



EAST WEST UNIVERSITY

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LAB-03

SUBMITTED TO

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P1)

```
import java.util.Scanner;

public class P1 {

    public static void main(String[] args) {

        Scanner in= new Scanner(System.in);

        System.out.println("Enter the size of the array: ");

        int i,j,a=0;

        int n=in.nextInt();

        int[]x=new int[n];

        System.out.println("Enter the value one by one:");

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

        {

            x[i]=in.nextInt();

        }

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

        {

            for(j=1; j<n-i;j++)

            {

                if(x[j-1]>x[j])

                {

                    a=x[j-1];

                    x[j-1]=x[j];

                    x[j]=a;

                }

            }

        }

        System.out.print("After bubble sort: ");

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

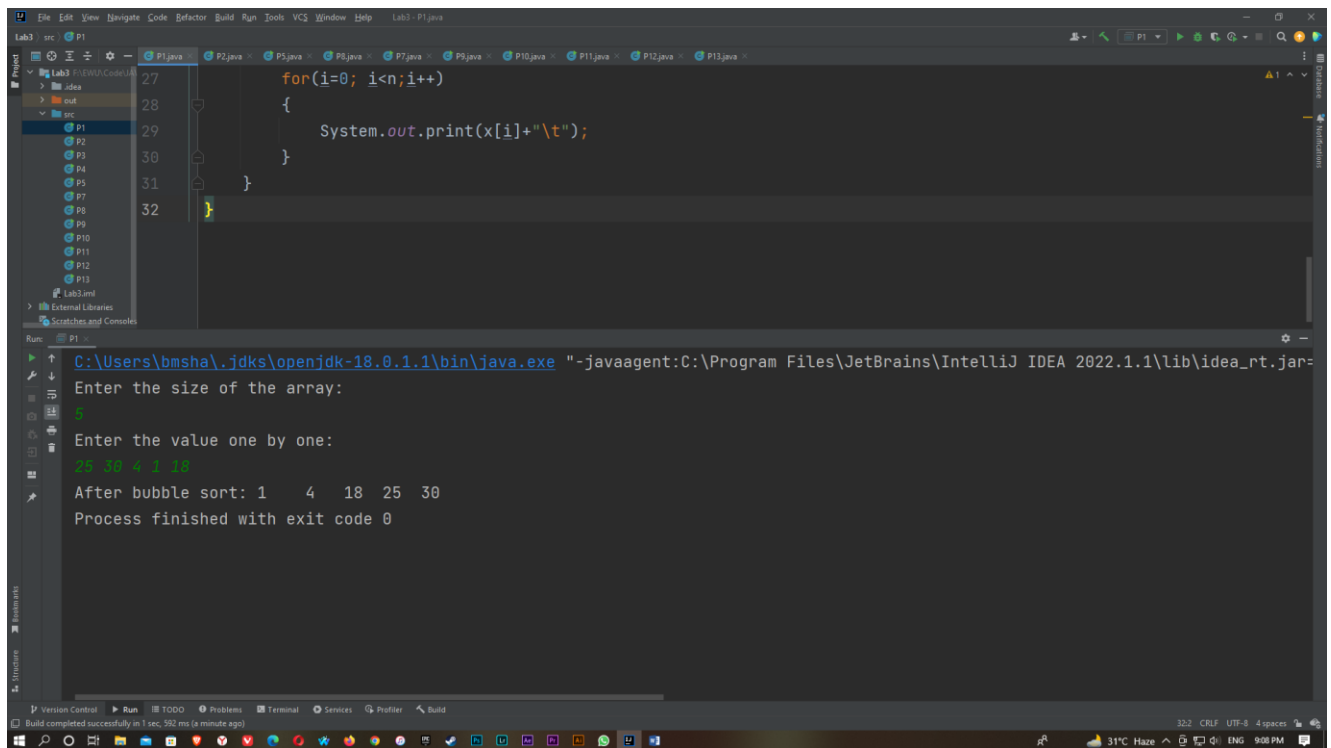
        {

            System.out.print(x[i]+"\\t");

        }

    }

}
```



P2)

import java.util.Scanner;

public class P2 {

public static void main(String[] args) {

Scanner in= new Scanner(System.in);

System.out.println("Enter the size of the array:");

int n,a=0,i,j;

n=in.nextInt();

int [] x= new int[n];

System.out.println("Enter the value one by one: ");

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

{

x[i]=in.nextInt();

}

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

{

for(j=1; j<n-1; j++)

