1. program:

```java
import java.util.Scanner;
public class question1 {
    public static void main(String[] a){
        Scanner scan=new Scanner(System.in);
        String s=scan.nextLine();
        int h=s.length();
        System.out.println(h);
        int j=h/2;
        if(h%2==0){
            System.out.println(s.charAt(j-1)+" "+s.charAt(j));
        }
        else{
            System.out.println(s.charAt(j));
        }
        scan.close();

    }

}
```

Output:

```
PS C:\Users\srika\Desktop\all files\HTML> cd "c:\Users\srika\Desktop\all files\HTML\" ; if ($?) { javac question1.java } ; if ($?) { java question1 }
varun
5
r
PS C:\Users\srika\Desktop\all files\HTML>
```

2. program:

```java
import java.util.Scanner;


public class question2 {
    public static void validpass(String password){
        int digitcount=0;
        if(password.length()<10){
            System.out.println("It must contains 10 characters");
            return;
        }
        for(int i=0;i<password.length();i++){
            char ch=password.charAt(i);
            if(!Character.isLetterOrDigit(ch)){
                System.out.println("Remove the Speacial characters");
                return;
            }

                if(Character.isDigit(ch)){
                    digitcount++;
                }
            }
                    if(digitcount<2){
                        System.out.println("Eneter atleast two integer values");
                        return;

                    }
System.out.println("valid passsword");
    }
```

```java
    public static void main(String[] a){
        Scanner scan=new Scanner(System.in);
        System.out.println("enter a password");
        String s=scan.nextLine();
        validpass(s);
        scan.close();
```

```
    }

}
```

Output:

```
PS C:\Users\srika\Desktop\all files\HTML> cd "c:\Users\srika\Desktop\all files\HTML\" ; if ($?) { javac question2.java } ; if ($?) { java question2 }
enter a password
varunkumar12
valid passsword
PS C:\Users\srika\Desktop\all files\HTML>
```

3. program:

```
public class question3 {
    public static void sortarray(int[] arr,int index){
        if(index==arr.length-1){
            System.out.println("array is sorted");
            return;
        }
        if(arr[index]>arr[index+1]){
            System.out.println("array si not soretd");
            return;
        }
        sortarray(arr, index+1);


    }
    public static void main(String[] a){
        int arr1[]={2,4,5,6,7,8};
        int index=0;
        sortarray(arr1, index);

    }
}
```

Output:

```
PS C:\Users\srika\Desktop\all files\HTML> cd "c:\Users\srika\Desktop\all files\HTML\" ; if ($?) { javac question3.java } ; if ($?) { java question3 }
array is sorted
PS C:\Users\srika\Desktop\all files\HTML>
```

4. program:

```

public class intializer {
    static int intialvalue;
    static{
        intialvalue=1000;
        System.out.println("static block craeted"+intialvalue);
    }
    public intializer(){
        System.out.println("intializer instance created");
    }
    public static void main(String[] a){
        System.out.println("before craeting instance "+intialvalue);
        intializer intial=new intializer();
        System.out.println("after craeting instance "+intial.intialvalue);

    }

}
```

Output:

```
PS C:\Users\srika\Desktop\all files\HTML> cd "c:\Users\srika\Desktop\all files\HTML\" ; if ($?) { javac intializer.java } ; if ($?) { java intializer }
static block craeted1000
before craeting instance 1000
intializer instance created
after craeting instance 1000
PS C:\Users\srika\Desktop\all files\HTML>
```

5. program:

```
public class IDgenerator {
```

```
    static int nextID=1;
    static int generateID(){
        int currentID=nextID;
        nextID++;
        return currentID;
    }
    public static void main(String[] args) {
        System.out.println("Generated ID: " + IDgenerator.generateID());
        System.out.println("Generated ID: " + IDgenerator.generateID());
        System.out.println("Generated ID: " + IDgenerator.generateID());

        IDgenerator generator1 = new IDgenerator();
        System.out.println("Generated ID (from instance): " + generator1.generateID());
```

```
        IDgenerator generator2 = new IDgenerator();
        System.out.println("Generated ID (from another instance): " + generator2.generateID());
    }

}
```

