1. Define a class to represent a bank account. Include the following members:

```
import java.io.*;
import java.util.*;
import java.util.Scanner;
import java.util.Random;
class Bank {
    public String nameOfDepositor;
    public int accNumber;
    public String accType;
    public double balanceAmount;
    public void assignValues(String nameOfDepositor, String accType, double
balanceAmount) {
        this.nameOfDepositor=nameOfDepositor;
        this.accType=accType;
        this.balanceAmount=balanceAmount;
        Random random = new Random();
        this.accNumber=random.nextInt(1000000);
        System.out.println("Your new account number is: "+accNumber);
    }
    public void depositAmount(double amount) {
        if(accNumber==0) {
            System.out.println("!You don't have bank account to
deposit\nNote:create a account First");
        }
        else {
            balanceAmount+=amount;
            System.out.println("Amount deposited successfully...");
        }
    }
    public void withdrawAmount(double amount) {
        if(accNumber==0) {
            System.out.println("!You don't have bank account to
credit\nNote:create a account First");
        }
        else if(balanceAmount>amount) {
            balanceAmount-=amount;
            System.out.println("Amount credited successfully...");
        }
        else {
            System.out.println("! Insufficient balance");
        }
    }
    public void displayDetails() {
        if(accNumber==0) {
            System.out.println("!You don't have bank account\nNote:create a
account First");
```

```
        }
        else {
            System.out.println("Name of the Depositor: "+nameOfDepositor);
            System.out.println("Balance amount in the account:
"+balanceAmount);
        }
    }
    public void getInput() {
        System.out.println("1. Open account");
        System.out.println("2. Deposit amount");
        System.out.println("3. Withdraw amount");
        System.out.println("4. Account details");
        System.out.println("5. Exit");
        System.out.print("Please Enter Your choise : ");
    }
}
class prog_1 {
    public static void main(String[] s) throws IOException {
        System.out.println("----- WELCOME TO STATE BANK OF INDIA -----");
        Bank newAccount=new Bank();
        Scanner scan=new Scanner(System.in);
        boolean process=true;
        int continueState=0;
        while(continueState!=5) {
            newAccount.getInput();
            int currentProcess=scan.nextInt();
            if(currentProcess==1) {
                System.out.println("----------------------------------------
-------------");
                System.out.print("Enter your name: ");
                String nameOfDepositor=scan.next();
                System.out.print("Enter your account type: ");
                String accType=scan.next();
                System.out.print("Enter your opening balance: ");
                double balanceAmount=scan.nextDouble();
                newAccount.assignValues(nameOfDepositor, accType,
balanceAmount);
            }
            else if(currentProcess==2) {
                System.out.println("----------------------------------------
-------------");
                System.out.print("Enter amount to deposit: ");
                newAccount.depositAmount(scan.nextDouble());
            }
            else if(currentProcess==3) {
                System.out.println("----------------------------------------
-------------");
```

```
                System.out.println("Your current Balance :
"+newAccount.balanceAmount);
                System.out.print("Enter amount to withdraw: ");
                newAccount.withdrawAmount(scan.nextDouble());
            }
            else if(currentProcess==4) {
                System.out.println("----------------------------------------
-------------");
                newAccount.displayDetails();
            }
            else if(currentProcess==5) {
                System.out.println("----------------------------------------
-------------");
                continueState=5;
                System.out.println("THANK YOU FOR CHOOSING US.");
            }
        }
        System.out.println("------------------------------------------------
-----");
    }
}
```

