CSE1007
Java Programming
Lab Assignment-1

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Question :

Write a program(s) in Java that illustrates the following concepts. The concepts can be applied to any practical scenario such as student administration system or software which maintains various information about students and provides various services to the users. The other scenarios may include retail business management software, banking systems, railway reservation system, online shopping applications, environmental monitoring system etc.

- Primitive data types
- Operators
- Conditional statements
- Loops,
- Single and multi-dimensional arrays
- Enhanced for loop,
- String package (A few important methods to manipulate strings can be considered)

Solution:

Program 1:

If there are 4 batches in B-Tech learning "CSE1007" course, read the count of the slow learners (who have scored <25) in each batch. Tutors should be assigned in the ratio of 1:4 (For every 4 slow learners, there should be one tutor). Determine the number of tutors for each batch. Create a 2-D jagged array with 4 rows to store the count of slow learners in the 4 batches. The number of columns in each row should be equal to the number of groups formed for that particular batch (Eg., If there are 23 slow learners in a batch, then there should be 6 tutors and in the jagged array, the corresponding row should store 4, 4, 4, 4, 4,3). Use for-each loop to traverse the array and print the details. Also print the number of batches in which all tutors have exactly 4 students.

Concepts used:

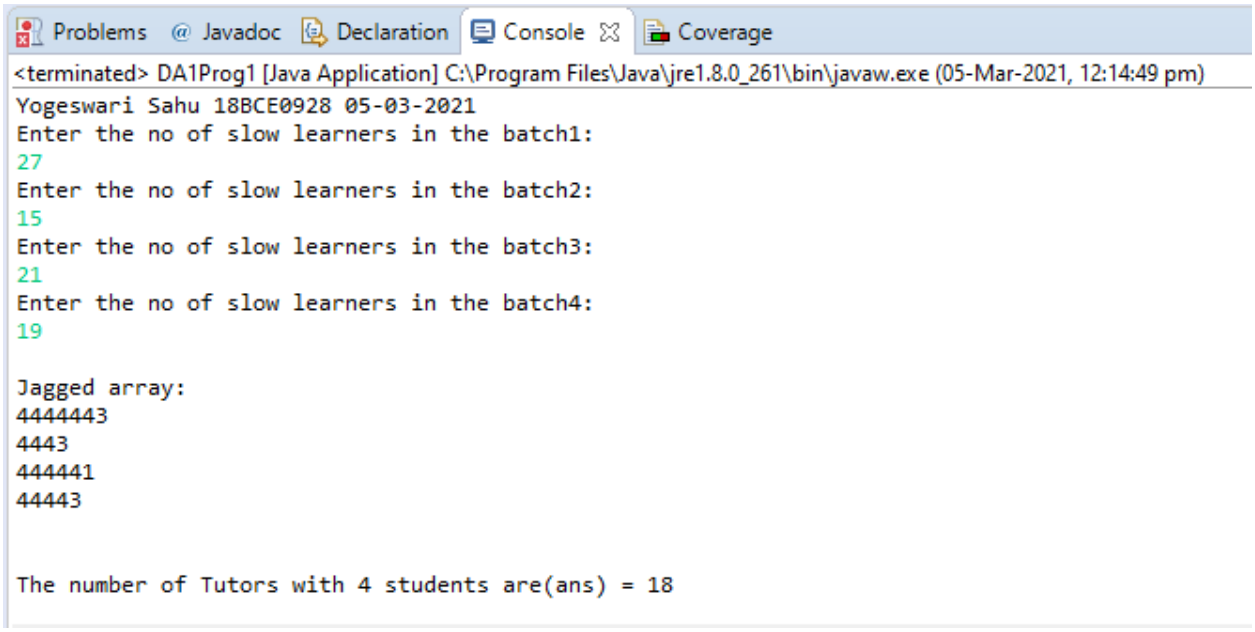
- Primitive data types
- Operators (=,++,+,%,/,==,>)
- Conditional statements (If,else)
- Loops (For)
- Multi-dimensional arrays (Use of Jagged arrays)
- Enhanced for loop

