

Assignment No:-18

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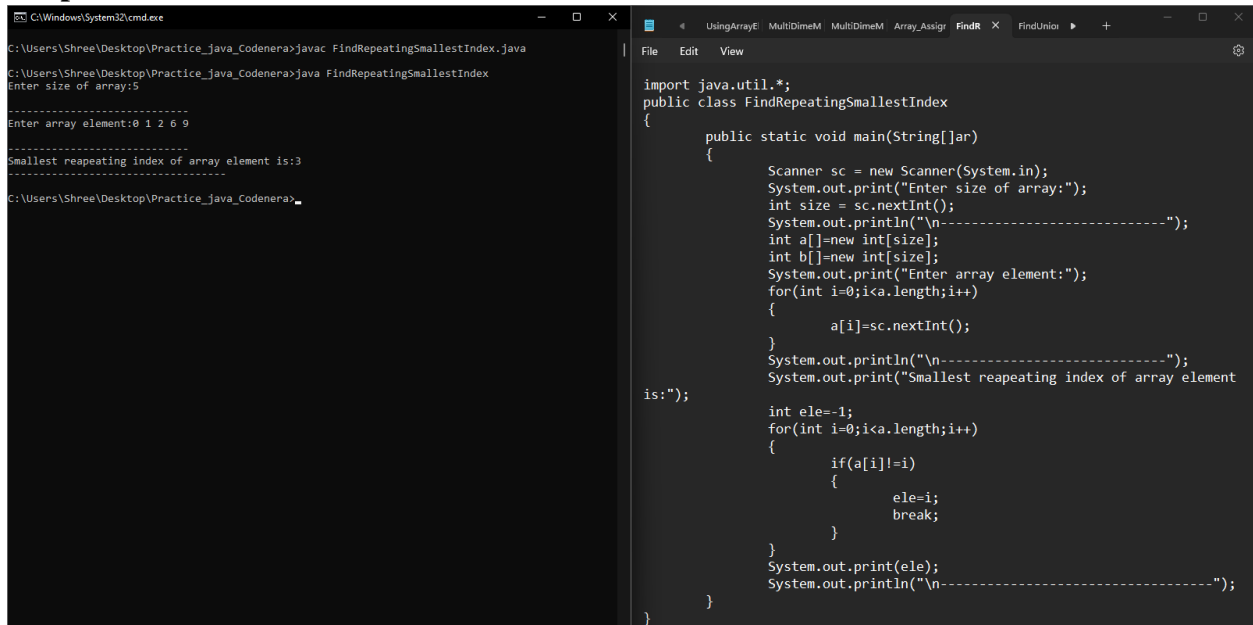
Batch: - Delta - DCA (Java) 2024 Date:-28/5/2024

12. Given a sorted array of n distinct integers where each integer is in the range from 0 to m-1 and $m > n$. Find the smallest number that is missing from the array.

Examples:

Input: {0, 1, 2, 6, 9}, n = 5, m = 10

Output: 3



```
C:\Windows\System32\cmd.exe
C:\Users\Shree\Desktop\Practice_java_Codenera>javac FindRepeatingSmallestIndex.java
C:\Users\Shree\Desktop\Practice_java_Codenera>java FindRepeatingSmallestIndex
Enter size of array:5
-----
Enter array element:0 1 2 6 9
-----
Smallest repeating index of array element is:3
-----
C:\Users\Shree\Desktop\Practice_java_Codenera>
```

```
import java.util.*;
public class FindRepeatingSmallestIndex
{
    public static void main(String[] ar)
    {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter size of array:");
        int size = sc.nextInt();
        System.out.println("\n-----");
        int a[]=new int[size];
        int b[]=new int[size];
        System.out.print("Enter array element:");
        for(int i=0;i<a.length;i++)
        {
            a[i]=sc.nextInt();
        }
        System.out.println("\n-----");
        System.out.print("Smallest reapeating index of array element
is:");
        int ele=-1;
        for(int i=0;i<a.length;i++)
        {
            if(a[i]!=i)
            {
                ele=i;
                break;
            }
        }
        System.out.print(ele);
        System.out.println("\n-----");
    }
}
```