Output

```
C:\Ashish\21BCA103 journal-2>javac prog_1.java

C:\Ashish\21BCA103 journal-2>java prog_1
----- WELCOME TO STATE BANK OF INDIA -----
1. Open account
2. Deposit amount
3. Withdraw amount
4. Account details
5. Exit
Please Enter Your choise : 1
-------------------------------------------------------
Enter your name: Ashish
Enter your account type: current
Enter your opening balance: 15000
Your new account number is: 707774
1. Open account
2. Deposit amount
3. Withdraw amount
4. Account details
5. Exit
Please Enter Your choise : 2
-------------------------------------------------------
Enter amount to deposit: 5000
Amount deposited successfully...
1. Open account
2. Deposit amount
3. Withdraw amount
4. Account details
5. Exit
Please Enter Your choise : 3
-------------------------------------------------------
```

```
Your current Balance : 20000.0
Enter amount to withdraw: 4000
Amount credited successfully...
1. Open account
2. Deposit amount
3. Withdraw amount
4. Account details
5. Exit
Please Enter Your choise : 4
Name of the Depositor: Ashish
Balance amount in the account: 16000.0
1. Open account
2. Deposit amount
3. Withdraw amount
4. Account details
5. Exit
Please Enter Your choise : 5
THANK YOU FOR CHOOSING US.

C:\Ashish\21BCA103 journal-2>
```

2. Write a program to print Floyd's triangle where n is command line input.

1
2 3
4 5 6
7 8 9 10

```java
class prog_2 {
    static void printFloydTriangle(int n) {
        int i, j, val = 1;
        for (i = 1; i <= n; i++) {
            for (j = 1; j <= i; j++) {
                System.out.print(val + " ");
                val++;
            }
        System.out.println();
    }
}
```

```
public static void main(String[] args) {
    int i= Integer.parseInt(args[0]);
    printFloydTriangle(i);
    }
}
```

Output

```
C:\Ashish\21BCA103 journal-2>javac prog_2.java

C:\Ashish\21BCA103 journal-2>java prog_2 5
1
2 3
4 5 6
7 8 9 10
11 12 13 14 15

C:\Ashish\21BCA103 journal-2>
```

3. Design a class Cricketer having data member name and a number of matches and appropriate member function to set the values. Derived two classes Batsman and Bowler from cricketer class with data member total number of runs and wickets respectively. Batsman class is having method to calculate average wicket. Write a program to create two objects and display information of one batsman and bowler along with average run and wicket.

```
import java.util.Scanner;
class Cricketer {
    public String cname;
    public int nom;
    public void setDataMain() {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the name of Cricketer: ");
        cname = sc.nextLine();
        Scanner sc2 = new Scanner(System.in);
        System.out.print("Enter the Number of matches of Cricketer: ");
        nom = sc2.nextInt();
    }
    public void displayDataMain() {
        System.out.println("Name " +cname);
        System.out.println("Matches " +nom);
```

```
    }
}
class Batsman extends Cricketer {
    public int total_run;
    public float average;
    public void setData() {
        Scanner sc4 = new Scanner(System.in);
        System.out.print("\nEnter the Total Number of Runs: ");
        total_run = sc4.nextInt();
    }
    public void displayData() {
        System.out.println("Total Runs "+total_run);
    }
}
class Bowler extends Cricketer {
    public int wickets;
    public float average;
    public void setData() {
        Scanner sc3 = new Scanner(System.in);
        System.out.print("Enter the number of wickets: ");
        wickets = sc3.nextInt();
    }
    public void displayData() {
        System.out.println("Wickets "+wickets);
    }
}
public class prog_3 {
    public static void main(String[] args) {
        Bowler bowl = new Bowler();
        Batsman bat = new Batsman();
        Cricketer cal = new Cricketer();
        cal.setDataMain();
        bat.setData();
        bowl.setData();
        cal.displayDataMain();
        bat.displayData();
        bowl.displayData();
        bowl.average = (float) bowl.wickets/cal.nom;
        bat.average = (float) bat.total_run/cal.nom;
        System.out.println("Average_Run's: "+bat.average);
        System.out.println("Average_Wicket's: "+bowl.average);
    }
}
```

Output

```
C:\Ashish\21BCA103 journal-2>javac prog_3.java

C:\Ashish\21BCA103 journal-2>java prog_3
Enter the name of Cricketer: Sanju
Enter the Number of matches of Cricketer: 25

Enter the Total Number of Runs: 1000
Enter the number of wickets: 15
Name Sanju
Matches 25
Total Runs 1000
Wickets 15
Average_Run's: 40.0
Average_Wicket's: 0.6

C:\Ashish\21BCA103 journal-2>
```