Code:

```
package JavaDa1;
import java.util.*;
public class DA1Prog1 {

	public static void main(String[] args) {
		System.out.println("Yogeswari Sahu 18BCE0928 05-03-2021");
		 Scanner s= new Scanner(System.in);
		 int slow,c;
		 int ans=0;
		 int a[][]=new int[4][];
		 //taking input and performing operations
		 for(int i=0;i<4;i++)
		 {
		 int k=i+1;
		 System.out.println("Enter the no of slow learners in the
batch"+k+":");
```

```
                slow=s.nextInt();
                if(slow%4==0)
                c=slow/4;
                else
                c=slow/4+1;
                a[i]=new int[c];
                for(int j=0;j<c;j++)
                {
                if(slow>4)
                {
                a[i][j]=4;
                slow=slow-4;
                }
                else
                {
                a[i][j]=slow;
                slow=0;
                }
                }
                }
                //display of jagged array
                System.out.println("\nJagged array:");
                for(int i=0;i<4;i++)
                {
                for(int n:a[i])
                {
                System.out.print(n);
                //checking if tutors have 4 students each
                if(n==4)
                ans++;
                }
                System.out.println();
                }
                //printing final result
                System.out.println("\n\nThe number of Tutors with 4 students are(ans)
= "+ans);

        }

}
```

Output:



Program 2:

In a particular Operating System class, the teacher has instructed every student to compute address at which the user input has to be stored by using a hash algorithm that uses rotation and fold shift methods to compute the address at which the user input has to be stored. The teacher has instructed the students to perform the following process in the hash algorithm: Define a static method to perform rotation of the data by moving the least significant digit to the most significant bit position. Also define a non-static method to perform fold shift by dividing the rotated data into segments of length 2 and then add all the segments to get the hash address. If the sum has more than 2 digits, delete the most significant digit and the resulting number is the address. Eg. If the data is 1 12286, after rotation it should be 61 1228 and after fold shift it should be 61+ 12 + 28=101 =01 (after deleting the most significant digit)

Concepts used:

- String package
- Primitive data types
- Operators

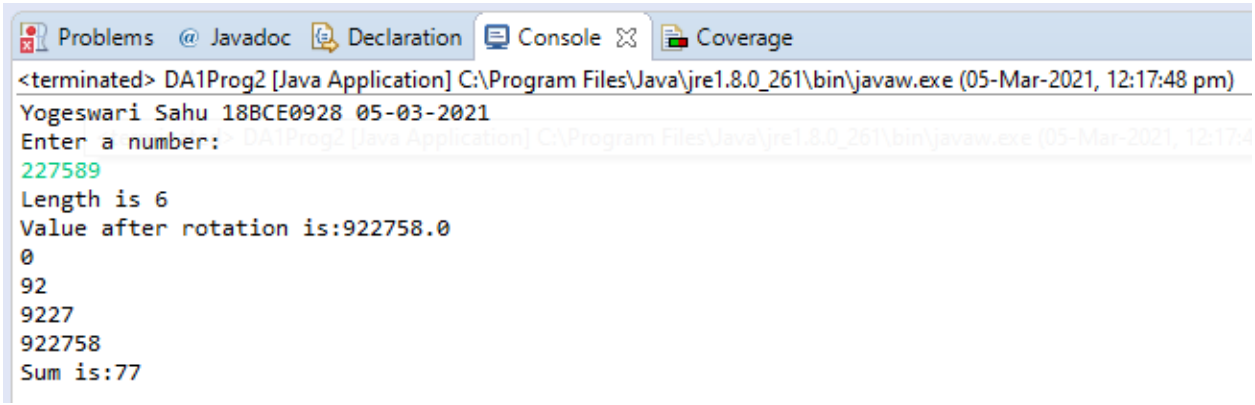
- Conditional statements
- Loops (While)
- Single dimensional arrays

Code:

```
package JavaDa1;
import java.util.*;
import java.lang.StrictMath;
//class hash is coded below that uses rotation moving the least significant
digit to the most significant bit position
class hash
{
static double rotate(int n)
 {
int l=String.valueOf(n).length();
int i;
System.out.println("Length is "+l);
double k=0;
double s=0;
for(i=0;i<l;i++)
 {
 k=((int) (n/(Math.pow(10,i)))%10);
 s=s+k*(Math.pow(10,((i+l-1)%l)));
 }
 s=(int) ((s/(Math.pow(10,l))+s)%(Math.pow(10,l)));
return s;
 }
int fold(double n)
{
 int l=String.valueOf(n).length();
 int i,x=0;
 double k=n;
 double s=0;
 int a[]=new int[l/2];
 for(i=l-2;i>=0;i=i-2)
 {
 a[x]= (int) (n/(Math.pow(10,i)));
 s=s+a[x];
 System.out.println(a[x]);
 x++;
 }
 s=s%100;
 return (int) s;}
}

public class DA1Prog2 {
```

```
	public static void main(String[] args) {
		System.out.println("Yogeswari Sahu 18BCE0928 05-03-2021");
		//creating object of hash class
		hash h=new hash();
		 System.out.println("Enter a number:");
		 Scanner t=new Scanner(System.in);
		 int n=t.nextInt();
		 //after rotating by calling rotate method
		 double s=hash.rotate(n);
		 System.out.println("Value after rotation is:"+s);
		 int s1=h.fold(s);
		 System.out.println("Sum is:"+s1);

	}

}
```