{

if(x[j-1]>x[j])

```

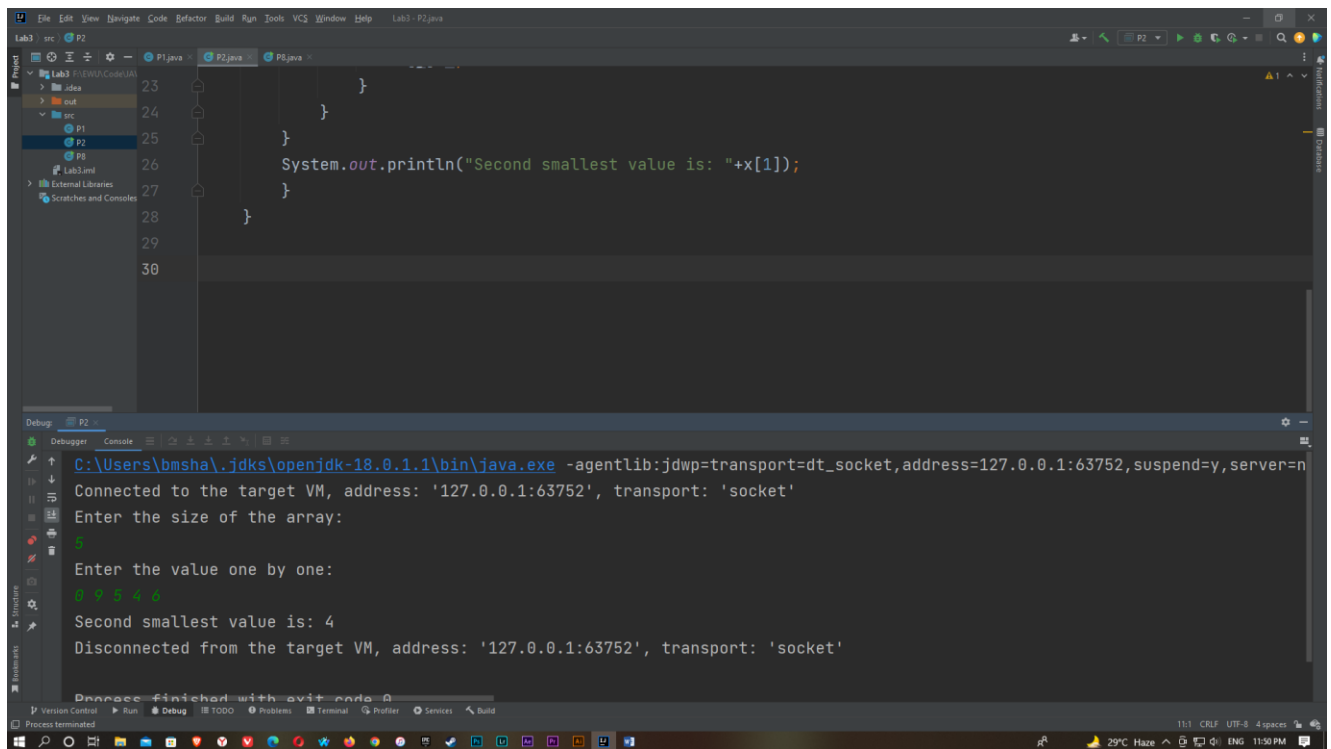
    {
        a=x[j-1];
        x[j-1]=x[j];
        x[j]=a;
    }
}
}

System.out.println("Second smallest value is: ");

for(i=0; i<n; i++)
{
    if(x[i]<x[i+1])
    {
        System.out.println(x[i+1]);

        break;
    }
}
}
}
}

```



P3)

```
import java.util.Scanner;

public class P3 {

    public static void main(String[] args) {

        Scanner in= new Scanner (System.in);

        System.out.println("Enter the matrix size: ");

        int i,j ,k;

        int n= in.nextInt();

        int m= in.nextInt();

        int [] [] x= new int[n][m];

        int [] [] y= new int[n][m];

        int [] [] z= new int[n][m];


        System.out.println("Enter the elements of 1st matrix:");

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

        {

            System.out.println("Enter Row "+ (i+1) + " :");

            for(j=0; j<m; j++)

            {

                x[i][j]=in.nextInt();

            }

        }


        System.out.println("Enter the elements of 2nd matrix:");

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

        {

            System.out.println("Enter Row "+ (i+1) + " :");

            for(j=0; j<m;j++)

            {

                y[i][j]=in.nextInt();

            }

        }


        System.out.println("1st Matrix: ");
```

```
for(i=0; i<n; i++)
{
    for(j=0; j<m; j++)
    {
        System.out.print(x[i][j]+" ");
    }
    System.out.println(" ");
}
```

```
System.out.println("2nd Matrix: ");
```

```
for(i=0; i<n; i++)
{
    for(j=0; j<m; j++)
    {
        System.out.print(y[i][j]+" ");
    }
    System.out.println(" ");
}
```

```
for (i = 0; i < n; i++)
{
    for (j = 0; j < m; j++)
    {
        for (k = 0; k < n; k++)
        {
            z[i][j]+=x[i][k] * y[k][j] ;
        }
    }
}
```

```
System.out.println("The multiplication of two matrix is : ");
```

```
for(i=0; i<n; i++)
```

```

    {
        for(j=0; j<m; j++)
        {
            System.out.print(z[i][j]+" ");
        }
        System.out.println(" ");
    }
}
}

```

```

x[i][j]=in.nextInt();
}

System.out.println("Enter the elements of 2nd matrix:");
for(i=0; i<n; i++)
{

```

Run: P3

```

C:\Users\bmsha\.jdk\openjdk-18.0.1\bin\java.exe "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA 2022.1.1\lib\idea_rt.jar=52393:C:\Program Files\JetBrains\IntelliJ IDEA 2022.1.1\bin" -Dfile.encoding=UTF-8
Enter the matrix size:
2 2
Enter the elements of 1st matrix:
Enter Row 1 :
1 2
Enter Row 2 :
3 4
Enter the elements of 2nd matrix:
Enter Row 1 :
5 6
Enter Row 2 :
7 8
1st Matrix:
1 2
3 4
2nd Matrix:
5 6
7 8
The multiplication of two matrix is :
19 22
43 50

Process finished with exit code 0