Output:

```
PS C:\Users\srika\Desktop\all files\HTML> cd "c:\Users\srika\Desktop\all files\HTML\" ; if ($?) { javac IDgenerator.java } ; if ($?) { java IDgenerator }
Generated ID: 1
Generated ID: 2
Generated ID: 3
Generated ID (from instance): 4
Generated ID (from another instance): 5
PS C:\Users\srika\Desktop\all files\HTML>
```

6. program:

```
public class Dog {
    private String name;
    private String color;

    public Dog(String name, String color) {
        this.name = name;
        this.color = color;
    }
```

```
    public void displayDetails() {
        System.out.println("Dog's Name: " + name);
        System.out.println("Dog's Color: " + color);
    }
```

```
    public static void main(String[] args) {
        Dog myDog = new Dog("Buddy", "Brown");
```

```
        myDog.displayDetails();
    }
}
```

Output:

```
PS C:\Users\srika\Desktop\all files\HTML> cd "c:\Users\srika\Desktop\all files\HTML\" ; if ($?) { javac Dog.java } ; if ($?) { java Dog }
Dog's Name: Buddy
Dog's Color: Brown
PS C:\Users\srika\Desktop\all files\HTML>
```

7. program:

```
public class Book {
    private String title;
    private String author;
    private double price;

    public Book() {

    }
```

```
    public Book(String title, String author) {
        this.title = title;
        this.author = author;
        this.price = 0.0;
    }
```

```
    public Book(String title, String author, double price) {
        this.title = title;
        this.author = author;
        this.price = price;
    }
    public void displayDetails() {
        System.out.println("Title: " + title);
        System.out.println("Author: " + author);
        System.out.println("Price: $" + price);
    }
```

```
    public static void main(String[] args) {
        Book defaultBook = new Book();
        System.out.println("Default Constructor:");
        defaultBook.displayDetails();
```

```
        Book bookWithTitleAndAuthor = new Book("1984", "George Orwell");
        System.out.println("\nConstructor with Title and Author:");
        bookWithTitleAndAuthor.displayDetails();
```

```
        Book bookWithAllDetails = new Book("To Kill a Mockingbird", "Harper Lee", 15.99);
        System.out.println("\nConstructor with Title, Author, and Price:");
        bookWithAllDetails.displayDetails();
    }
}
```

Output:

```
Default Constructor:
Title: null
Author: null
Price: $0.0

Constructor with Title and Author:
Title: 1984
Author: George Orwell
Price: $0.0
```

8. program:

```
class Bankaccount{
    private int accountnumber;
    private int balance;
    public Bankaccount(int accountnumber,int balance){
        this.accountnumber=accountnumber;
        this.balance=balance;
    }
    void setdata(int accountnumber,int balance){
        this.accountnumber=accountnumber;
        this.balance=balance;
    }
    int getaccountnumber(){
        return accountnumber;
    }
    int getbalance(){
        return balance;
    }
    void accountdetails(){
        System.out.println("account number : "+getaccountnumber()+"\nbalance : "+getbalance());
    }
```

```
}

public class bankaccounttest {
    public static void main(String[] a){
        Bankaccount bank=new Bankaccount(73929, 8291);
        bank.accountdetails();
    }

}
```

Output:

```
PS C:\Users\srika\Desktop\all files\HTML> cd "c:\Users\srika\Desktop\all files\HTML\" ; if ($?) { javac bankaccounttest.java } ; if ($?) { java bankaccounttest }
account number : 73929
balance : 8291
PS C:\Users\srika\Desktop\all files\HTML>
```

9. program:

```
interface playable{
    void play();
}
class football implements playable{
    public void play(){
        System.out.println("play football");
    }
}
class volleyball implements playable{
    public void play(){
        System.out.println("play volleyball");
    }
}
class basketball implements playable{
    public Object play;

    public void play(){
        System.out.println("play basketball");
    }
}
public class quetsion9 {
    public static void main(String[] args) {
        football f=new football();
        f.play();
        volleyball v=new volleyball();
        v.play();
        basketball b=new basketball();
        b.play();
    }
}
```

