**17. Create a Graphics package that has classes and interfaces for figures Rectangle, Triangle, Square and Circle. Test the package by finding the area of these figures.**

**Code :**

import graphics.util.\*;

import java.util.Scanner;

class Area {

public static void main(String [] arg) {

Scanner scanner = new Scanner(System.in);

System.out.println("Name : Sreyas Satheesh\nRoll.no : 53\nTitle : Area of different shapes using packages.\nDate : 15/04/2024\n");

System.out.println("Enter the details of rectangle.");

System.out.print("Height : ");

double height = scanner.nextDouble();

System.out.print("Width : ");

double width = scanner.nextDouble();

Rectangle rec = new Rectangle(height, width);

System.out.println("Enter the details of circle.");

System.out.print("Radius : ");

double radius = scanner.nextDouble();

Circle cir = new Circle(radius);

System.out.println("Enter the details of square.");

System.out.print("Side : ");

double side = scanner.nextDouble();

Square sq = new Square(side);

System.out.println("Enter the details of Triangle.");

System.out.print("Height : ");

height = scanner.nextDouble();

System.out.print("Base : ");

double base = scanner.nextDouble();

Triangle tr = new Triangle(height, base);

System.out.println("");

rec.area();

cir.area();

sq.area();

tr.area();

}

}

**graphics/Circle.java**

package graphics.util;

public class Circle {

double radius;

public Circle(double radius){

this.radius = radius;

}

public void area(){

System.out.println("Area of circle is : " + (this.radius \* this.radius \* Math.PI));

}

}

**graphics/Rectangle.java**

package graphics.util;

public class Rectangle {

double height, width;

public Rectangle(double height, double width){

this.height = height;

this.width = width;

}

public void area(){

System.out.println("Area of rectangle is : " + (this.height \* this.width));

}

}

**graphics/Square.java**

package graphics.util;

public class Square {

double side;

public Square(double side){

this.side = side;

}

public void area(){

System.out.println("Area of square is : " + (this.side \* this.side));

}

}

**graphics/Triangle.java**

package graphics.util;

public class Triangle {

double height, base;

public Triangle(double height, double base){

this.height = height;

this.base = base;

}

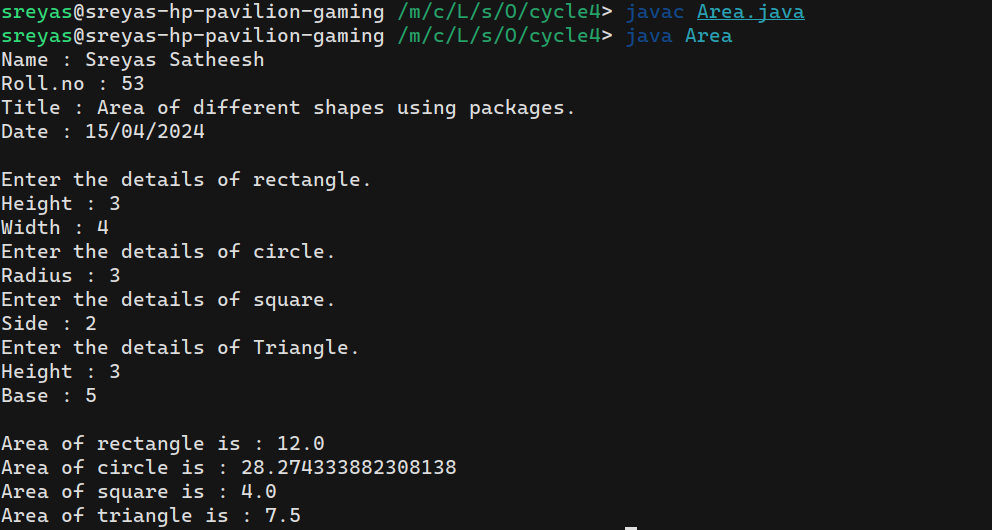
public void area(){

System.out.println("Area of triangle is : " + (this.height \* this.base \* 0.5));

}

}

**Output :**



**18. Create an Arithmetic package that has classes and interfaces for the 4 basic arithmetic operations. Test the package by implementing all operations on two given numbers**