```

P4)

```

import java.util.Scanner;

public class P4 {

    public static void main(String[] args) {

        Scanner in= new Scanner (System.in);

        int n,i,j,sum=0;

        System.out.println("Input the size of the square matrix :");

        n=in.nextInt();

        int [][]x =new int[n][n];
    }
}

```

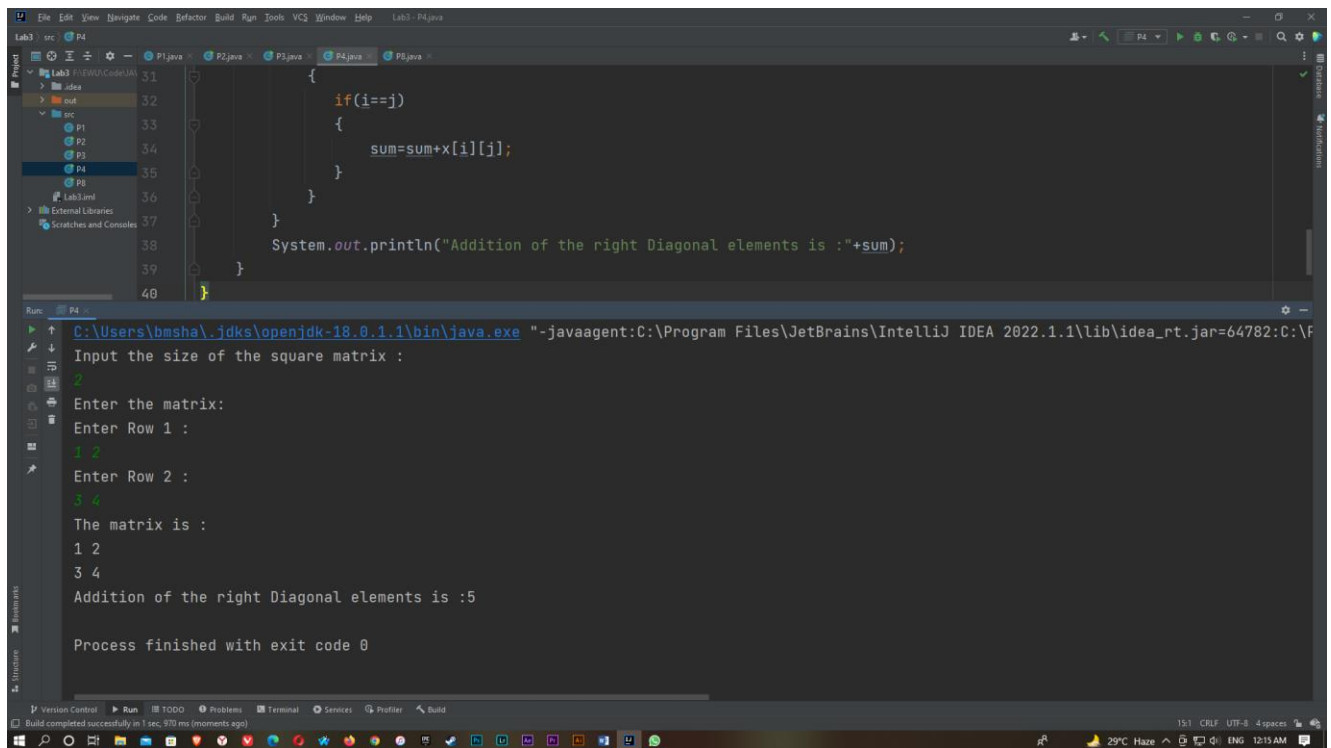
```

System.out.println("Enter the matrix:");
for(i=0; i<n;i++)
{
    System.out.println("Enter Row "+ (i+1) + " :");
    for(j=0; j<n;j++)
    {
        x[i][j]=in.nextInt();
    }
}
System.out.println("The matrix is :");
for(i=0; i<n;i++)
{
    for(j=0; j<n;j++)
    {
        System.out.print(x[i][j]+ " ");
    }
    System.out.println(" ");
}

for(i=0; i<n;i++)
{
    for(j=0; j<n;j++)
    {
        if(i==j)
        {
            sum=sum+x[i][j];
        }
    }
}

System.out.println("Addition of the right Diagonal elements is :"+sum);
}
}

```

P5)

```
import java.util.Scanner;

public class P5 {

    public static void main(String[] args) {

        Scanner in = new Scanner(System.in);

        int i,j,a,b,c,d=0;

        int[][]x = new int[3][3];

        System.out.println("Enter the 3x3 matrix: ");

        for (i = 0; i < 3; i++)

        {

            System.out.println("Enter Row " + (i + 1) + " :");

            for (j = 0; j < 3; j++)

            {

                x[i][j] = in.nextInt();

            }

        }

        System.out.println("The matrix is :");
```

```

    for (i = 0; i < 3; i++)
    {
        for (j = 0; j < 3; j++)
        {
            System.out.print(x[i][j] + " ");
        }
        System.out.println(" ");
    }

    a=(x[0][0] * (x[1][1]* x[2][2]-x[1][2]* x[2][1]));
    b=(x[0][1] * (x[1][0]* x[2][2]-x[1][2]* x[2][1]));
    c=(x[0][2] * (x[1][0]* x[2][1]-x[1][1]* x[2][0]));
    d=a-b+c;

    System.out.println("The Determinant of the matrix is: "+d);
}
}