Output:



Program 3:

Write a java program for the inter college event registration using string array. The number of events conducted is 3. Name the sessions according to your conveyance. Get the Register no for students for Event 1 and store it in one array. Compare with the registrations done for Event 2 and Event 3 check for duplicate entry. No students are allowed to register for more than two events, IF so kindly throw an error message and print the same with the register number of the student.

Concepts used:

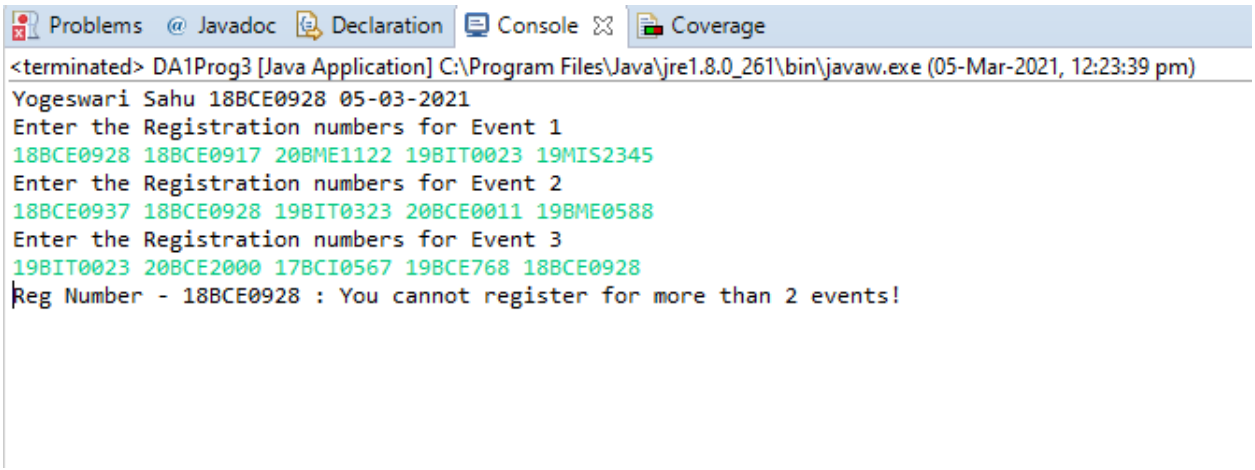
- Primitive data types
- Operators
- Conditional statements
- Loops,
- String package (Different Methods)
- Single dimensional arrays

Code:

```
package JavaDa1;
import java.util.*;
public class DA1Prog3 {

	public static void main(String[] args) {
		System.out.println("Yogeswari Sahu 18BCE0928 05-03-2021");
		Scanner s=new Scanner(System.in);
		String e1[] = new String[5];
		String e2[] = new String[5];
		String e3[] = new String[5];
		String duplicates[] = new String[5];
		int i=0,j=0,k=0,p=0;
		//taking registration numbers as input
		System.out.println("Enter the Registration numbers for Event
1");
		for(i=0;i<e1.length;i++) {
		e1[i]=s.next();
		}
		System.out.println("Enter the Registration numbers for Event
2");
		for(j=0;j<e2.length;j++) {
		e2[j]=s.next();
		}
		System.out.println("Enter the Registration numbers for Event
3");
		for(k=0;k<e3.length;k++) {
		e3[k]=s.next();
		}
		//printing error message if there are duplicates in more than 2
arrays
		for(i=0;i<e1.length;i++) {
			for(j=0;j<e2.length;j++) {
				for(k=0,p=0;k<e3.length && p<duplicates.length;k++) {
					if(e1[i].matches(e2[j])) {
						if(e1[i].matches(e3[k])) {
```

```
                                        duplicates[p]=e1[i];
                                        System.out.println("Reg Number - "
+duplicates[p] + " : You cannot register for more than 2 events!" );
                                        p++;
                                    }
                                }
                            }
                        }
                    }
                }

}
```