**Code :**

import arithmatic.util.\*;

import java.util.Scanner;

class Arithmatic {

public static void main(String [] args) {

System.out.println("Name : Sreyas Satheesh\nRoll.no : 53\nTitle : Arithmatic operations using package.\nDate : 15/04/2024\n");

double a, b;

Scanner scanner = new Scanner(System.in);

System.out.println("Enter the values to add");

System.out.print("a : ");

a = scanner.nextDouble();

System.out.print("b : ");

b = scanner.nextDouble();

Add add = new Add(a, b);

add.result();

System.out.println("\nEnter the values to substract");

System.out.print("a : ");

a = scanner.nextDouble();

System.out.print("b : ");

b = scanner.nextDouble();

Sub sub = new Sub(a, b);

sub.result();

System.out.println("\nEnter the values to multiply");

System.out.print("a : ");

a = scanner.nextDouble();

System.out.print("b : ");

b = scanner.nextDouble();

Mul mul = new Mul(a, b);

mul.result();

System.out.println("\nEnter the values to division");

System.out.print("a : ");

a = scanner.nextDouble();

System.out.print("b : ");

b = scanner.nextDouble();

Div div = new Div(a, b);

div.result();

}

}

**arithmatic/Add.java**

package arithmatic.util;

public class Add {

double a, b;

public Add(double a, double b){

this.a = a;

this.b = b;

}

public void result(){

System.out.println(this.a + " + " + this.b + " = " + (this.a + this.b));

}

}

**arithmatic/Div.java**

package arithmatic.util;

public class Div {

double a, b;

public Div(double a, double b){

this.a = a;

this.b = b;

}

public void result(){

System.out.println(this.a + " / " + this.b + " = " + ((double)this.a / this.b));

}

}

**arithmatic/Mul.java**

package arithmatic.util;

public class Mul {

double a, b;

public Mul(double a, double b){

this.a = a;

this.b = b;

}

public void result(){

System.out.println(this.a + " x " + this.b + " = " + (this.a \* this.b));

}

}

**arithmatic/Sub.java**

package arithmatic.util;

public class Sub {

double a, b;

public Sub(double a, double b){

this.a = a;

this.b = b;

}

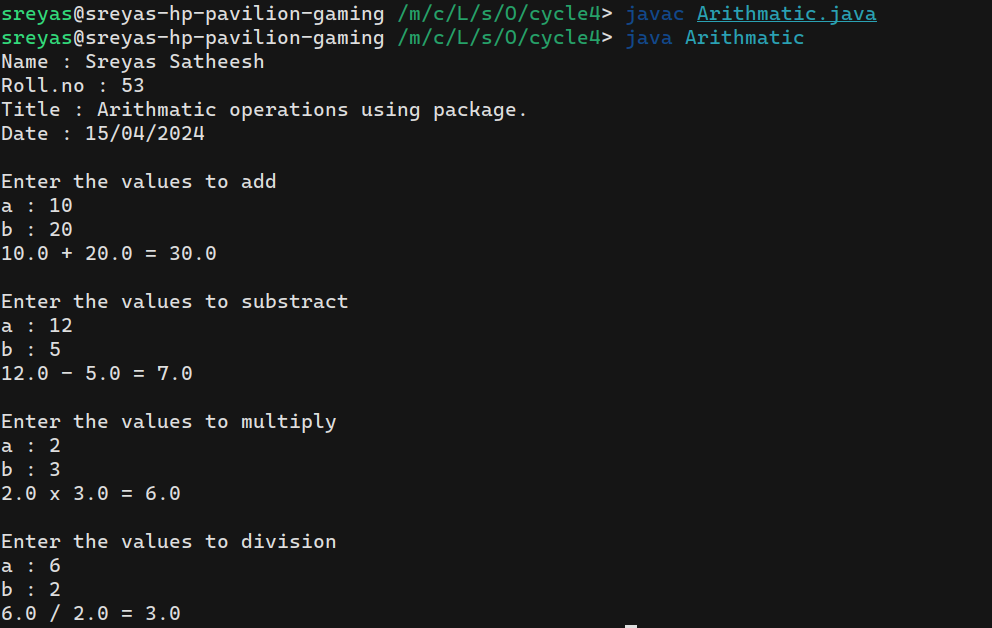
public void result(){

System.out.println(this.a + " - " + this.b + " = " + (this.a - this.b));