```

The screenshot shows the IntelliJ IDEA IDE with a Java file named P5.java. The code defines a 3x3 matrix and calculates its determinant using the formula: $a = x_{00}(x_{11}x_{22} - x_{12}x_{21})$, $b = x_{01}(x_{10}x_{22} - x_{12}x_{20})$, $c = x_{02}(x_{10}x_{21} - x_{11}x_{20})$, and $d = a - b + c$. The matrix is printed, and the determinant is displayed.

```

12      for (j = 0; j < 3; j++)
13      {
14          x[i][j] = in.nextInt();
15      }
16  }
17
18  System.out.println("The matrix is :");
19  for (i = 0; i < 3; i++)
20  {
21      for (j = 0; j < 3; j++)
22      {
23          System.out.print(x[i][j] + " ");

```

Run console output:

```

C:\Users\bmsha\.jdk\openjdk-18.0.1\bin\java.exe "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA 2022.1.1\lib\idea_rt.jar=49190:C:\P
Enter the 3x3 matrix:
Enter Row 1 :
1 0 -1
Enter Row 2 :
0 0 1
Enter Row 3 :
-1 -1 0
The matrix is :
1 0 -1
0 0 1
-1 -1 0
The Determinant of the matrix is: 1

```

P6)

```

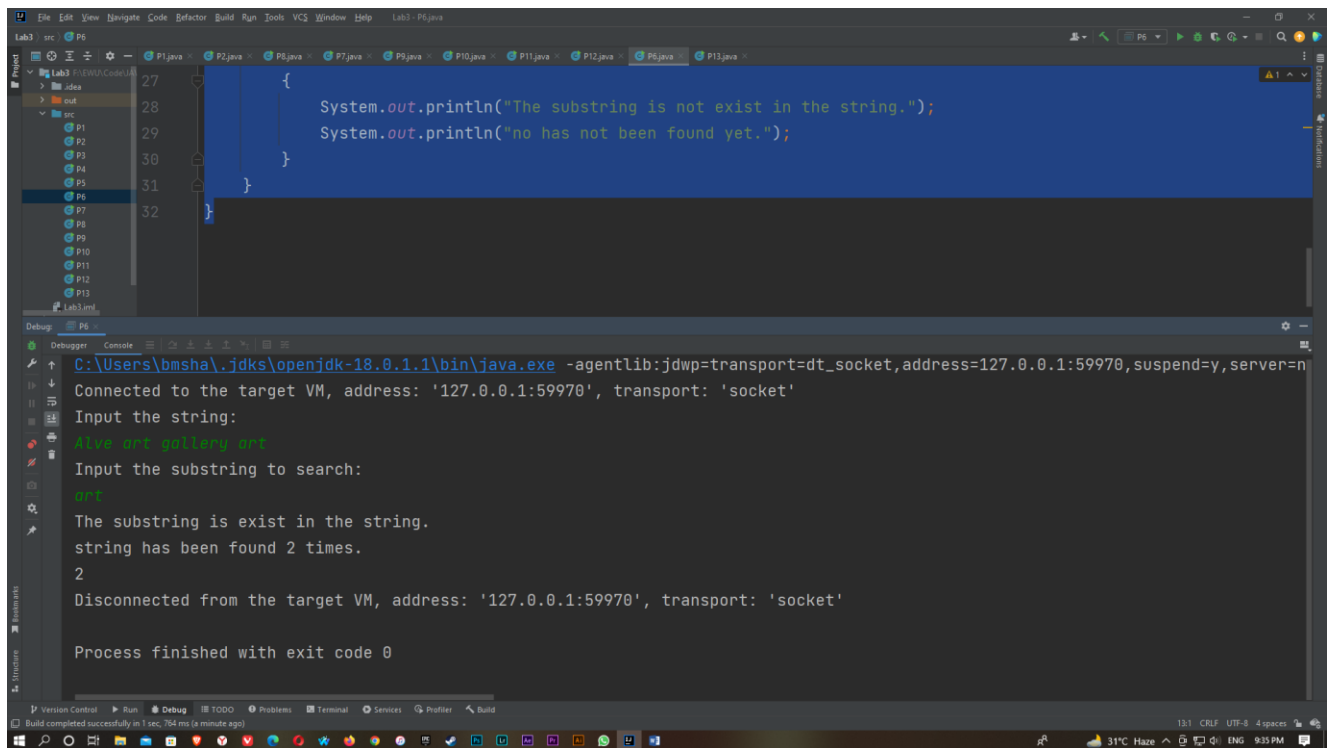
import java.util.Scanner;

public class P6 {

    public static void main(String[] args)

```

```
{  
    Scanner in = new Scanner(System.in);  
    int x=0,i;  
    String a,b;  
    String c[];  
    System.out.println("Input the string: ");  
    a = in.nextLine();  
    System.out.println("Input the substring to search: ");  
    b = in.nextLine();  
    c = a.split("\\s+");  
    for(i=0;i<c.length;i++)  
    {  
        if(c[i].equals(b))  
        {  
            x++;  
        }  
    }  
    if(x>0)  
    {  
        System.out.println("The substring is exist in the string.");  
        System.out.println("string has been found "+x+" times.");  
    }  
    else  
    {  
        System.out.println("The substring is not exist in the string.");  
        System.out.println("no has not been found yet.");  
    }  
}
```



P7)

import java.util.Scanner;

public class P7 {

public static void main(String[] args)

{

Scanner input = new Scanner(System.in);

String a,x,y,c[];

