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Subject object oriented programming lab

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Q1 how to calculate parameter of a triangle in java using object oriented approach

This Java program allows the user to enter three sides of the triangle. Using those values, we will calculate the Perimeter of a triangle,

Within the following statements, **System.out.println** statement will ask the user to enter the three sides of the triangle a, b, c. Next, we are assigning those users value to a, b and c

In the next [Java](#) line, we used a mathematical formula to calculate the Perimeter of the Triangle using the formula  $P = a + b + c$ .

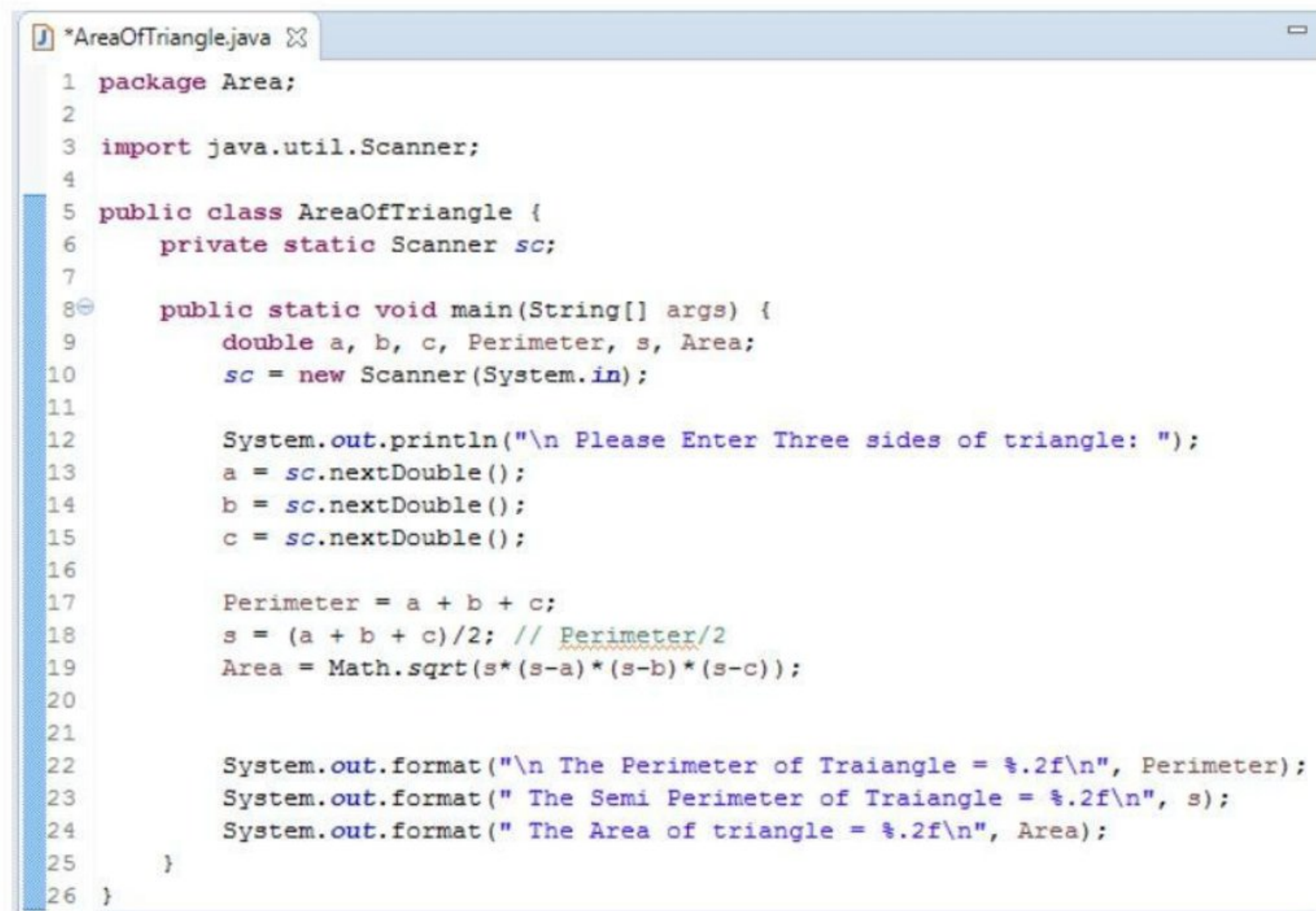
Next, we are calculating the area of a triangle using Heron's Formula. Here [Math.sqrt\(\)](#) is the math function, which is to calculate the square root.

```
/ Java Program to find Area of Triangle and Perimeter of a Triangle
package Area;
import java.util.Scanner;
public class AreaOfTriangle {
    private static Scanner sc;
    public static void main(String[] args) {
        double a, b, c, Perimeter, s, Area;
        sc = new Scanner(System.in);
        System.out.println("\n Please Enter Three sides of triangle: ");
        a = sc.nextDouble();
        b = sc.nextDouble();
        c = sc.nextDouble();
        Perimeter = a + b + c;
        s = (a + b + c)/2; // Perimeter/2
```

```
Area = Math.sqrt(s*(s-a)*(s-b)*(s-c));

System.out.format("\n The Perimeter of Traiangle = %.2f\n", Perimeter);
System.out.format("\n The Semi Perimeter of Traiangle = %.2f\n",s);
System.out.format("\n The Area of triangle = %.2f\n",Area);
}
}
```

