + b;

  Subtraction = a – b;

  Multiplication = a * b;

Division = a / b;

Modulo = a % b;

- To learn program to enter length and breadth of a rectangle and find out its perimeter in problem 4 and know about double (data type), this problem logic is perimeter = 2 * (l + b).
- To use this formula, Area= l*b we able to solve problem 5 and know a program to enter length and breadth of a rectangle and find out its area.
- In problem 6, enter a radius of circle and find out its diameter, circumference and area, using this mathematical rules like

Diameter = 2 * radius;

Circumference = 2 * Math .PI * radius;

Area = Math. PI * radius * radius;

- Also in problem 7, we enter a length in centimeter and convert it into meter and kilometer using final keyword in this program. Like,

final double METER = 0.01;

final double KILOMETER = 0.00001;

- In problem 8, we enter any temperature in Celsius and convert it into Fahrenheit.

Fahrenheit = Celsius * (9f / 5) + 32.

- And also in problem 9, we also enter temperature in Fahrenheit and convert to Celsius.

Celsius = (Fahrenheit - 32) * (9f / 5).

- To learn problem 10, we know about this program like convert days into years, weeks and days.

Years = (days / 365); //Ignoring leap year

Weeks = (days % 365)/7;

Days = days - ((years * 365) + (weeks * 7));

- In problem 11, we find out power of any number x ^ y using for loop in this program.
- In problem 12, to enter any number and calculating its square root and also use this term Math.sqrt(number).
- In problem 13, we find out two angles of a triangle and their third angle using this rule,

  c =180-(a + b).

- In problem 14, we write a program to enter base and height of a triangle and find out its area, like

  Area = (base* height)/2.

- In problem 15, enter any number to calculate area of an equilateral triangle using this rule area = (Math.sqrt(3)/4)*(a*a).
- In problem 16, enter marks of five subjects and calculate total, average and percentage.

  Total = M1 + M2 + M3 + M4 + M5;

  Average = Total / 5;

  Percentage = (Total * 100) / 500;

Problem 1:

1. Write a JAVA program to perform input/output of all basic data types.

Source code:

```
package allbasisdatatypes;

public class AllBasisDatatypes {

public static void main(String[] args) {

int i = 1465;

char c = 'D';

byte b = 4;

short s = 56;
```

```
long l = 10201465;
double d = 3.0554569432d;
float f = 3.2633894f;
boolean flag = true;
boolean val = false;
System.out.println("Int Value = "+ i);
System.out.println("Char Value = "+ c);
System.out.println("Byte Value = "+ b);
System.out.println("Short Value = "+ s);
System.out.println("Long Value = "+ l);
System.out.println("Float Value = "+ f);
System.out.println("Double Value = "+ d);
System.out.println("Boolean Value = "+ flag);
System.out.println("Boolean Value = "+ val);
}    }
```

Output:

```
Int Value = 1465
Char Value = D
Byte Value = 4
Short Value = 56
Long Value = 10201465
Float Value = 3.2633893
Double Value = 3.0554569432
Boolean Value = true
Boolean Value = false
```

Problem 2:

2. Write a JAVA program to enter two numbers and find their sum.

Source code:

```
package addtwonunbers2;
import java.util.Scanner;
public class AddTwoNunbers2 {
public static void main(String[] args) {

int number1, number2, result;
Scanner scanner= new Scanner(System.in);

System.out.println("Enter number 1 : ");
number1= scanner.nextInt();
System.out.println("Enter number 2 : ");
number2= scanner.nextInt();

result= number1+number2;
System.out.println("The result= "+result);
}
}
```

Output:

Enter number 1: 8

Enter number 2: 5

The result = 13

Problem 3:

3. Write a JAVA program to enter two numbers and perform all arithmetic operations.

Source code:

```
package allarithmeticoperations3;

import java.util.Scanner;


public class AllArithmeticOperations3 {

public static void main(String[] args) {

int a,b;

Scanner scanner= new Scanner(System.in);

System.out.println("Enter a : ");

a= scanner.nextInt();


System.out.println("Enter b : ");

b= scanner.nextInt();


int addition = a+b;

System.out.println("Addition= "+addition);


int subtraction = a-b;

System.out.println("Substraction= "+subtraction);


int multiplication = a*b;
```

```
System.out.println("Multiplication= "+multiplication);


int division = a/b;
System.out.println("Division= "+division);


int modulo =a%b;
System.out.println("Modulo= "+modulo);
}
}
```

Output:

```
Enter a : 35
Enter b : 22
Addition= 57
Substraction= 13
Multiplication= 770
Division= 1
Modulo= 13
```

Problem 4:

4. Write a JAVA program to enter length and breadth of a rectangle and find its perimeter.

Source code:

```
package perimeterofrectangle;
import java.util.Scanner;
public class PerimeterofRectangle {
```

```
public static void main(String[] args) {
Scanner scanner = new Scanner(System.in);

System.out.println("Enter the length of the Rectangle: ");
double l= scanner.nextDouble();

System.out.println("Enter the breadth of the Rectangle: ");
double b= scanner.nextDouble();

double  perimeter=2*(l+b);
System.out.println("Perimeter of Rectangle is: " + perimeter);
}
}
```