Output:

```
PS C:\Users\srika\Desktop\all files\HTML> cd "c:\Users\srika\Desktop\all files\HTML\" ; if ($?) { javac quetsion9.java } ; if ($?) { java quetsion9 }
play football
play volleyball
play basketball
PS C:\Users\srika\Desktop\all files\HTML>
```

10. program:

```
class OddNumberException extends Exception {
    public OddNumberException(String message) {
        super(message);
    }
}


public class NumberChecker {

    public static void checkEven(int number) throws OddNumberException {
        if (number % 2 != 0) {
```

```
            throw new OddNumberException("The number " + number + " is odd. Exception
thrown.");
        }
        System.out.println("The number " + number + " is even.");
    }
```

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

        try {
            checkEven(10);
            checkEven(11);
        } catch (OddNumberException e) {
            System.out.println("Exception caught: " + e.getMessage());
            System.out.println(e);
        }
    }
}
```

Output:

```
PS C:\Users\srika\Desktop\all files\HTML> cd "c:\Users\srika\Desktop\all files\HTML\" ; if ($?) { javac NumberChecker.java } ; if ($?) { java NumberChecker }
The number 10 is even.
Exception caught: The number 11 is odd. Exception thrown.
OddNumberException: The number 11 is odd. Exception thrown.
PS C:\Users\srika\Desktop\all files\HTML>
```

11. program:

```
import java.util.Scanner;

class VowelException extends Exception {
    public VowelException(String message) {
        super(message);
    }
}
public class vowlesChecker {
    public static void checkvowels(String input) throws VowelException{
        if(!input.matches(".*[AEIOUaeiou].*")){
        throw new VowelException("the string does not contain vowels.");
    }
    else{
        System.out.println("the string contains vowels.");
    }
}
    public static void main(String[] args) {
        Scanner scan=new Scanner(System.in);
        String s=scan.nextLine();
        try{
            checkvowels(s);
        }
        catch(VowelException e){
            System.err.println(e.getMessage());
        }
        scan.close();
```

```
    }

}
```

Output:

```
PS C:\Users\srika\Desktop\all files\HTML> cd "c:\Users\srika\Desktop\all files\HTML\" ; if ($?) { javac vowlesChecker.java } ; if ($?) { java vowlesChecker }
varun
the string contains vowels.
PS C:\Users\srika\Desktop\all files\HTML>
```

12. program:

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

```
    public static void main(String[] args) {
        Scanner scan=new Scanner(System.in);
        int cols=scan.nextInt();
        int rows=scan.nextInt();
        for (int i=0;i<=10;i++){
            for(int j=0;j<=10;j++){
                System.out.print("_ ");
            }
            System.out.println();
        }
        scan.close();
    }

}
```

Output:

```
10
-----------
-----------
-----------
-----------
-----------
-----------
-----------
-----------
-----------
```

13. program:

```
import java.util.ArrayList;
import java.util.List;
public class ListMerger {
    public static <T> List<T> mergeLists(List<T> list1, List<T> list2) {
        List<T> mergedList = new ArrayList<>();
        int size1 = list1.size();
        int size2 = list2.size();
        int maxSize = Math.max(size1, size2);
        for (int i = 0; i < maxSize; i++) {
            if (i < size1) {
                mergedList.add(list1.get(i));
            }
            if (i < size2) {
                mergedList.add(list2.get(i));
            }
        }
        return mergedList;
    }
    public static void main(String[] args) {
        List<Integer> list1 = new ArrayList<>();
        list1.add(1);
        list1.add(3);
        list1.add(5);
        List<Integer> list2 = new ArrayList<>();
        list2.add(2);
        list2.add(4);
        list2.add(6);
        list2.add(8);
        List<Integer> mergedList = mergeLists(list1, list2);
        System.out.println("Merged List: " + mergedList);
        List<String> list3 = new ArrayList<>();
        list3.add("A");
        list3.add("C");
        list3.add("E");
        List<String> list4 = new ArrayList<>();
        list4.add("B");
        list4.add("D");
        list4.add("F");
```