Output:



Program 4:

Write a java Program to find if scores of players in a cricket match are good or bad .Create an array to store the score of players in a cricket match. Create an integer array of length 11 and then define a method called addscore ( ) that adds the array with random numbers (Range 0-110]. Once you have done this, define some code that loops through the array, and for each element, prints to the console whether the Score is good or bad. For example if the array is {2,55,25,9, ...}, the output will be: a[0] = bad a[1] = good a[2] = good a[3] = bad

Concepts used:

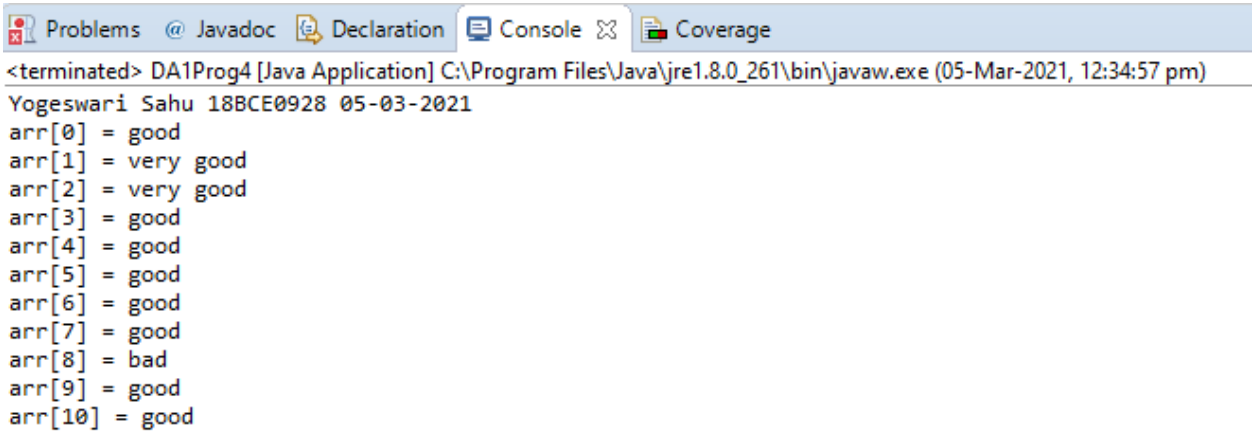
- Primitive data types
- Operators (!=,++,=,%,++,/)
- Conditional statements (Switch)
- Loops (For)
- Single dimensional arrays (Used Methods)

Code:

```
package JavaDa1;
import java.lang.*;
import java.util.*;
public class DA1Prog4 {
	public static void addscore(int arr[]) {
		//finding length of array using predefined method
		int n = arr.length;
		int i,num=0;
		//using for loop and random method in Math class
		for(i=0;i<n;i++) {
			arr[i] = (int) (Math.random()*110);
		}
		for(i=0;i<n;i++) {
			num=arr[i];
			int count=0;
			int rem=0;
			while(num!=0) {
			rem = num % 10;
			count++;
			num=num/10;
			}
			//using switch
				switch(count) {
					case 1:
					System.out.println("arr["+ i + "] = bad");
					break;
					case 2:
					System.out.println("arr["+ i +"] = good");
					break;
					case 3:
					System.out.println("arr["+ i + "] = very
good");
					break;
					default:
					System.out.println("not a score");
				}
		}
	}
	public static void main(String[] args) {
```

```
            System.out.println("Yogeswari Sahu 18BCE0928 05-03-2021");
            //initializing an array
            int scores[] = new int[11];
            //providing the array as input to the function to perform the
operations
            addscore(scores);

      }

}
```

Output:



Program 5:

A student wants to know if his name is a palindrome , what will his name look if it is sorted alphabetically, if his name and surname are anagrams and to check whose names will come first during attendance according to their alphabetical order .Write a java Program to perform all of these using switch.