1. Write a Java program to add two matrices of the same size.

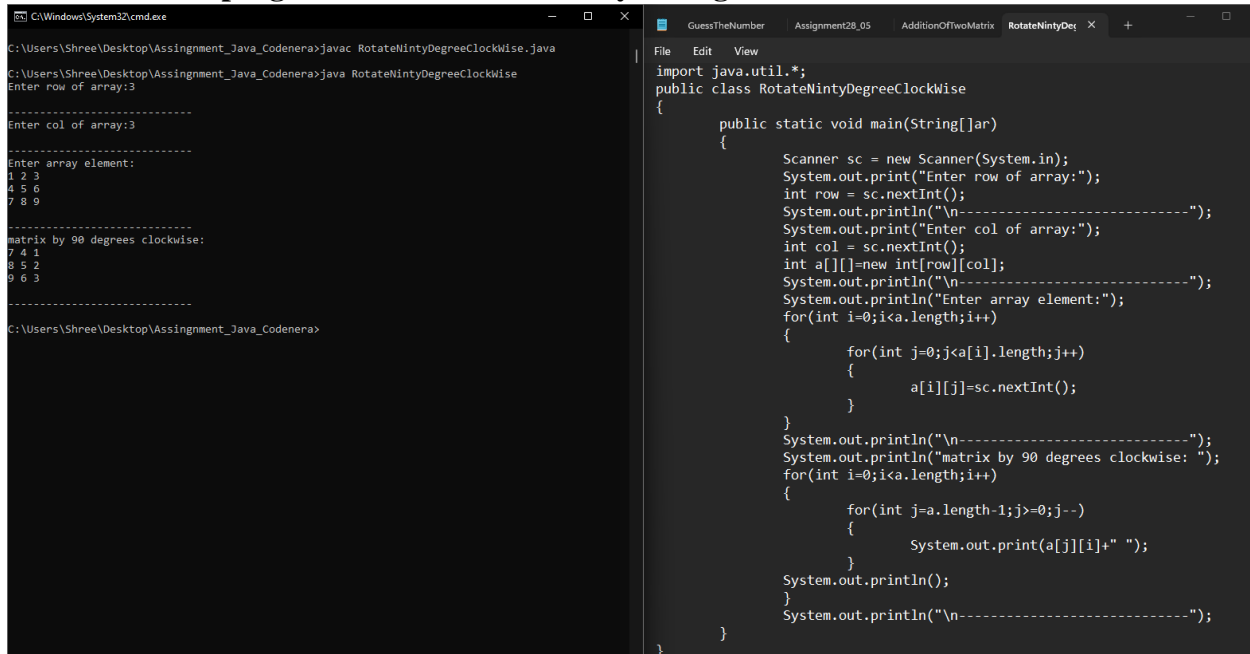
The image shows a Java IDE (IntelliJ IDEA) and a Windows Command Prompt window. The IDE window displays the source code for a Java program named `AdditionOfTwoMatrix.java`. The program uses `Scanner` to take input for the dimensions and elements of two matrices, `a` and `b`, and then prints the sum of the two matrices.

```
import java.util.*;
public class AdditionOfTwoMatrix
{
    public static void main(String[] ar)
    {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter row of array:");
        int row = sc.nextInt();
        System.out.println("\n-----");
        System.out.print("Enter col of array:");
        int col = sc.nextInt();
        int a[][]=new int[row][col];
        int b[][]=new int[row][col];
        System.out.println("\n-----");
        System.out.println("Enter 1 array element:");
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                a[i][j]=sc.nextInt();
            }
        }
        System.out.println();
        System.out.println("\n-----");
        System.out.println("Enter 2 array element:");
        for(int i=0;i<b.length;i++)
        {
            for(int j=0;j<b[i].length;j++)
            {
                b[i][j]=sc.nextInt();
            }
        }
        System.out.println();
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                a[i][j]=sc.nextInt();
            }
        }
        System.out.println();
        System.out.println("\n-----");
        System.out.println("Enter 2 array element:");
        for(int i=0;i<b.length;i++)
        {
            for(int j=0;j<b[i].length;j++)
            {
                b[i][j]=sc.nextInt();
            }
        }
        System.out.println();
        System.out.println("\n-----");
        System.out.println("Addition of two matrix:");
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                System.out.print(a[i][j]+b[i][j]+" ");
            }
        }
        System.out.println();
        System.out.println("\n-----");
    }
}
```

