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OOPs Practical 1

Aim:

A. Create a class Stack and implement the functionalities of the Stack Class
B. Write a program to demonstrate method overloading. Create a class 3DShape and overload a method named volume() to calculate volume of different geometric shapes like sphere, cube, cuboid and cylinder. Create a main() to implement all the methods.

Code & Output:

Code A:

stack.java

```java
public class stack {
    int top;
    int MAXSIZE = 20;
    int a[] = new int[MAXSIZE];

    stack(){
        top = -1;
    }

    int pop(){
        if(isEmpty()==0){
            System.out.println("Popped Element: "+ a[top]);
            int data = a[top];
            top--;
            return data;
        }
        System.out.println("STACK UNDERFLOW");
        return -1;
    }
```

```java
    void push(int num){
        if(isFull()==0){
            top++;
            a[top] = num;
        }
    }

    int isEmpty(){
        if(top == -1){
            System.out.println("Stack Empty!");
            return 1;
        }
        return 0;
    }

    int isFull(){
        if(top == MAXSIZE-1){
            System.out.println("Stack Full!");
            return 1;
        }
        return 0;
    }

    int peek(){
        if(isEmpty()==0){
            System.out.println("Peek --> "+ a[top]);
            return a[top];
        }
        System.out.println("STACK UNDERFLOW");
        return -1;
    }
}
```

main.java

```java
public class main {
    public static void main(String[] args) {
        stack S = new stack();

        S.push(49);
        S.peek();
        S.push(56);
        S.push(10);
        S.peek();
        S.pop();
        S.peek();
        S.pop();
```

```
        S.pop();
        S.pop();
    }
}
```

Output A:

Code B:

three_d_shape.java

```java
public class three_d_shape {
    double volume(double radius){
        return 4*Math.PI*radius*radius*radius/3;
    }
    double volume(int l, int b, int h){
        return l*b*h;
    }
    double volume(int r, int h){
        return Math.PI*r*r*h;
    }
    double volume(int side){
        return side*side*side;
    }
}
```

main.java

```java
public class main {
    public static void main(String[] args) {
        three_d_shape v = new three_d_shape();

        double sphere_v = v.volume(5.0);
        System.out.println("Volume of Sphere : "+sphere_v);

        double cube_c= v.volume(2);
        System.out.println("Volume of Cube : "+cube_c);
```

```java
        double cuboid_v = v.volume(2,3,4);
        System.out.println("Volume of Cuboid : "+cuboid_v);

        double cylinder_v = v.volume(2,3);
        System.out.println("Volume of Cylinder : "+cylinder_v);
    }
}
```

Output B:

```
PS C:\Users\LENOVO\OneDrive\Desktop\GitHub Main Folder\Sem 4\OOPs> cd "c:\Users\LENOVO\OneDrive\Desktop\GitHub
ac main.java } ; if ($?) { java main }
Volume of Sphere : 523.5987755982989
Volume of Cube : 8.0
Volume of Cuboid : 24.0
Volume of Cylinder : 37.69911184307752
PS C:\Users\LENOVO\OneDrive\Desktop\GitHub Main Folder\Sem 4\OOPs\1st_Prac_B>
```