4. Write a program that will accept two strings or two numbers from command line and create overloaded method that add these two numbers or concate two strings.

```
import java.io.*;
class prog_4 {
    static boolean isNumber(String s) {
        for(int i=0;i<s.length();i++)
            if(Character.isDigit(s.charAt(i))==false)
                return false;
            return true;
    }
    void add(int a, int b) {
        System.out.println("Result is : "+(a+b));
        }
    void add(String a, String b) {
        System.out.println("Result is : "+(a+b));
    }
public static void main(String[] args) {
    prog_4 obj = new prog_4();
    if(isNumber(args[0])&&isNumber(args[1])) {
        int a=Integer.parseInt(args[0]);
        int b=Integer.parseInt(args[1]);
        obj.add(a,b);
    }
```

```
    else
    obj.add(args[0],args[1]);
    }
}
```

Output

```
C:\Ashish\21BCA103 journal-2>javac prog_4.java

C:\Ashish\21BCA103 journal-2>java prog_4 2 2
Result is : 4

C:\Ashish\21BCA103 journal-2>java prog_4 Ashish Jangir
Result is : AshishJangir

C:\Ashish\21BCA103 journal-2>
```

5. Write a program that accept a number from command line and check whether it is palindrome or not.

```
public class prog_5 {
    public static void main(String args[]) {
        int n = Integer.parseInt(args[0]);
        int sum = 0, r;
        int temp = n;
        while(n>0) {
            r = n % 10;
            sum = (sum*10)+r;
            n = n/10;
        }
        if(temp==sum)
            System.out.println("It is a Palindrome No.");
        else
            System.out.println("It's Not a palindrome No.");
    }
}
```

Output

```
C:\Ashish\21BCA103 journal-2>javac prog_5.java

C:\Ashish\21BCA103 journal-2>java prog_5 25
It's Not a palindrome No.

C:\Ashish\21BCA103 journal-2>
```

6. Write a program that will accept a string from command line and arrange all the characters in alphabetical order.

E.g.
input- computer
output-cemoprtu

```
public class prog_6 {
    public static void main(String args[]) {
        String str = args[0];
        str = str.toLowerCase();
        int len = str.length();
        String Result = ""; //Empty String
        for (char ch = 'a'; ch <= 'z'; ch++) {
            for (int i = 0; i < len; i++) {
                char strCh = str.charAt(i);
                if (ch == strCh) {
                    Result += strCh;
                }
            }
        }
    System.out.println("Alphabetical order : "+Result);
    }
}
```

Output

```
C:\Ashish\21BCA103 journal-2>javac prog_6.java

C:\Ashish\21BCA103 journal-2>java prog_6 Computer
Alphabetical order : cemoprtu

C:\Ashish\21BCA103 journal-2>
```

7. Write a program to create interface Area. Create three classes called rectangle, triangle and square calculate areas respectively.

```
import java.util.Scanner;
interface area {
    double calc(double x,double y);
}
class rectangle implements area {
    public double calc(double x,double y)
    {
        return(x*y);
    }
}
class triangle implements area {
    public double calc(double x,double y) {
        return((x*y)/2);
    }
}
class square implements area {
    public double calc(double x,double y) {
        return(x*x);
    }
}
class prog_7 {
    public static void main(String arg[]) {
        int p,q;
        Scanner in = new Scanner(System.in);
        rectangle r = new rectangle();
        triangle c = new triangle();
        square s = new square();
        area a;
        a = r;
        System.out.print("\nEnter hight of Rectangle : ");
        p=in.nextInt();
        System.out.print("Enter width of Rectangle : ");
        q=in.nextInt();
        System.out.println("\nArea of Rectangle is : " +a.calc(p,q));
        a = c;
        System.out.print("\nEnter hight of Triangle : ");
        p=in.nextInt();
        System.out.print("Enter Breath of Triangle : ");
        q=in.nextInt();
        System.out.println("\nArea of Triangle is : " +a.calc(p,q));
        a = s;
        System.out.print("\nEnter Side of Square : ");
        p=in.nextInt();
        System.out.println("\nArea of Square is : " +a.calc(p,p));
```

```
    }
}
```