The Command Prompt window shows the execution of the program. It prompts the user to enter the row and column of the arrays, and then the elements of the two arrays. The output shows the addition of the two matrices.

```
C:\Users\Shree\Desktop\Assingment_Java_Codenera>javac AdditionOfTwoMatrix.java
C:\Users\Shree\Desktop\Assingment_Java_Codenera>java AdditionOfTwoMatrix
Enter row of array:3
Enter col of array:3
Enter 1 array element:
1 2 3
4 5 6
7 8 9
Enter 2 array element:
1 2 3
4 5 6
7 8 9
Addition of two matrix:
2 4 6
8 10 12
14 16 18
C:\Users\Shree\Desktop\Assingment_Java_Codenera>
```

2. Write a Java program to rotate a matrix by 90 degrees clockwise.

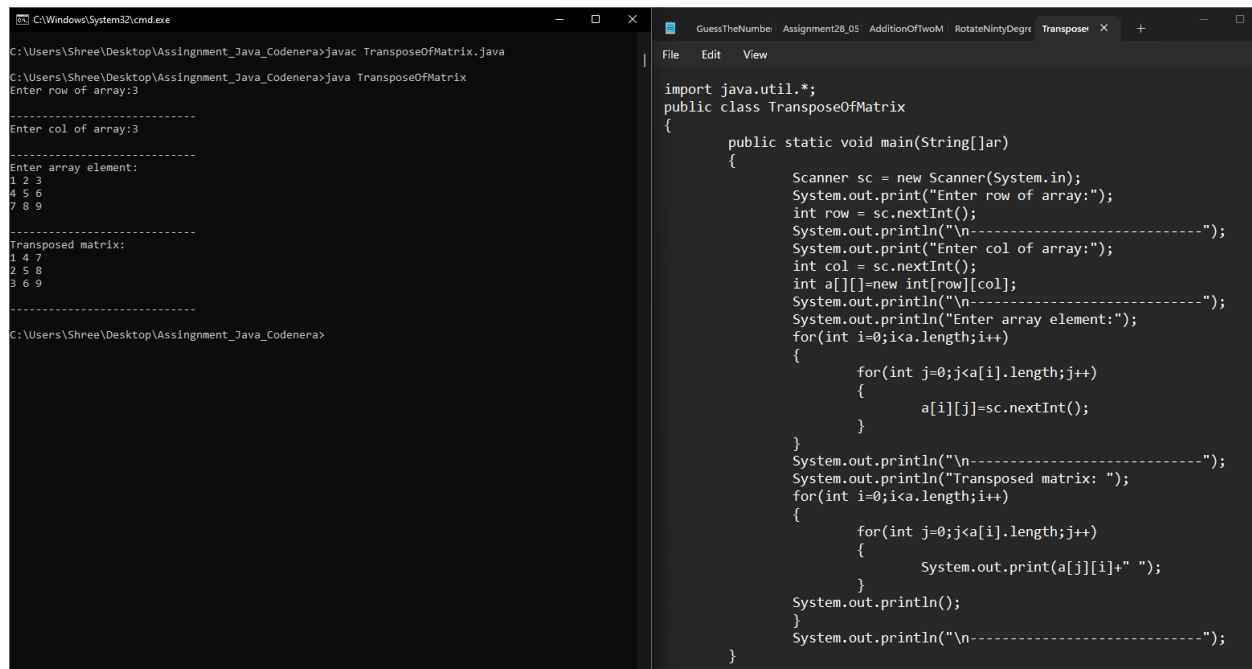


The image shows a Java IDE with two windows. The left window is a command prompt showing the compilation and execution of a Java program. The right window shows the source code of the program, which uses a Scanner to take input for the number of rows and columns, and then the elements of the matrix. It then prints the matrix rotated 90 degrees clockwise.

```
C:\Windows\System32\cmd.exe
C:\Users\Shree\Desktop\Assingment_Java_Codenera>javac RotateNintyDegreeClockwise.java
C:\Users\Shree\Desktop\Assingment_Java_Codenera>java RotateNintyDegreeClockwise
Enter row of array:3
-----
Enter col of array:3
-----
Enter array element:
1 2 3
4 5 6
7 8 9
-----
matrix by 90 degrees clockwise:
7 4 1
8 5 2
9 6 3
-----
C:\Users\Shree\Desktop\Assingment_Java_Codenera>
```

```
File Edit View
import java.util.*;
public class RotateNintyDegreeClockwise
{
    public static void main(String[]ar)
    {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter row of array:");
        int row = sc.nextInt();
        System.out.println("\n-----");
        System.out.print("Enter col of array:");
        int col = sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("\n-----");
        System.out.println("Enter array element:");
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                a[i][j]=sc.nextInt();
            }
        }
        System.out.println("\n-----");
        System.out.println("matrix by 90 degrees clockwise: ");
        for(int i=0;i<a.length;i++)
        {
            for(int j=a.length-1;j>=0;j--)
            {
                System.out.print(a[j][i]+" ");
            }
            System.out.println();
        }
        System.out.println("\n-----");
    }
}
```