}

}

**Output :**



**19. Write a user defined exception class to authenticate the user name and password.**

**Code :**

import java.util.Scanner;

class UserDefinedException extends Exception {

public UserDefinedException(String message){

super(message);

}

}

class AuthChecker {

String username, password;

String USERNAME = "admin";

String PASSWORD = "admin@123";

public AuthChecker(String username, String password){

this.username = username;

this.password = password;

}

public boolean usernameChecker(){

try {

if(USERNAME.equals(this.username)){

System.out.println("Username passed...");

return true;

} else {

throw new UserDefinedException("Invalid username");

}

} catch (UserDefinedException e) {

System.out.println(e);

return false;

}

}

public boolean passwordChecker(){

try {

if(PASSWORD.equals(this.password)){

System.out.println("Password passed...");

return true;

} else {

throw new UserDefinedException("Invalid password");

}

} catch (UserDefinedException e) {

System.out.println(e);

return false;

}

}

}

public class Auth {

public static void main(String [] arg) {

System.out.println("Name : Sreyas Satheesh\nRoll.no : 53\nTitle : User Authentication.\nDate : 15/04/2024\n");

Scanner scanner = new Scanner(System.in);

while(true){

int flag = 0;

System.out.print("\nusername : ");

String username = scanner.nextLine();

System.out.print("password : ");

String password = scanner.nextLine();

AuthChecker auth = new AuthChecker(username, password);

if(auth.usernameChecker()) flag++;

if(auth.passwordChecker()) flag++;

if(flag == 2) {

System.out.println("User authenticated successfully");

break;

}

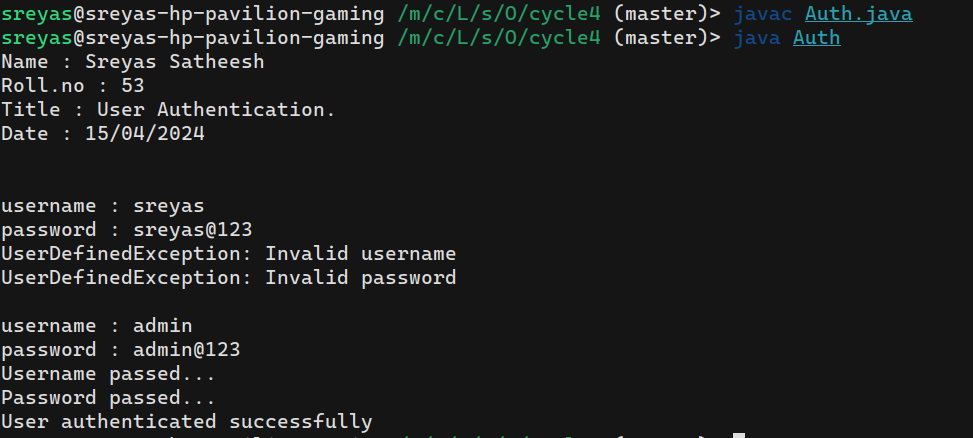
}

scanner.close();

}

}

**Output :**



**20. Find the average of N positive integers, raising a user defined exception for each negative input.**

**Code :**

import java.util.Scanner;

class NegativeException extends Exception {

public NegativeException(String message) {

super(message);

}

}

public class Average {

public static void main(String[] args){

System.out.println("Name : Sreyas Satheesh\nRoll.no : 53\nTitle : Average of N positive numbers.\nDate : 15/04/2024\n");

Scanner scanner = new Scanner(System.in);

int sum = 0;

System.out.print("Enter the no.of elements : ");

int n = scanner.nextInt();

System.out.println("Enter the elements");

for(int i=0; i<n; i++){

System.out.print("Enter the element : ");

int num = scanner.nextInt();

try {

if(num < 0) {

i--;

throw new NegativeException(num + " is a negative number.");

} else {

sum+=num;

}

} catch (Exception e) {

System.out.println(e.getMessage());