System.out.println("Input the string: ");

a = input.nextLine();

c = a.split("\\s+");

x=c[0];

y = c[0];

int large = c[0].length();

int small=c[0].length();

for(int i=1;i<c.length;i++)

{

if(large<c[i].length())

{

```

        large=c[i].length();

        x=c[i];
    }

    if(small>c[i].length())
    {
        small=c[i].length();

        y=c[i];
    }
}

System.out.println("The largest word is '"+x+"'");
System.out.println("and the smallest word is '"+y+"'");
System.out.println("in the string : '"+a+"'");
}
}

```

The screenshot shows the IntelliJ IDEA IDE with a Java file named P7.java. The code in the editor is as follows:

```

10  x=c[0];
11  y = c[0];
12  int large = c[0].length();
13  int small=c[0].length();
14
15  for(int i=1;i<c.length;i++)
16  {
17      if(large<c[i].length())
18      {
19          large=c[i].length();

```

The Run window at the bottom shows the execution of the program. The command used is:

```

C:\Users\bmsha\.jdk\openjdk-18.0.1.1\bin\java.exe "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA 2022.1.1\lib\idea_rt.jar=

```

The input string is:

```

It is a string with smallest and largest word.

```

The output of the program is:

```

The largest word is 'smallest'
and the smallest word is 'a'
in the string : 'It is a string with smallest and largest word.'

```

The process finished with exit code 0.

P8)

```

import java.util.Scanner;

public class P8 {

    public static void main(String[] args) {

        char a = '\u221A';
    }
}

```

```

char b= '\u2126';
char c= '\u00B1';
char d= '\u2260';
System.out.println("square root (" +a+"");
System.out.println("Ohm (" +b+"");
System.out.println("Plus-Minus (" +c+"");
System.out.println("not equal (" +d+"");
}
}

```

P9)

```

import java.util.Scanner;

public class P9 {

    public static void main(String[] args) {

        Scanner in = new Scanner(System.in);

        int x,i;

        float y=1,z=0;

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

        x=in.nextInt();

        for(i=1;i<=x;i++)

        {

            y=y*i;

            z=z+(y/(float)i);

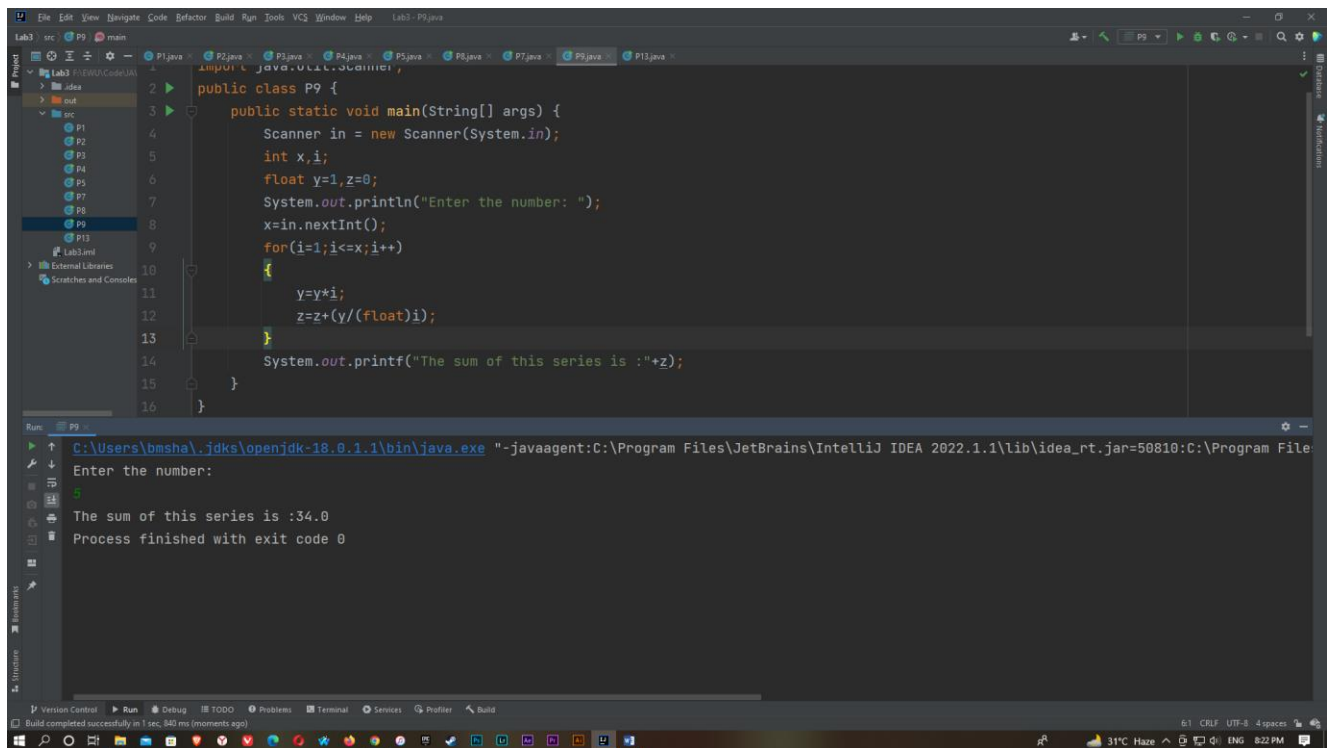
        }

        System.out.printf("The sum of this series is :"+z);

    }

}