3. Write a Java program to find the transpose of a matrix



```
C:\Windows\System32\cmd.exe
C:\Users\Shree\Desktop\Assignment_Java_Codenera>javac TransposeOfMatrix.java
C:\Users\Shree\Desktop\Assignment_Java_Codenera>java TransposeOfMatrix
Enter row of array:3
Enter col of array:3
Enter array element:
1 2 3
4 5 6
7 8 9
Transposed matrix:
1 4 7
2 5 8
3 6 9
C:\Users\Shree\Desktop\Assignment_Java_Codenera>
```

```
import java.util.*;
public class TransposeOfMatrix
{
    public static void main(String[] ar)
    {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter row of array:");
        int row = sc.nextInt();
        System.out.println("\n-----");
        System.out.print("Enter col of array:");
        int col = sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("\n-----");
        System.out.println("Enter array element:");
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                a[i][j]=sc.nextInt();
            }
        }
        System.out.println("\n-----");
        System.out.println("Transposed matrix: ");
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                System.out.print(a[j][i]+" ");
            }
        }
        System.out.println();
        System.out.println("\n-----");
    }
}
```

4. Write a Java program to check if a matrix is symmetric.

```
C:\Windows\System32\cmd.exe
C:\Users\Shree\Desktop\Assingment_Java_Codenera>javac SymmetricMatrix.java
C:\Users\Shree\Desktop\Assingment_Java_Codenera>java SymmetricMatrix
Enter row of array:3
-----
Enter col of array:3
-----
Enter array element:
1 2 3
2 3 4
3 4 5
-----
Symmetric matrix:
1 2 3
2 3 4
3 4 5
-----
C:\Users\Shree\Desktop\Assingment_Java_Codenera>

import java.util.*;
public class SymmetricMatrix
{
    public static void main(String[]ar)
    {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter row of array:");
        int row = sc.nextInt();
        System.out.println("\n-----");
        System.out.print("Enter col of array:");
        int col = sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("\n-----");
        System.out.println("Enter array element:");
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                a[i][j]=sc.nextInt();
            }
        }
        System.out.println("\n-----");
        int c=0;
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                if(a[i][j]!=a[j][i])
                {
                    c++;
                }
            }
        }
    }
}
```

```
C:\Windows\System32\cmd.exe
C:\Users\Shree\Desktop\Assingment_Java_Codenera>javac SymmetricMatrix.java
C:\Users\Shree\Desktop\Assingment_Java_Codenera>java SymmetricMatrix
Enter row of array:3
-----
Enter col of array:3
-----
Enter array element:
1 2 3
2 3 4
3 4 5
-----
Symmetric matrix:
1 2 3
2 3 4
3 4 5
-----
C:\Users\Shree\Desktop\Assingment_Java_Codenera>

        a[i][j]=sc.nextInt();
    }
}
System.out.println("\n-----");
int c=0;
for(int i=0;i<a.length;i++)
{
    for(int j=0;j<a[i].length;j++)
    {
        if(a[i][j]!=a[j][i])
        {
            c++;
        }
    }
}
if(c==0)
{
    System.out.println("Symmetric matrix:");
    for(int i=0;i<a.length;i++)
    {
        for(int j=0;j<a[i].length;j++)
        {
            System.out.print(a[j][i]+" ");
        }
        System.out.println();
    }
}
else
{
    System.out.print("Non Symmetric matrix");
}
System.out.println("\n-----");
}
```