# OUTPUT



```
*AreaOfTriangle.java
1 package Area;
2
3 import java.util.Scanner;
4
5 public class AreaOfTriangle {
6     private static Scanner sc;
7
8     public static void main(String[] args) {
9         double a, b, c, Perimeter, s, Area;
10        sc = new Scanner(System.in);
11
12        System.out.println("\n Please Enter Three sides of triangle: ");
13        a = sc.nextDouble();
14        b = sc.nextDouble();
15        c = sc.nextDouble();
16
17        Perimeter = a + b + c;
18        s = (a + b + c)/2; // Perimeter/2
19        Area = Math.sqrt(s*(s-a)*(s-b)*(s-c));
20
21
22        System.out.format("\n The Perimeter of Traiangle = %.2f\n", Perimeter);
23        System.out.format(" The Semi Perimeter of Traiangle = %.2f\n", s);
24        System.out.format(" The Area of triangle = %.2f\n", Area);
25    }
26 }
```

```
Please Enter Three sides of triangle:
```

```
3  
4  
5
```

```
The Perimeter of Traiangle = 12.00  
The Semi Perimeter of Traiangle = 6.00  
The Area of triangle = 6.00
```

Q2 how to calculate **diameter** of a circle in java using object oriented approach

Below is the step by step descriptive logic to find diameter, circumference and area of a circle -

1. Input radius of circle from user. Store it in a variable say radius.
2. Apply the formulas to calculate diameter, circumference and area. Use diameter =  $2 * \text{radius}$ , circumference =  $2 * 3.14 * \text{radius}$  and area =  $3.14 * \text{radius} * \text{radius}$ .
3. Print all resultant value diameter, circumference and area.

Program to find diameter, and area of circle

```
/**  
 * Java program to calculate diameter, circumference and area of  
 circle  
 */  
  
import java.util.Scanner;  
  
class Test  
{  
public static void main(String args[])  
{  
    double radius, diameter, circumference, area;  
    Scanner op=new Scanner(System.in);  
    /*  
    * Input radius of circle from user  
    */  
    System.out.print("Enter radius of circle: ");  
    radius=op.nextDouble();
```

```
/*
 * Calculate diameter, circumference and area
 */
diameter = 2 * radius;
circumference = 2 * 3.14 * radius;
area = 3.14 * (radius * radius);

/*
 * Print all results
 */
System.out.println("Diameter of circle = "+diameter+" units ");
System.out.println("Circumference of circle = "+circumference+"
units ");
System.out.println("Area of circle = "+area+" sq. units ");
}
}
```

Output:

```
Enter radius of circle: 5
Diameter of circle = 10.0 units
Circumference of circle = 31.400000000000002 units
Area of circle = 78.5 sq. units
```

Q3 how to check leap year in java using object oriented approach

- 

- Using Ternary Operator.
- Using Static Method.

- **Using Ternary Operator**

- **1)** The ternary operator syntax is “if (condition)? value1:value2;”, if the condition is true then it returns value1, otherwise it returns value2.
- **2)** We are calculating the given year is a leap year or not. A year divisible by 400 (or) a year divisible by 4 and not divisible by 100 is a leap year.
- **3)** Read the year value using scanner object sc.nextLong and store it in the variable y.