Concepts used:

- Primitive data types
- Operators (=,%,/,ternary operators(?:),==,<,=-,--,++,=!)
- Conditional statements(if, else , else if, switch)
- Loops (for, while)
- Use of Continue and Break
- Single dimensional arrays

- String package (A few important methods to manipulate strings can be considered – toLowerCase(), charAt(),toCharArray(),length(),toUpperCase(),)

Code:

```
package JavaDa1;
import java.util.Scanner;
import java.util.*;

import java.io.*;

public class DA1Prog5 {


	public static void main(String[] args) {

		System.out.println("Yogeswari Sahu 18BCE0928 05-03-2021");
		Scanner sc= new Scanner(System.in);

		System.out.println("Enter a number from 1-5 ");
		System.out.println("1 - To check if your name is a palindrome");
		System.out.println("2- To see your name in ascending order
(letters arranged alphabetically)");
		System.out.println("3- To check if name and surname are
anagrams");
		System.out.println("4- To sort names in ascending order
(alphabetically)");
		System.out.println("5- To sort names in descending order
(alphabetically)");
		int x=sc.nextInt();

		switch(x) {

		//To check if your name is a palindrome
		case 1:

		{

			System.out.println("Enter the string (your name)");
			String s=sc.next();

			s=s.toUpperCase();

			int i=0;

			 int j=s.length()-1;

			 int ans=0;

			 while(i<j){

			 if(s.charAt(i++)==s.charAt(j--))continue;
```

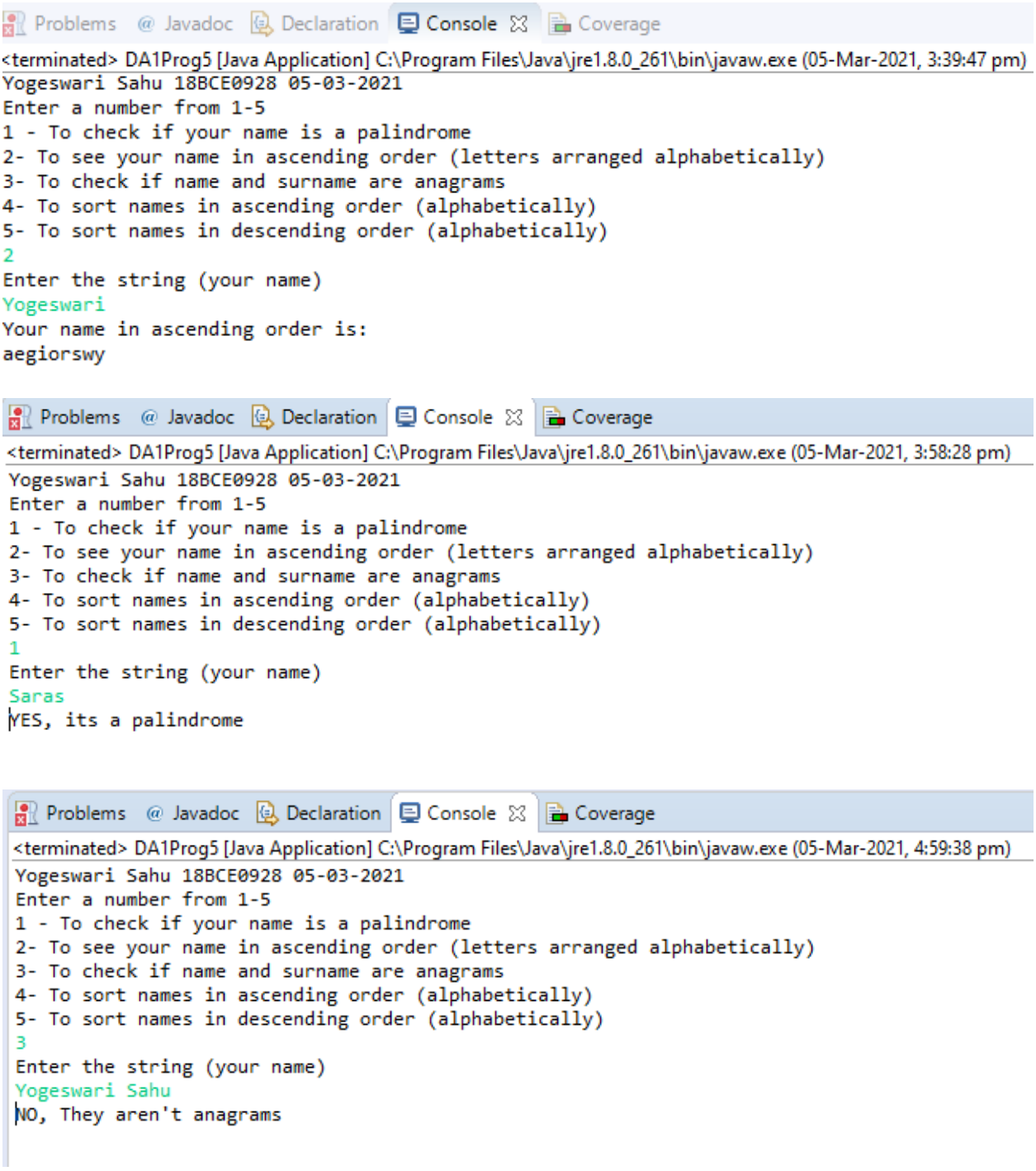
```
                    else {
                    ans=-1;
                    break;
                    }
                    }
                    System.out.println((ans==-1)?"NO, Not a palindrome":"YES,
its a palindrome");
                    sc.close();
                    break;
              }
              //To see your name in ascending order (letters arranged
alphabetically)
              case 2:
              {
                    System.out.println("Enter the string (your name)");
                    String s=sc.next();
                    s=s.toLowerCase();
                    char []arr=s.toCharArray();
                     Arrays.sort(arr);
                     System.out.println("Your name in ascending order is:");
                     String str=new String(arr);
//                   System.out.println(Arrays.toString(arr));
                    System.out.println(str);
                     sc.close();
                     break;
              }
              //To check if name and surname are anagrams
              case 3:
                    {
                          System.out.println("Enter the string (your name)");
                          String ana=sc.next();
                          ana=ana.toLowerCase();
                          String ana2=sc.next();
```