}

}

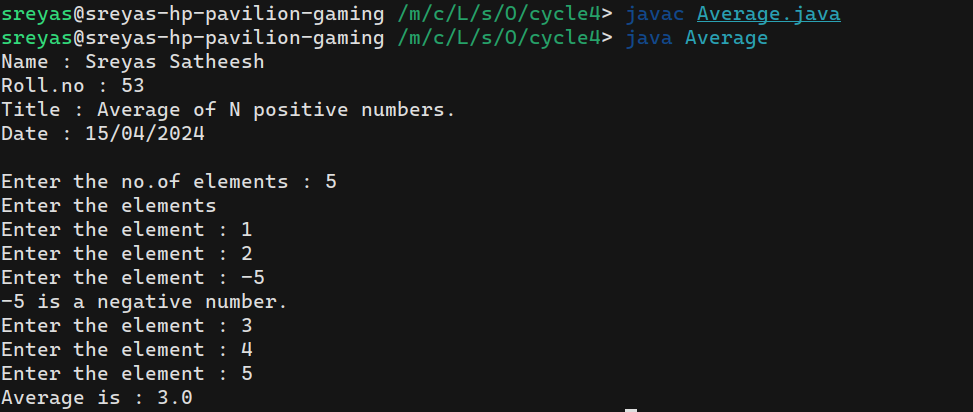
System.out.println("Average is : " + (float)sum/n);

scanner.close();

}

}

**Output :**



**21. Program to remove all the elements from a linked list**

**Code :**

import java.util.Scanner;

class LinkedList {

Node head;

static class Node {

int data;

Node next;

Node(int d)

{

data = d;

next = null;

}

}

public static LinkedList insert(LinkedList list, int data)

{

Node new\_node = new Node(data);

if (list.head == null) {

list.head = new\_node;

}

else {

Node last = list.head;

while (last.next != null) {

last = last.next;

}

last.next = new\_node;

}

return list;

}

public static void removeElements(LinkedList list){

list.head = null;

}

public static void printList(LinkedList list)

{

Node currentNode = list.head;

System.out.print("LinkedList: ");

if(currentNode == null) System.out.print("[]");

while (currentNode != null) {

System.out.print(currentNode.data + " ");

currentNode = currentNode.next;

}

System.out.println("");

}

public static void main(String[] args)

{

System.out.println("Name : Sreyas Satheesh\nRoll.no : 53\nTitle : Remove all elements from a linked list.\nDate : 15/04/2024\n");

Scanner scanner = new Scanner(System.in);

LinkedList list = new LinkedList();

System.out.print("Enter the no.of elements : ");

int n = scanner.nextInt();

for(int i = 0; i < n; i++){

System.out.print("Enter the number : ");

list = insert(list, scanner.nextInt());

}

printList(list);

while(true){

System.out.print("Do you want to remove all elements (yes/no) : ");

String choice = scanner.nextLine();

if(choice.isEmpty()) choice = scanner.nextLine(); // Solved the auto read issue on console.

if(choice.equals("yes")){

System.out.println("Elements removed.");

removeElements(list);

printList(list);

break;

} else if(choice.equals("no")) {

System.out.println("Elements not removed.");

printList(list);

break;

} else {

System.out.println("Invalid choice.");

}

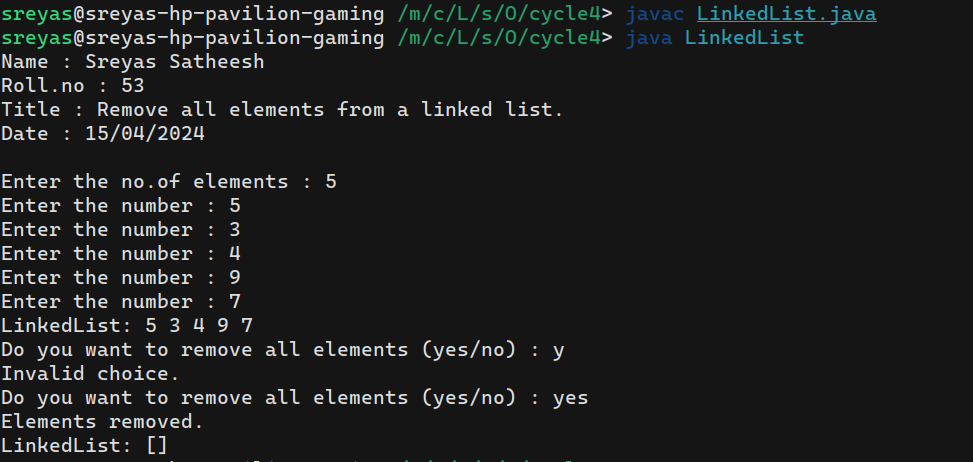
}

scanner.close();