Output:

```
Enter the length of the Rectangle: 8
Enter the breadth of the Rectangle: 9
Perimeter of Rectangle is: 34.0
```

Problem 5:

5. Write a JAVA program to enter length and breadth of a rectangle and find its area.

Source code:

```
package areaofrectangle5;
import java.util.Scanner;
public class AreaofRectangle5 {
public static void main(String[] args) {
```

```
Scanner scanner = new Scanner(System.in);

System.out.println("Enter the length of the Rectangle: ");
double l= scanner.nextDouble();

System.out.println("Enter the breadth of the Rectangle: ");
double b= scanner.nextDouble();

double  area= l*b;
System.out.println("Area of Rectangle is: " + area);
}
}
```

Output:

```
Enter the length of the Rectangle: 5
Enter the breadth of the Rectangle: 6
Area of Rectangle is: 30.0
```

Problem 6:

6. Write a JAVA program to enter radius of a circle and find its diameter, circumference and area.

Source code:

```
package radiusofcircle;
import java.util.Scanner;
public class RadiusofCircle {
public static void main(String[] args) {
Scanner scanner = new Scanner(System.in);
```

```
double radius, diameter, circumference, area;


System.out.print("Radius: ");
radius = scanner.nextDouble();


diameter = 2 * radius;
System.out.println("Diameter: " + diameter);


circumference = 2 * Math.PI * radius;
System.out.println("Circumference: " + circumference);


area = Math.PI * radius * radius;
System.out.println("Area: " + area);
}
}
```

Output:

```
Radius: 3
Diameter: 6.0
Circumference: 18.84955592153876
Area: 28.274333882308138
```

Problem 7:

7. Write a JAVA program to enter length in centimeter and convert it into meter and kilometer.

Source code:

```
package lengthincentimeter7;
```

```
import java.util.Scanner;
public class LengthinCentimeter7 {

public static void main(String[] args) {

//Constants for meter and kilometer in 1 centimeter.

final double METER      = 0.01;
final double KILOMETER  = 0.00001;

Scanner scanner = new Scanner(System.in);

System.out.print("Enter length in centimeters: ");
double cm = scanner.nextDouble();

double m    = cm * METER;
double km   = cm * KILOMETER;
System.out.println(cm + " cm is equal to " + m    + " meters.");
System.out.println(cm + " cm is equal to " + km    +" kilometers.");
}
}
```

Output:

```
Enter length in centimeters: 12225
12225.0 cm is equal to 122.25 meters.
12225.0 cm is equal to 0.12225000000000001 kilometers.
```

Problem 8:

8. Write a JAVA program to enter temperature in Celsius and convert it into Fahrenheit.

Source code:

```
package celsiustofahrenheit;

import java.util.Scanner;

public class CelsiustoFahrenheit {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.println("Enter temperature in Celsius: ");

double celsius = scanner.nextDouble();

double fahrenheit = celsius * (9f / 5) + 32;

System.out.println( celsius+ " degree Celsius is equal to " + fahrenheit +" degree Fahrenheit.");

}

}
```

Output:

```
Enter temperature in Celsius: 85.5

85.5 degree Celsius is equal to 185.8999959230423 degree Fahrenheit.
```

Problem 9:

9. Write a JAVA program to enter temperature in Fahrenheit and convert to Celsius.

Source code:

```
package fahrenheittocelsius;

import java.util.Scanner;
```

```
public class FahrenheittoCelsius {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.println("Enter temperature in Farenheit: ");

double fahrenheit = scanner.nextDouble();


double celsius = (fahrenheit-32) * (9f / 5);

System.out.println( fahrenheit+ " degree Fahrenheit is equal to " + celsius +" degree Celsius.");

}

}
```

Output:

```
Enter temperature in Farenheit: 255.5

255.5 degree Fahrenheit is equal to 402.2999893426895 degree Celsius.
```

Problem 10:

10.Write a JAVA program to convert days into years, weeks and days.

Source code:

```
package convertdaysintoyears.weeksanddays;

import java.util.Scanner;

public class ConvertdaysintoyearsWeeksanddays {

public static void main(String[] args) {


int days, years, weeks;

Scanner scanner = new Scanner(System.in);
```

```
System.out.println("Enter Days: ");
days = scanner.nextInt();

years = (days / 365);  //Ignoring leap year
weeks = (days % 365)/7;
days = days - ((years * 365) + (weeks * 7));  //days  = (days % 365) % 7;
System.out.println("YEARS: "+years);
System.out.println("WEEKS: "+weeks);
System.out.println("DAYS:  "+days);
}
}
```

Output:

```
Enter Days: 881
YEARS: 2
WEEKS: 21
DAYS:  4
```

Problem 11:

11.Write a JAVA program to find power of any number x ^ y.