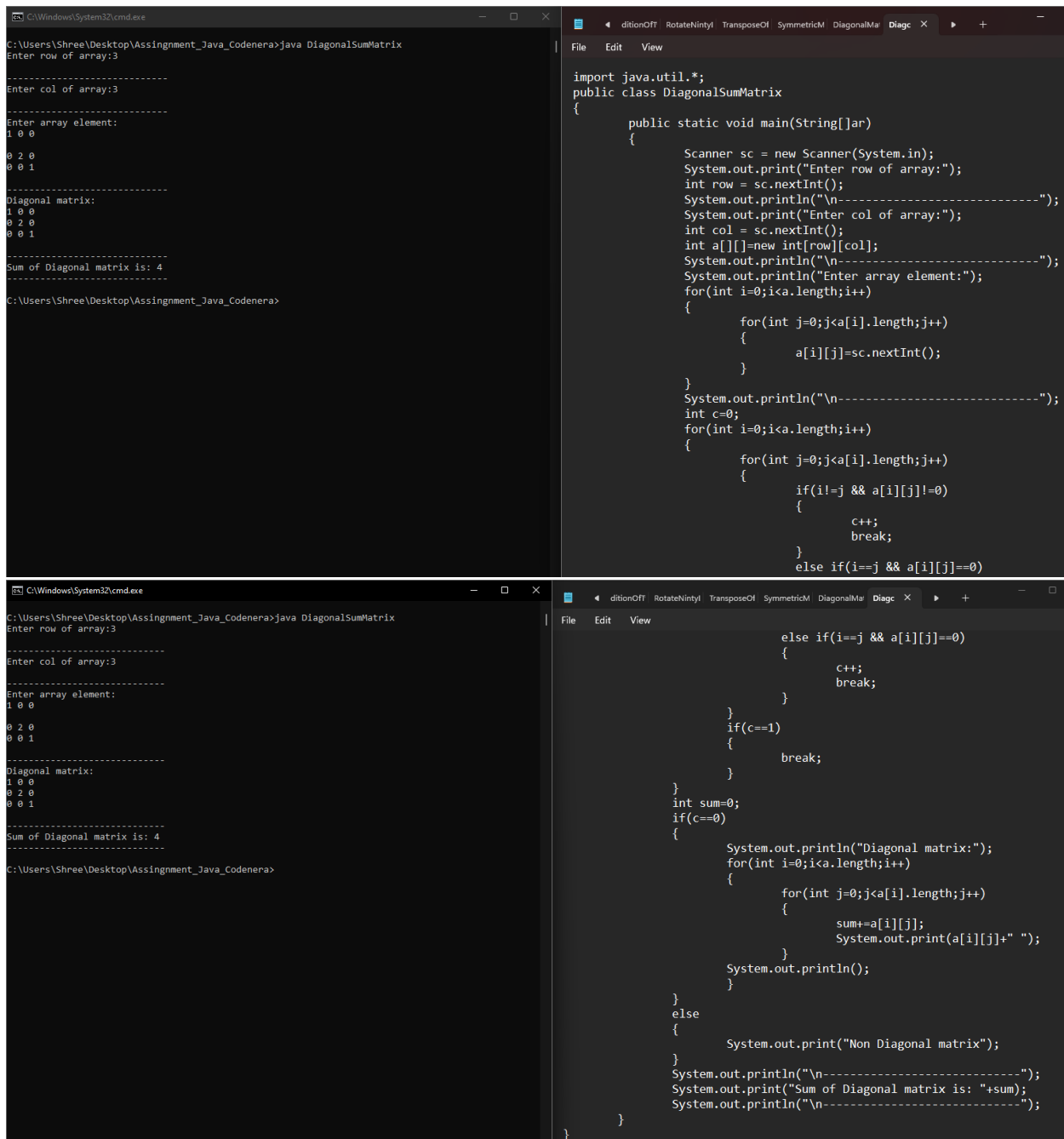
5. Write a Java program to check if a matrix is diagonal.



```
C:\Windows\System32\cmd.exe
C:\Users\Shree\Desktop\Assingment_Java_Codenera>javac DiagonalMatrix.java
C:\Users\Shree\Desktop\Assingment_Java_Codenera>java DiagonalMatrix
Enter row of array:3
-----
Enter col of array:3
-----
Enter array element:
1 0 0
0 2 0
0 0 1
-----
Diagonal matrix:
1 0 0
0 2 0
0 0 1
-----
C:\Users\Shree\Desktop\Assingment_Java_Codenera>_

import java.util.*;
public class DiagonalMatrix
{
    public static void main(String[]ar)
    {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter row of array:");
        int row = sc.nextInt();
        System.out.println("\n-----");
        System.out.print("Enter col of array:");
        int col = sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("\n-----");
        System.out.println("Enter array element:");
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                a[i][j]=sc.nextInt();
            }
        }
        System.out.println("\n-----");
        int c=0;
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                if(i!=j && a[i][j]!=0)
                {
                    c++;
                    break;
                }
                else if(i==j && a[i][j]==0)
                {
                    c++;
                    break;
                }
            }
        }
        if(c==1)
        {
            break;
        }
        if(c==0)
        {
            System.out.println("Diagonal matrix:");
            for(int i=0;i<a.length;i++)
            {
                for(int j=0;j<a[i].length;j++)
                {
                    System.out.print(a[i][j]+" ");
                }
                System.out.println();
            }
        }
        else
        {
            System.out.print("Non Diagonal matrix");
        }
        System.out.println("\n-----");
    }
}
```