```
        list4.add("G");
        List<String> mergedListStrings = mergeLists(list3, list4);
        System.out.println("Merged String List: " + mergedListStrings);
    }
}
```

Output:

```
PS C:\Users\srika\Desktop\all files\HTML> cd "c:\Users\srika\Desktop\all files\HTML\" ; if ($?) { javac ListMerger.java } ; if ($?) { java ListMerger }
Merged List: [1, 2, 3, 4, 5, 6, 8]
Merged String List: [A, B, C, D, E, F, G]
PS C:\Users\srika\Desktop\all files\HTML>
```

14. program:

```
public class selectionsort {
    public static void sortarray(int[] arr){
        int n=arr.length;
        for(int i=0;i<n;i++){
            int min_index=i;
            for (int j=i+1;j<n;j++){
                if(arr[j]<arr[min_index]){
                    min_index=j;
                }
            }
            int temp=arr[min_index];
            arr[min_index]=arr[i];
            arr[i]=temp;
        }
    }
    public static void main(String[] args) {
        int[] arr={4,5,6,2,1,3};
        sortarray(arr);
        printarray(arr);
    }
        public static void printarray(int[] arr){
        for(int num:arr){
            System.out.print(num+" ");
        }
        System.out.println();
        }
}
```

Output:

```
PS C:\Users\srika\Desktop\all files\HTML> cd "c:\Users\srika\Desktop\all files\HTML\" ; if ($?) { javac selectionsort.java } ; if ($?) { java selectionsort }
1 2 3 4 5 6
PS C:\Users\srika\Desktop\all files\HTML>
```

15. program:

```
public class search {
    public static void binarysearch(int[] arr,int target){
        int n=arr.length;
        for (int i=0;i<n;i++){
            if(arr[i]==target){
                System.out.println("element found at index : "+i);
            }
        }
    }
    public static void main(String[] a){
        int[] arr={1,2,3,4,5,6,7,8};
        int target=5;
        binarysearch(arr,target);
    }

}
```

Output:

```
PS C:\Users\srika\Desktop\all files\HTML> cd "c:\Users\srika\Desktop\all files\HTML\" ; if ($?) { javac search.java } ; if ($?) { java search }
element found at index : 4
PS C:\Users\srika\Desktop\all files\HTML>
```

16. program:

```
import java.util.regex.Matcher;
import java.util.regex.Pattern;

public class UnderscoreSequences {
    public static void main(String[] args) {
        String inputString = "abc_def_ghi_123_xyz";
        Pattern pattern = Pattern.compile("[a-z]+_[a-z]+");
        Matcher matcher = pattern.matcher(inputString);

        while (matcher.find()) {
            String sequence = matcher.group();
            System.out.println(sequence);
        }
    }
}
```

Output:

```
PS C:\Users\srika\Desktop\all files\HTML> cd "c:\Users\srika\Desktop\all files\HTML\" ; if ($?) { javac UnderscoreSequences.java } ; if ($?) { java UnderscoreSequence
s }
abc_def
PS C:\Users\srika\Desktop\all files\HTML>
```

17. program:

```
import java.util.regex.Matcher;
import java.util.regex.Pattern;

public class GWordMatcher {
    public static void main(String[] args) {
        String inputString = "dog cat tiger lion";
        Pattern pattern = Pattern.compile("\\b[a-zA-Z]*g[a-zA-Z]*\\b");
        Matcher matcher = pattern.matcher(inputString);

        while (matcher.find()) {
            String matchedWord = matcher.group();
            System.out.println(matchedWord);
        }
    }
}
```

Output:

```
PS C:\Users\srika\Desktop\all files\HTML> cd "c:\Users\srika\Desktop\all files\HTML\" ; if ($?) { javac GWordMatcher.java } ; if ($?) { java GWordMatcher }
dog
tiger
PS C:\Users\srika\Desktop\all files\HTML>
```