Output

```
C:\Ashish\21BCA103 journal-2>javac prog_7.java

C:\Ashish\21BCA103 journal-2>java prog_7

Enter hight of Rectangle : 25
Enter width of Rectangle : 12

Area of Rectangle is : 300.0

Enter hight of Triangle : 15
Enter Breath of Triangle : 3

Area of Triangle is : 22.5

Enter Side of Square : 15

Area of Square is : 225.0

C:\Ashish\21BCA103 journal-2>
```

8. Write a program that will accept a number from command line and raise a user defined exception if the number consists of odd number of digits.

```
class OddNumberOfDigitsException extends Exception {
    public OddNumberOfDigitsException(String message) {
        super(message);
    }
}
public class prog_8 {
    public static void main(String[] args) {
        int numberString = Integer.parseInt(args[0]);
        int temp=numberString;
        int x;
        try {
            while(numberString>0) {
                x=numberString%10;
                numberString=numberString/10;
                if (x % 2 != 0) {
                    throw new OddNumberOfDigitsException("The number has an
odd number of digits");
                }
```

```
            }
        }
        catch (ArrayIndexOutOfBoundsException e) {
            System.out.println("Please provide a number as a command-line
argument.");
        }
        catch (OddNumberOfDigitsException e) {
            System.out.println(e.getMessage());
        }
    }
}
```

Output

```
C:\Ashish\21BCA103 journal-2>javac prog_8.java

C:\Ashish\21BCA103 journal-2>java prog_8 123
The number has an odd number of digits

C:\Ashish\21BCA103 journal-2>
```

9. Write a java application which accepts 10 names of student and their age. Sort names and age in descending order. (Using Array)

```
import java.util.Arrays;
import java.util.Scanner;
public class prog_9 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        String[] names = new String[10];
        int[] ages = new int[10];
        for (int i = 0; i < 10; i++) {
            System.out.print("Enter name of student " + (i + 1) + ": ");
            names[i] = scanner.nextLine();
            System.out.print("Enter age of student " + (i + 1) + ": ");
            ages[i] = scanner.nextInt();
            scanner.nextLine();
        }
        while (true) {
            System.out.println("1. Sort via Name.");
            System.out.println("2. Sort via Age.");
            System.out.println("3. Exit");
            System.out.print("\nSelect Your Choice : ");
            int choice = scanner.nextInt();
            scanner.nextLine();
            switch (choice) {
```

```
                case 1:
                for (int i = 0; i < 10; i++) {
                    for (int j = i + 1; j < 10; j++) {
                        if (names[i].compareToIgnoreCase(names[j]) < 0) {
                            String tempName = names[i];
                            names[i] = names[j];
                            names[j] = tempName;
                            int tempAge = ages[i];
                            ages[i] = ages[j];
                            ages[j] = tempAge;
                        }
                    }
                }
                System.out.println("\nSorted Names in Descending Order:");
                for (int i = 0; i < 10; i++) {
                    System.out.println(names[i] + " : " + ages[i]);
                }
                break;
                case 2:
                for (int i = 0; i < 10; i++) {
                    for (int j = i + 1; j < 10; j++) {
                        if (ages[i] < (ages[j])) {
                            int tempage = ages[i];
                            ages[i] = ages[j];
                            ages[j] = tempage;
                            String tempname = names[i];
                            names[i] = names[j];
                            names[j] = tempname;
                        }
                    }
                }
                System.out.println("\nSorted Ages in Descending Order:");
                for (int i = 0; i < 10; i++) {
                    System.out.println(ages[i] + " - " + names[i]);
                }
                break;
                case 3:
                System.out.println("Exiting program...");
                System.exit(0);
                break;
                default:
                System.out.println("Invalid choice. Try again.");
            }
        }
    }
}
```