6. Write a Java program to find the sum of the diagonal elements of a matrix.



```
C:\Windows\System32\cmd.exe
C:\Users\Shree\Desktop\Assingment_Java_Codenera>java DiagonalSumMatrix
Enter row of array:3
-----
Enter col of array:3
-----
Enter array element:
1 0 0
0 2 0
0 0 1
-----
Diagonal matrix:
1 0 0
0 2 0
0 0 1
-----
Sum of Diagonal matrix is: 4
-----
C:\Users\Shree\Desktop\Assingment_Java_Codenera>
```

```
import java.util.*;
public class DiagonalSumMatrix
{
    public static void main(String[] Jar)
    {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter row of array:");
        int row = sc.nextInt();
        System.out.println("\n-----");
        System.out.print("Enter col of array:");
        int col = sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("\n-----");
        System.out.print("Enter array element:");
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                a[i][j]=sc.nextInt();
            }
        }
        System.out.println("\n-----");
        int c=0;
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                if(i!=j && a[i][j]!=0)
                {
                    c++;
                    break;
                }
                else if(i==j && a[i][j]==0)
                {
                    c++;
                    break;
                }
            }
            if(c==1)
            {
                break;
            }
        }
        int sum=0;
        if(c==0)
        {
            System.out.println("Diagonal matrix:");
            for(int i=0;i<a.length;i++)
            {
                for(int j=0;j<a[i].length;j++)
                {
                    sum+=a[i][j];
                    System.out.print(a[i][j]+" ");
                }
                System.out.println();
            }
        }
        else
        {
            System.out.print("Non Diagonal matrix");
        }
        System.out.println("\n-----");
        System.out.print("Sum of Diagonal matrix is: "+sum);
        System.out.println("\n-----");
    }
}
```

7. Write a Java program to find the product of diagonal elements of a matrix.

The image displays four screenshots of a Java development environment, showing the code for a program that calculates the product of diagonal elements of a matrix.

Top Left Screenshot: A Windows Command Prompt window showing the execution of the program. The user enters the row and column dimensions (3x3) and the matrix elements (1 0 0, 0 2 0, 0 0 3). The program outputs the diagonal matrix and the product of its diagonal elements, which is 6.

Top Right Screenshot: An IDE window showing the initial code for the `DiagonalProductMatrix` class. It includes imports for `java.util.*` and a `main` method that takes an array of strings as input.