```



P10)

```
import java.util.Scanner;
```

```
public class P10 {
```

```
    public static boolean Armstrong(int a)
```

```
    {
```

```
        int x,sum=0,num=a;
```

```
        while(num!=0)
```

```
        {
```

```
            x=num%10;
```

```
            sum=sum+(x*x*x);
```

```
            num=num/10;
```

```
        }
```

```
        return (a == sum);
```

```
    }
```

```
    public static boolean Perfect(int a)
```

```
    {
```

```
        int i, sum=0, num=a;
```

```
        for(i=1; i<num; i++)
```

```

    {
        if(num%i == 0)
        {
            sum += i;
        }
    }

    return (a == sum);
}

public static void main(String[] args) {
    Scanner in = new Scanner(System.in);

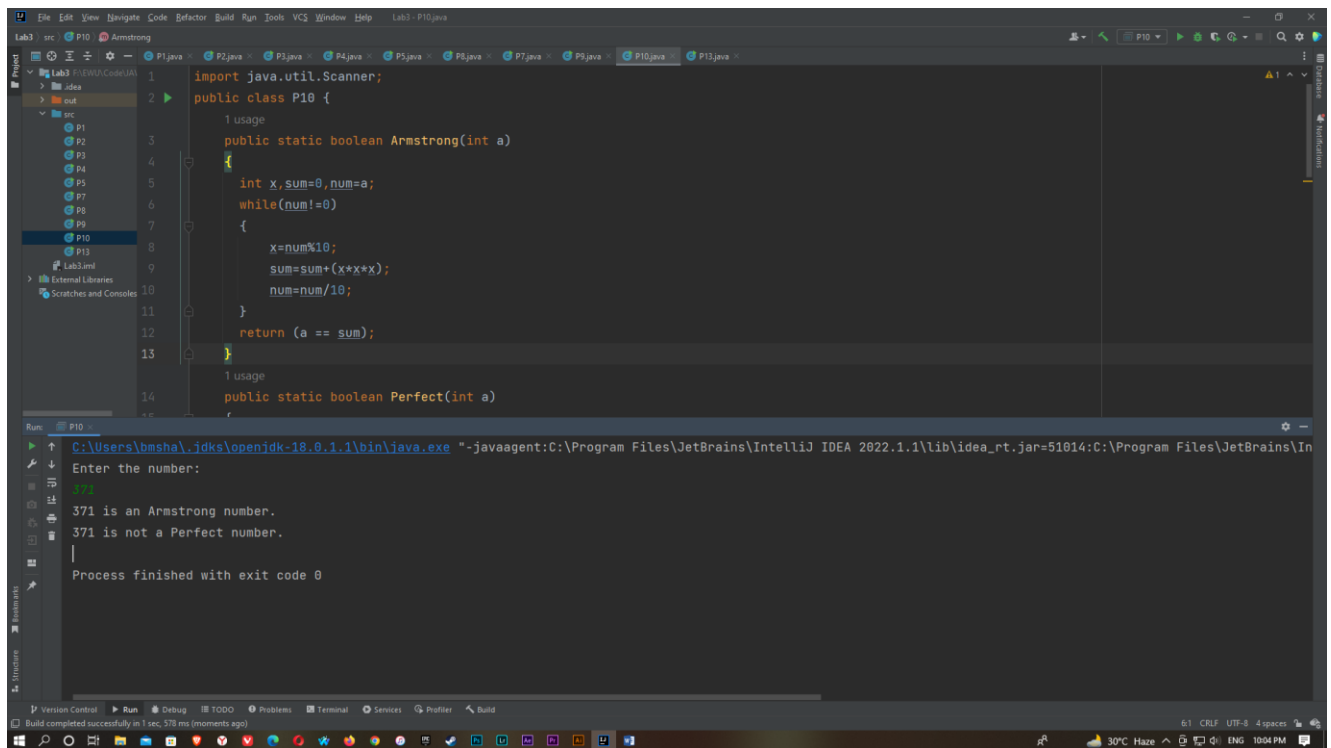
    int x;

    System.out.println("Enter the number: ");
    x = in.nextInt();

    if (Armstrong(x))
    {
        System.out.println(x + " is an Armstrong number.");
    }
    else
    {
        System.out.println(x + " is not an Armstrong number.");
    }

    if (Perfect(x))
    {
        System.out.println(x + " is an Perfect number.");
    }
    else
    {
        System.out.println(x + " is not a Perfect number.");
    }
}
}