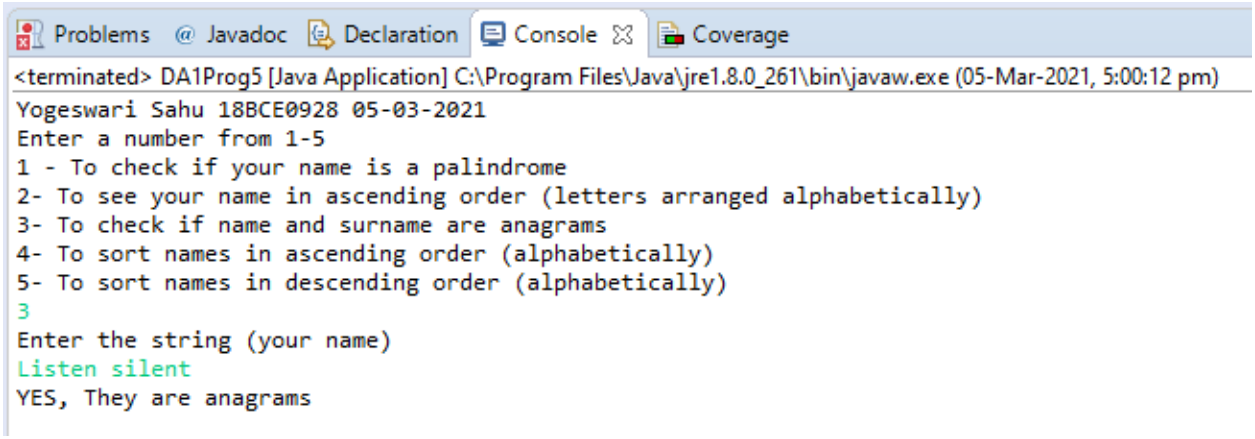
```
                    ana2=ana2.toLowerCase();
                    int []arr=new int[100];


                     for(int i=0;i<ana.length();i++){
                     if(ana.charAt(i)!=' ')
                     {
                     // System.out.println("adding at
"+((int)ana.charAt(i)-65));
                     arr[ana.charAt(i)-65]+=1;
                     }
                     }
                     for(int i=0;i<ana2.length();i++){
                           if(ana2.charAt(i)!=' ')
                           {
                           // System.out.println("adding at
"+((int)ana.charAt(i)-65));
                                 arr[ana2.charAt(i)-65]+=1;
                           }
                           }
                     // if any place its not multiple of two then its not
anagram
                     int ans=0;
                     for(int i=0;i<arr.length;i++){
                     if(arr[i]%2!=0){
                     ans=-1;
                     break;
                     }else continue;
                     }
                     // System.out.println(Arrays.toString(arr));

                  System.out.println((ans==-1)?"NO, They aren't
anagrams":"YES, They are anagrams");
                  sc.close();
```