}

}

**Output :**



**22. Program to remove an object from the Stack when the position is passed as parameter**

**Code :**

import java.util.LinkedList;

import java.util.Scanner;

public class Stack {

public static void main(String[] args) {

System.out.println("Name : Sreyas Satheesh\nRoll.no : 53\nTitle : Remove an object from the Stack when the position is passed.\nDate : 15/04/2024\n");

LinkedList<Integer> stack = new LinkedList<>();

Scanner scanner = new Scanner(System.in);

while(true) {

boolean exit = false;

System.out.print("\nSTACK OPERATIONS\n========================\n1. Push\n2. Pop\n3. Remove at a position\n4. Exit\nEnter your choice : ");

int choice = scanner.nextInt();

switch (choice) {

case 1:

System.out.print("Enter the element : ");

stack.push(scanner.nextInt());

System.out.println("Stack : " + stack);

break;

case 2:

removeElementAtPosition(stack);

System.out.println("Stack : " + stack);

break;

case 3:

System.out.print("Enter the position : ");

removeElementAtPosition(stack, scanner.nextInt());

System.out.println("Stack : " + stack);

break;

case 4:

exit = true;

break;

default:

System.out.println("Invalid choice.");

}

if(exit) break;

}

scanner.close();

}

public static void removeElementAtPosition(LinkedList<Integer> stack, int position) {

if (position < 0 || position >= stack.size()) {

System.out.println("Invalid position.");

} else {

stack.remove(position);