```

P11)

```

import java.util.Scanner;

public class P11 {

    public static void main(String[] args) {

        Scanner input = new Scanner(System.in);

        System.out.print("1. A password must have at least eight characters.\n"+
            "2. A password consists of only letters and digits.\n"+
            "3. A password must contain at least two digits \n"+
            "Enter the password:\n");

        String s = input.nextLine();

        if (s.length()<8)
        {
            System.out.println("Not a valid password: "+s);
        }

        if(s.length()>=8)
        {
            int a = 0, b = 0;

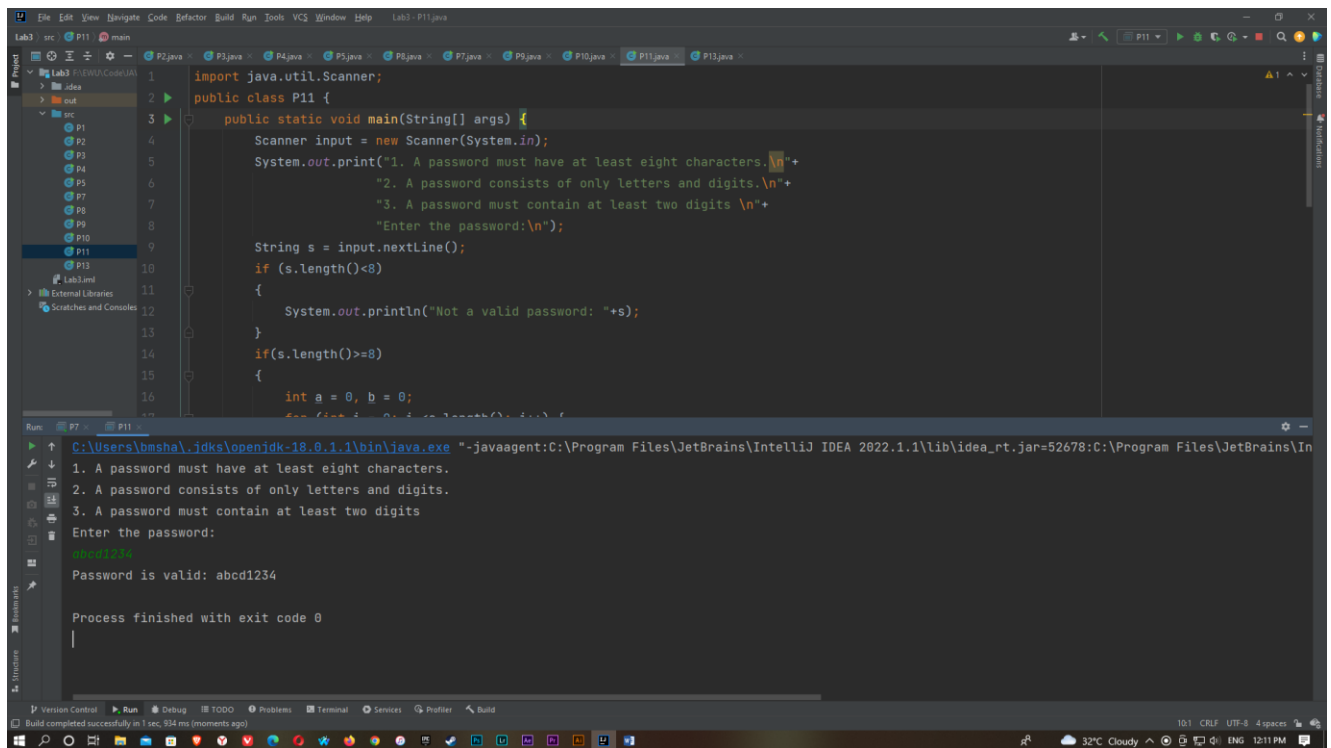
            for (int i = 0; i < s.length(); i++) {

                char ch = s.charAt(i);

```

```
    if (ch >= '0' && ch <= '9')
    {
        a++;
    }
    else if ((ch >= 'A' && ch <= 'Z') || (ch >= 'a' && ch <= 'z'))
    {
        b++;
    }
}

if (a >= 2 && b >= 2)
{
    System.out.println("Password is valid: "+s);
}
else
{
    System.out.println("Not a valid password: "+s);
}
}
}
```



P12)

```
import java.util.Scanner;
```

```
public class P12 {
```

```
    public static int prime (int n)
```

```
    {
```

```
        int i, a=0;
```

```
        for (i = 2; i <= n / 2; i++)
```

```
        {
```

```
            if (n % i == 0)
```

```
            {
```

```
                a = 1;
```

```
                break;
```

```
            }
```

```
        }
```

```
        return a;
```

```
    }
```

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

```
        Scanner in = new Scanner(System.in);
```

```

int n, i;

System.out.println("Enter the limit: ");

n = in.nextInt();

System.out.println("Two prime numbers are: ");

for (i = 2; i <= n; i++)
{
    if (prime(i) == 0 && prime(i + 2) == 0)
    {
        System.out.println("(" + i + ", " + (i + 2) + ")");
    }
}
}
}

```

The screenshot shows the IntelliJ IDEA IDE with a Java project named 'Lab3'. The code in the editor is as follows:

```

public static void main(String args[]) {
    Scanner in = new Scanner(System.in);
    int n, i;
    System.out.println("Enter the limit: ");
    n = in.nextInt();
    System.out.println("Two prime numbers are: ");
    for (i = 2; i <= n; i++)
    {
        if (prime(i) == 0 && prime(i + 2) == 0)
        {
            System.out.println("(" + i + ", " + (i + 2) + ")");
        }
    }
}

```

The Run window shows the output of the program:

```

C:\Users\bmsaha\jdk\openjdk-18.0.1\bin\java.exe "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA 2022.1.1\lib\idea_rt.jar=53490:C:\Program Files\JetBrains\In
Enter the limit:
100
Two prime numbers are:
(3,5)
(5,7)
(11,13)
(17,19)
(29,31)
(41,43)
(59,61)
(71,73)

Process finished with exit code 0