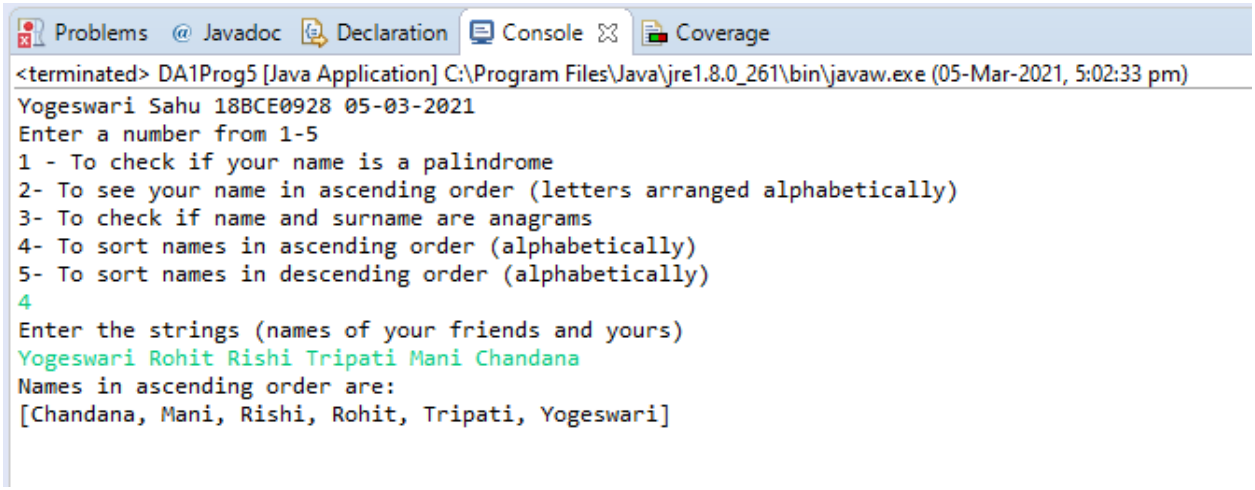
```
                break;

            }

            //To sort names in ascending order (alphabetically)
            case 4:{

                System.out.println("Enter the strings (names of your
friends and yours)");
                ArrayList<String> arr=new ArrayList<>();

                while(sc.hasNext()){

                arr.add(sc.next());

                }

                Collections.sort(arr);

                System.out.println("Names in ascending order are:");
                System.out.println(arr);

                sc.close();

                break;

            }

            //To sort names in descending order (alphabetically)
            case 5:{

                System.out.println("Enter the strings (names of your
friends and yours)");
                ArrayList<String> arr=new ArrayList<>();

                while(sc.hasNext()){

                arr.add(sc.next());

                }

                Collections.sort(arr,Collections.reverseOrder());

                System.out.println("Names in descending order are:");
                System.out.println(arr);

                sc.close();

                break;

            }

            default:

                System.out.println("Wrong number entered ");
            }
```

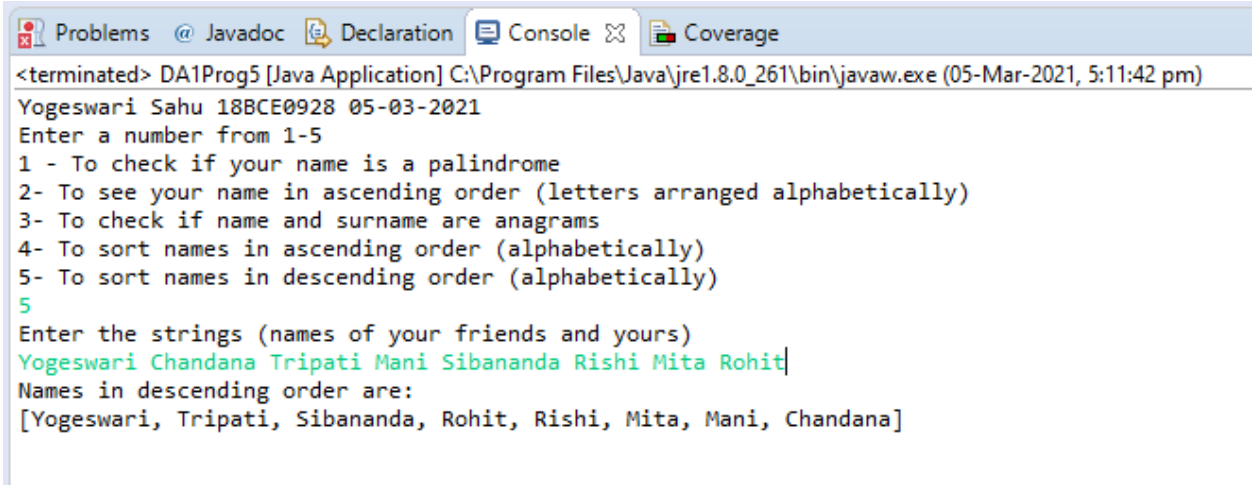
```
        }


}
```

Output:


Problems Javadoc Declaration Console Coverage
<terminated> DA1Prog5 [Java Application] C:\Program Files\Java\jre1.8.0_261\bin\javaw.exe (05-Mar-2021, 3:39:47 pm)
Yogeswari Sahu 18BCE0928 05-03-2021
Enter a number from 1-5
1 - To check if your name is a palindrome
2- To see your name in ascending order (letters arranged alphabetically)
3- To check if name and surname are anagrams
4- To sort names in ascending order (alphabetically)
5- To sort names in descending order (alphabetically)
2
Enter the string (your name)
Yogeswari
Your name in ascending order is:
aegiorswy
Problems Javadoc Declaration Console Coverage
<terminated> DA1Prog5 [Java Application] C:\Program Files\Java\jre1.8.0_261\bin\javaw.exe (05-Mar-2021, 3:58:28 pm)
Yogeswari Sahu 18BCE0928 05-03-2021
Enter a number from 1-5
1 - To check if your name is a palindrome
2- To see your name in ascending order (letters arranged alphabetically)
3- To check if name and surname are anagrams
4- To sort names in ascending order (alphabetically)
5- To sort names in descending order (alphabetically)
1
Enter the string (your name)
Saras
YES, its a palindrome
Problems Javadoc Declaration Console Coverage
<terminated> DA1Prog5 [Java Application] C:\Program Files\Java\jre1.8.0_261\bin\javaw.exe (05-Mar-2021, 4:59:38 pm)
Yogeswari Sahu 18BCE0928 05-03-2021
Enter a number from 1-5
1 - To check if your name is a palindrome
2- To see your name in ascending order (letters arranged alphabetically)
3- To check if name and surname are anagrams
4- To sort names in ascending order (alphabetically)
5- To sort names in descending order (alphabetically)
3
Enter the string (your name)
Yogeswari Sahu
NO, They aren't anagrams


Problems
Javadoc
Declaration
Console
Coverage
<terminated> DA1Prog5 [Java Application] C:\Program Files\Java\jre1.8.0_261\bin\javaw.exe (05-Mar-2021, 5:00:12 pm)
Yogeswari Sahu 18BCE0928 05-03-2021
Enter a number from 1-5
1 - To check if your name is a palindrome
2- To see your name in ascending order (letters arranged alphabetically)
3- To check if name and surname are anagrams
4- To sort names in ascending order (alphabetically)
5- To sort names in descending order (alphabetically)
3
Enter the string (your name)
Listen silent
YES, They are anagrams


Problems
Javadoc
Declaration
Console
Coverage
<terminated> DA1Prog5 [Java Application] C:\Program Files\Java\jre1.8.0_261\bin\javaw.exe (05-Mar-2021, 5:02:33 pm)
Yogeswari Sahu 18BCE0928 05-03-2021
Enter a number from 1-5
1 - To check if your name is a palindrome
2- To see your name in ascending order (letters arranged alphabetically)
3- To check if name and surname are anagrams
4- To sort names in ascending order (alphabetically)
5- To sort names in descending order (alphabetically)
4
Enter the strings (names of your friends and yours)
Yogeswari Rohit Rishi Tripati Mani Chandana
Names in ascending order are:
[Chandana, Mani, Rishi, Rohit, Tripati, Yogeswari]


Problems
Javadoc
Declaration
Console
Coverage
<terminated> DA1Prog5 [Java Application] C:\Program Files\Java\jre1.8.0_261\bin\javaw.exe (05-Mar-2021, 5:11:42 pm)
Yogeswari Sahu 18BCE0928 05-03-2021
Enter a number from 1-5
1 - To check if your name is a palindrome
2- To see your name in ascending order (letters arranged alphabetically)
3- To check if name and surname are anagrams
4- To sort names in ascending order (alphabetically)
5- To sort names in descending order (alphabetically)
5
Enter the strings (names of your friends and yours)
Yogeswari Chandana Tripati Mani Sibananda Rishi Mita Rohit
Names in descending order are:
[Yogeswari, Tripati, Sibananda, Rohit, Rishi, Mita, Mani, Chandana]