- In given example  $y=1948$ ,  $y!=0$ , it is divisible by 400 so  $c=1$  return to a, a is initialized as  $a=1$ . Then it prints 1948 is a leap year.

```

1 import java.util.Scanner;
2 class Leapyear
3 {
4     public static void main(String arg[])
5     {
6         long a,y,c;
7         Scanner sc=new Scanner(System.in);
8         System.out.print("enter any calendar year :");
9         y=sc.nextLong();
10        if(y!=0)
11        {
12            a=(y%400==0)?(c=1):((y%100==0)?(c=0):((y%4==0)?(c=1):(c=0)));
13            if(a==1)
14                System.out.println(y+" is a leap year");
15        else
16            System.out.println(y+" is not a leap year");
17        }
18        else
19            System.out.println("year zero does not exist ");
20    }
21 }

```

- **Output:**

1 enter any calendar year :1950

2 1950 is not a leap year

1 enter any calendar year :1948

2 1948 is a leap year

- **Using Static Method**

- **1)** In this program leapOrNot(long year) is the static method which finds the given year is a leap year or not. leapOrNot(long year) method calls at the

main method of the class Leapyear. Then that static method starts the execution.

- **a)** If the year divisible by 400 then it prints the given year is leap(or) If the given year divisible by 4 and not divisible by 100 then it prints the given year is a leap.
- **b)** Otherwise, it prints “year is not a leap year”.

```
1 import java.util.Scanner;
2 class Leapyear
3 {
4     public static void main(String arg[])
5     {
6         long year;
7         Scanner sc=new Scanner(System.in);
8         System.out.print("enter any calendar year :");
9         year=sc.nextLong();
10        leapOrNot(year);
11    }
12    static void leapOrNot(long year)
13    {
14        if(year!=0)
15        {
16            if(year%400==0)
17                System.out.println(year+" is a leap year");
18            else if(year%100==0)
19                System.out.println(year+" is not a leap year");
20            else if(year%4==0)
21                System.out.println(year+" is a leap year");
22            else
23                System.out.println(year+" is not a leap year");
24        }
25        else
26            System.out.println("Year zero does not exist ");
27    }
28 }
```

- **Output:**

1 enter any calendar year :2016

2 2016 is a leap year

:

Q4. How to check that the input from the user is the vowel or not in java using oop?

Ans: To **check** whether the **input** alphabet is a **vowel or not in Java** Programming, you have to ask to the **user** to enter a character (alphabet) and **check** if the entered character is equal to a, A, e, E, i, I, o, O, u, U. If it is equal to any one of the 10, then it will be **vowel** otherwise it will **not** be a **vowel**.

```
#include <stdio.h>

int main()
{
    char ch;

    printf("Enter a character: ");
    scanf("%c",&ch);

    //condition to check character is alphabet or not
    if((ch>='A' && ch<='Z') || (ch>='a' && ch<='z'))
    {
        //check for VOWEL or CONSONANT
        switch(ch)
        {
            case 'A':
```



```

        case 'E':
        case 'I':
        case 'O':
        case 'U':
        case 'a':
        case 'e':
        case 'i':
        case 'o':
        case 'u':
            printf("%c is a VOWEL.\n",ch);
            break;
        default:
            printf("%c is a CONSONANT.\n",ch);
    }
}
else
{
    printf("%c is not an alphabet.\n",ch);
}

return 0;
}

```

## Output

```

First Run:
Enter a character: E
E is a VOWEL.

Second Run:
Enter a character: X
X is a CONSONANT.

Third Run:
Enter a character: +
+ is not an alphabet.

```

## Q5. How to use power of a number in java using object oriented approach?

Ans: **Java** program to calculate the **power of a number**. Read the base and exponent values from the user. Multiply the base **number** by itself and multiply the resultant with base (again) repeat this n times where n is the exponent value.

Read the base and exponent values from the user. Multiply the base number by itself and multiply the resultant with base (again) repeat this n times where n is the exponent value.

```
2 ^ 5 = 2 X 2 X 2 X 2 X 2 (5 times)
```

### Example

```
import java.util.Scanner;

public class PowerOfNumber {

    public static void main(String args[]){

        Scanner sc = new Scanner(System.in);

        System.out.println("Enter the base number ::");

        int base = sc.nextInt();

        int temp = base;

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

        int exp = sc.nextInt();

        for (int i=1; i<exp; i++){

            temp = temp*temp;

        }

        System.out.println("Result of "+base+" power "+exp+" is "+temp);

    }

}
```

### Output

```
Enter the base number ::
```

```
12
Enter the exponent number ::
2
Result of 12 power 2 is 144
```