}

}

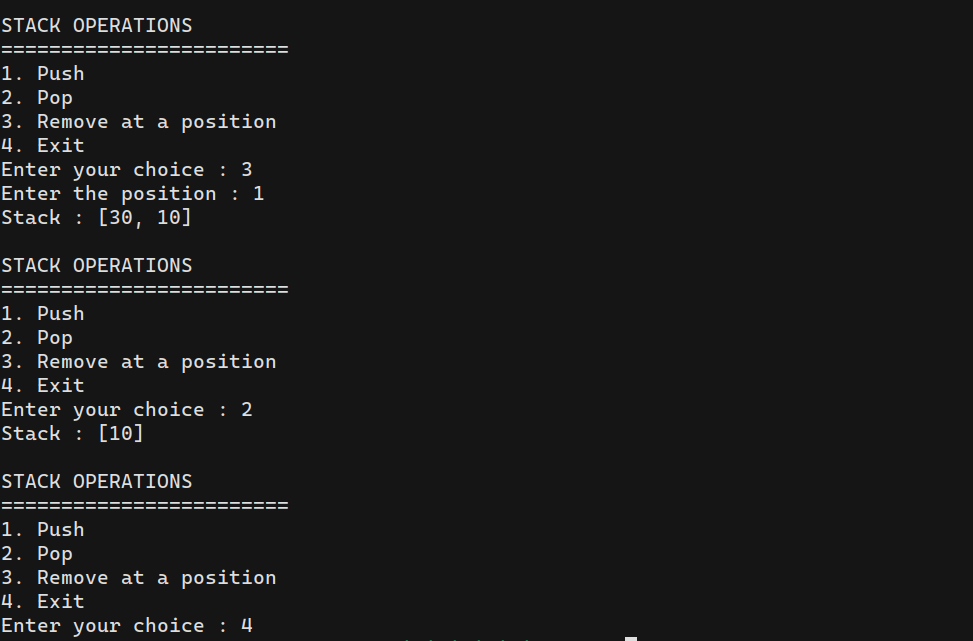
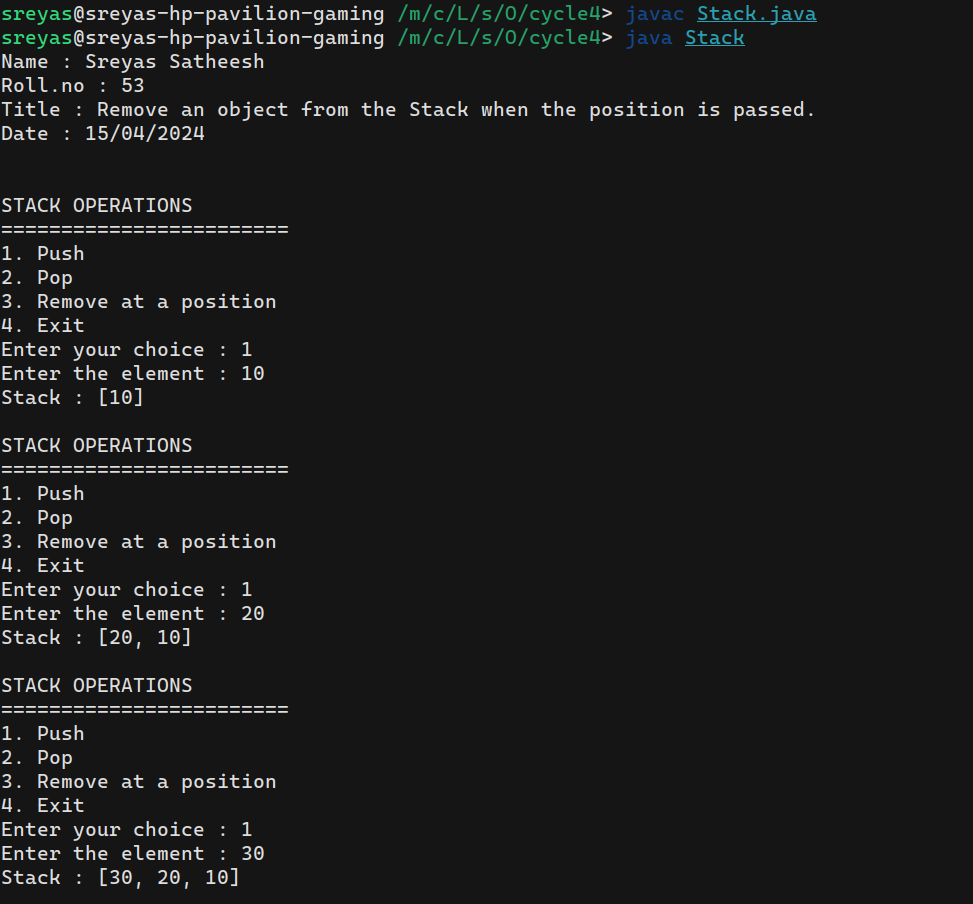
public static void removeElementAtPosition(LinkedList<Integer> stack) {

stack.pop();

}

}

**Output :**



**23. Write a Java program to compare two hash set**

**Code :**

import java.util.HashSet;

import java.util.Scanner;

public class Set {

public static void main(String[] args) {

System.out.println("Name : Sreyas Satheesh\nRoll.no : 53\nTitle : Compare two hash sets.\nDate : 15/04/2024\n");

Scanner scanner = new Scanner(System.in);

HashSet<Integer> set1 = new HashSet<>();

HashSet<Integer> set2 = new HashSet<>();

System.out.print("Enter the no.of elements in set 1 : ");

int n1 = scanner.nextInt();

for(int i = 0; i < n1; i++) {

System.out.print("Enter the element : ");

set1.add(scanner.nextInt());

}

System.out.print("Enter the no.of elements in set 2 : ");

int n2 = scanner.nextInt();

for(int i = 0; i < n2; i++) {

System.out.print("Enter the element : ");

set2.add(scanner.nextInt());

}

System.out.println("Set 1 : " + set1);

System.out.println("Set 2 : " + set2);

if (set1.equals(set2)) {

System.out.println("The two hash sets are equal.");

} else {

System.out.println("The two hash sets are not equal.");

}

scanner.close();

}

}

**Output :**