```

P13)

```

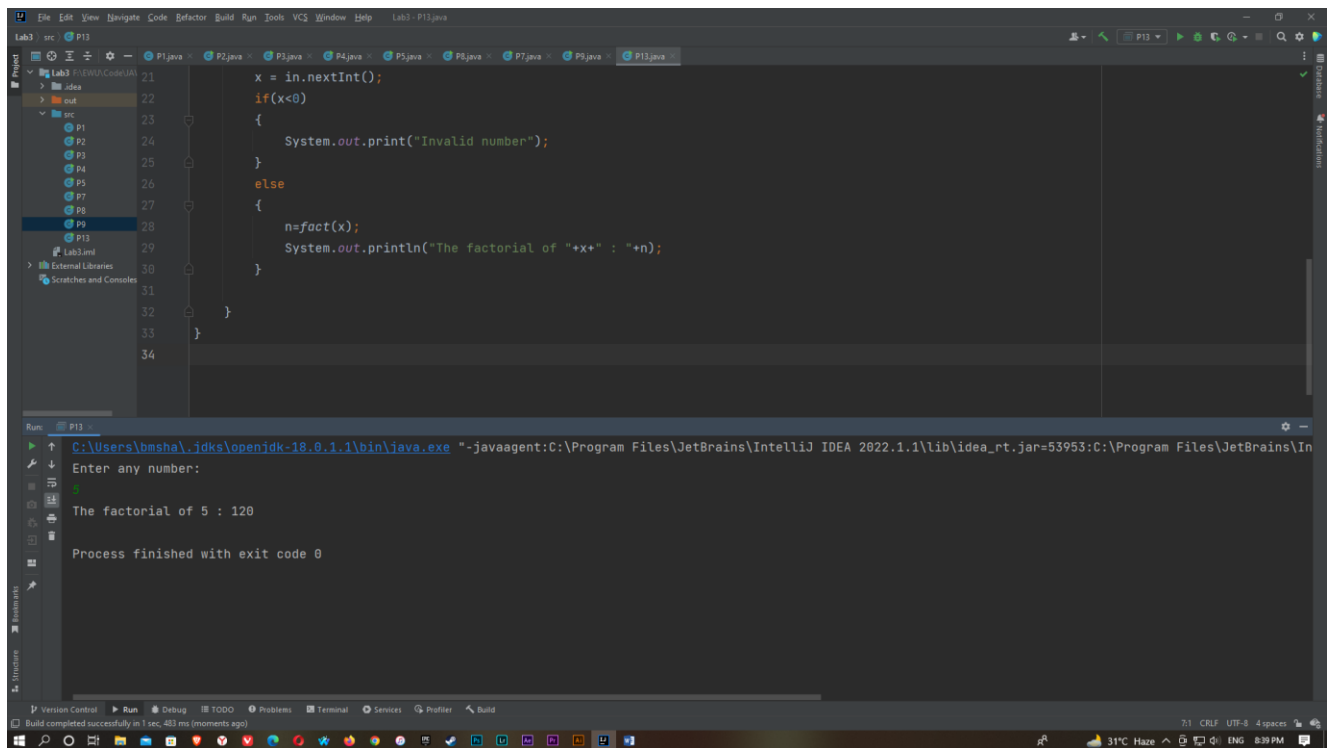
import java.util.Scanner;

public class P13
{
    public static int fact (int x)
    {

```

```
    if (x==0 || x==1)
    {
        return 1;
    }
    else
    {
        return (x* fact (x-1));
    }
}
```

```
public static void main(String[] args)
{
    Scanner in = new Scanner(System.in);
    int x, n;
    System.out.println("Enter any number:");
    x = in.nextInt();
    if(x<0)
    {
        System.out.print("Invalid number");
    }
    else
    {
        n=fact(x);
        System.out.println("The factorial of "+x+" : "+n);
    }
}
}
```



P14)

```
import java.util.Arrays;
```

```
import java.util.Scanner;
```

```
public class P14 {
```

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

```
        Scanner input= new Scanner(System.in);
```

```
        System.out.println("Enter the first word:");
```

```
        String x = input.nextLine();
```

```
        System.out.println("Enter the Second word:");
```

```
        String y = input.nextLine();
```

```
        x = x.toLowerCase();
```

```
        y = y.toLowerCase();
```

```
        System.out.println(x);
```

```
        System.out.println(y);
```

```
        if(x.length()== y.length())
```

```
        {
```

```
            char[]a= x.toCharArray();
```

```
            char[]b= y.toCharArray();
```

```

Arrays.sort(a);

Arrays.sort(b);

boolean z = Arrays.equals(a, b);

if(z)
{
    System.out.println(x+" and "+y+" are anagram.");
}
else
{
    System.out.println(x+" and "+y+" are not anagram.");
}
}
else
{
    System.out.println(x+" and "+y+" are not anagram.");
}
}
}

```

The screenshot displays the IntelliJ IDEA IDE with a Java file named Lab3.java. The code implements a method to check if two strings are anagrams by sorting their character arrays and comparing them. The IDE interface includes a project view on the left, a code editor in the center, and a terminal at the bottom.

```

18 char[] b= y.toCharArray();
19 Arrays.sort(a);
20 Arrays.sort(b);
21 boolean z = Arrays.equals(a, b);
22 if(z)
23 {
24     System.out.println(x+" and "+y+" are anagram.");
25 }
26 else
27 {
28     System.out.println(x+" and "+y+" are not anagram.");
29 }
30 }
31 }

```

The terminal output shows the program's execution:

```

C:\Users\bmsha\.jdk\openjdk-18.0.1\bin\java.exe "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA 2022.1.1\lib\idea_rt.jar-
Enter the first word:
shahrja
Enter the Second word:
hhaaris
shahrja
hhaaris
shahrja and hhaaris are anagram.

Process finished with exit code 0

```