Output

```
C:\Ashish\21BCA103 journal-2>javac prog_9.java

C:\Ashish\21BCA103 journal-2>java prog_9
Enter name of student 1: Ashish
Enter age of student 1: 21
Enter name of student 2: Drashti
Enter age of student 2: 19
Enter name of student 3: Yash
Enter age of student 3: 20
Enter name of student 4: Dev
Enter age of student 4: 18
Enter name of student 5: Jay
Enter age of student 5: 22
Enter name of student 6: Sahil
Enter age of student 6: 20
Enter name of student 7: Laxman
Enter age of student 7: 21
Enter name of student 8: Abhisek
Enter age of student 8: 22
Enter name of student 9:
Enter age of student 9: 18
Enter name of student 10: Sudhir
Enter age of student 10: 19
1. Sort via Name.
2. Sort via Age.
3. Exit

Select Your Choice : 1
```

```
Sorted Names in Descending Order:
Yash : 20
Sudhir : 19
Sahil : 20
Laxman : 21
Jay : 22
Drashti : 19
Dev : 18
Ashish : 21
Abhisek : 22
 : 18
1. Sort via Name.
2. Sort via Age.
3. Exit

Select Your Choice : 2
```

```
Sorted Ages in Descending Order:
22 - Jay
22 - Abhisek
21 - Ashish
21 - Laxman
20 - Yash
20 - Sahil
19 - Sudhir
19 - Drashti
18 - Dev
18 -
1. Sort via Name.
2. Sort via Age.
3. Exit

Select Your Choice : 3
Exiting program...

C:\Ashish\21BCA103 journal-2>
```

10. Design a class MyString having a data member of type String and add member functions to achieve following task.
(i) Reverse string
(ii) String in Titlecase.
(iii) Extract N-characters from rightend of the string Write a menu driven program to call these methods of MyString class.
The program should not terminate abruptly.

```
import java.util.Scanner;
public class prog_10 {
    private String str;
    public prog_10(String str) {
        this.str = str;
    }
    public String reverse() {
        StringBuilder sb = new StringBuilder(str);
        return sb.reverse().toString();
    }
    public String titleCase() {
        String[] words = str.split("\\s+");
        StringBuilder sb = new StringBuilder();
        for (String word : words) {
            if (word.length() > 0) {
                sb.append(Character.toUpperCase(word.charAt(0)));
                sb.append(word.substring(1).toLowerCase());
                sb.append(" ");
            }
```

```
        }
        return sb.toString().trim();
    }
    public String extractFromRight(int n) {
        if (n >= str.length()) {
            return str;
        }
        return str.substring(str.length() - n);
    }
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a string: ");
        String inputString = scanner.nextLine();
        prog_10 myString = new prog_10(inputString);
        while (true) {
            System.out.println("1. Reverse the string");
            System.out.println("2. Convert the string to title case");
            System.out.println("3. Extract N characters from the right-end of
the string");
            System.out.println("4. Exit");
            System.out.print("\nSelect Your Choice : ");
            int choice = scanner.nextInt();
            scanner.nextLine();
            switch (choice) {
                case 1:
                    System.out.println("Reversed string: " +
myString.reverse());
                break;
                case 2:
                    System.out.println("Title case string: " +
myString.titleCase());
                break;
                case 3:
                    System.out.print("Enter the number of characters to
extract: ");
                    int n = scanner.nextInt();
                    scanner.nextLine();
                    System.out.println("Extracted string: " +
myString.extractFromRight(n));
                break;
                case 4:
                    System.out.println("Exiting program...");
                    System.exit(0);
                break;
                default:
                    System.out.println("Invalid choice. Try again.");
            }
        }
```

```
    }
}
```

Output

```
C:\Ashish\21BCA103 journal-2>javac prog_10.java

C:\Ashish\21BCA103 journal-2>java prog_10
Enter a string: ASHISH
1. Reverse the string
2. Convert the string to title case
3. Extract N characters from the right-end of the string
4. Exit

Select Your Choice : 1
Reversed string: HSIHSA
1. Reverse the string
2. Convert the string to title case
3. Extract N characters from the right-end of the string
4. Exit

Select Your Choice : 2
Title case string: Ashish
1. Reverse the string
2. Convert the string to title case
3. Extract N characters from the right-end of the string
4. Exit
```

```
Select Your Choice : 3
Enter the number of characters to extract: 2
Extracted string: SH
1. Reverse the string
2. Convert the string to title case
3. Extract N characters from the right-end of the string
4. Exit

Select Your Choice : 4
Exiting program...

C:\Ashish\21BCA103 journal-2>
```