Source code:

```
package powerofanynumber;
import java.util.Scanner;
public class PowerofAnyNumber {
public static void main(String[] args) {
int base,exponent,result;
```

```
Scanner scanner = new Scanner(System.in);
System.out.println("Enter the Base Number:");
base = scanner.nextInt();

System.out.println("Enter the exponent number:");
exponent = scanner.nextInt();

result = (int)  Math.pow(base,exponent );
System.out.println("Result of "+base+" ^ "+exponent+" = "+result);
}
}
```

Output:

```
Enter the Base Number: 2
Enter the exponent number: 3
Result of 2 ^ 3 = 8
```

Problem 12:

12.Write a JAVA program to enter any number and calculate its square root.

Source code:

```
package squareroot12;
import java.util.Scanner;
public class SquareRoot12 {

public static void main(String[] args) {
```

```
Scanner scanner = new Scanner(System.in);
int number;

System.out.print("Enter an integer number: ");//12
number = scanner.nextInt();

//System.out.println("Cube of "+ num + " is: "+ Math.pow(num, 3));
System.out.println("Square Root of "+ number + " is: "+ Math.sqrt(number));
}
}
```

Output:

```
Enter an integer number: 5
Square Root of 5 is: 2.23606797749979
```

Problem 13:

13.Write a JAVA program to enter two angles of a triangle and find the third angle.

Source code:

```
package thirdangle;
import java.util.Scanner;
public class ThirdAngle {
public static void main(String[] args) {
float a,b,c;
Scanner scanner = new Scanner(System.in);
System.out.print("First Angle: ");//50
a = scanner.nextFloat();
```

```
System.out.print("Second Angle: ");//20
b = scanner.nextFloat();


c =180-(a+b);
System.out.println("Third Angle = " +c);//110
}
}
```

Output:

```
First Angle: 40
Second Angle: 50
Third Angle = 90.0
```

Problem 14:

14.Write a JAVA program to enter base and height of a triangle and find its area.

Source code:

```
package trianglearea14;
import java.util.Scanner;
public class TriangleArea14 {
public static void main(String[] args) {
double base,height,area;
Scanner scanner = new Scanner(System.in);


System.out.print("Enter the base of Triangle: ");//6
base = scanner.nextDouble();
```

```
System.out.print("Enter the height of Triangle: ");//12
height = scanner.nextDouble();


area =(base* height)/2;
System.out.println("Area of Triangle = " +area);//36
}
}
```

Output:

```
Enter the base of Triangle: 8
Enter the height of Triangle: 4
Area of Triangle = 16.0
```

Problem 15:

15.Write a JAVA program to calculate area of an equilateral triangle.

Source code:

```
package equilateraltriangle;
import java.util.Scanner;
public class EquilateralTriangle {
public static void main(String[] args) {
double a,area;
Scanner scanner = new Scanner(System.in);


System.out.println("Enter the side of the Triangle: ");//5,6
a= scanner.nextDouble();
```

```
area=(Math.sqrt(3)/4)*(a*a);
System.out.println("Area of Triangle is: " + area);
}
}
```

Output:

```
Enter the side of the Triangle: 5
Area of Triangle is: 10.825317547305483
```

Problem 16:

16.Write a JAVA program to enter marks of five subjects and calculate total, average and percentage.

Source code:

```
package fivesubject16;
import java.util.Scanner;
public class FiveSubject16 {
public static void main(String[] args) {

int M1, M2, M3, M4, M5;

float Average, Percentage,Total;

Scanner scanner = new Scanner(System.in);

System.out.println("Enter Mark of Subject 1: ");//95
M1 = scanner.nextInt();
System.out.println("Enter Mark of Subject 2: ");//85
```

```
M2 = scanner.nextInt();
System.out.println("Enter Mark of Subject 3: ");//75
M3 = scanner.nextInt();
System.out.println("Enter Mark of Subject 4: ");//85
M4 = scanner.nextInt();
System.out.println("Enter Mark of Subject 5: ");//95
M5 = scanner.nextInt();

Total = M1 + M2 + M3 + M4 + M5;
Average = Total / 5;
Percentage = (Total * 100) / 500;
System.out.println("Total of Five Subject is : " + Total);
System.out.println("Average of Five Subject is : " + Average);
System.out.println("Percentage is : " + Percentage + " %");
}
}
```

Output:

```
Enter Mark of Subject 1: 95
Enter Mark of Subject 2: 85
Enter Mark of Subject 3: 75
Enter Mark of Subject 4: 85
Enter Mark of Subject 5: 95
Total of Five Subject is: 435.0
Average of Five Subject is: 87.0
Percentage is: 87.0 %
```

Discussion:

By doing those problems in the assignment, we have to face different kind of logics and also Mathematical logics. So after doing the above study we have understood how to create a class and a main function in java and we have understood the concept and various operations on strings. Doing those problems, we have to know the concept of packages, how to create a package and how to import package and also know the concept of final statement. Sometimes we have to face some values problem. Some of few problems can't run first time, then find out what's the problem and fix it. Finally, we solved all the problems. And overcome it.