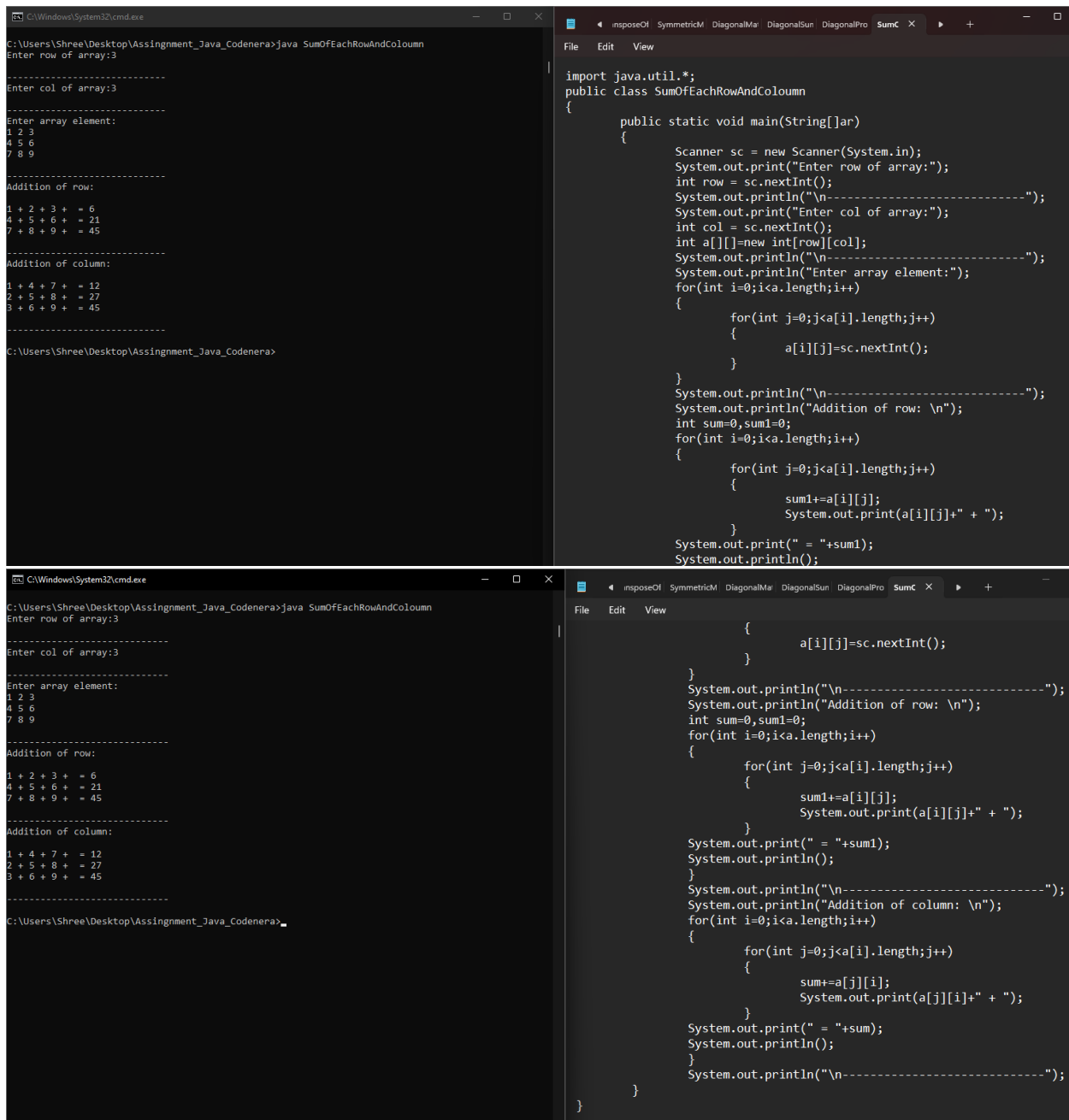
Bottom Left Screenshot: A second Windows Command Prompt window showing the same execution as the top left, confirming the output of the program.

Bottom Right Screenshot: The IDE window showing the completed code. The `main` method now includes logic to parse the input array, convert it to an integer matrix, and calculate the product of the diagonal elements. It also includes a check for non-diagonal matrices.

```
import java.util.*;

public class DiagonalProductMatrix
{
    public static void main(String[] ar)
    {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter row of array:");
        int row = sc.nextInt();
        System.out.println("\n-----");
        System.out.print("Enter col of array:");
        int col = sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("\n-----");
        System.out.println("Enter array element:");
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                a[i][j]=sc.nextInt();
            }
        }
        System.out.println("\n-----");
        int c=0;
        int product=1;
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                if(i==j)
                {
                    product*=a[i][j];
                }
                if(i!=j && a[i][j]!=0)
                {
                    break;
                }
                else if(i==j && a[i][j]==0)
                {
                    {
                        c++;
                        break;
                    }
                }
            }
            if(c==1)
            {
                break;
            }
        }
        if(c==0)
        {
            System.out.println("Diagonal matrix:");
            for(int i=0;i<a.length;i++)
            {
                for(int j=0;j<a[i].length;j++)
                {
                    System.out.print(a[i][j]+" ");
                }
                System.out.println();
            }
        }
        else
        {
            System.out.print("Non Diagonal matrix");
        }
        System.out.println("\n-----");
        System.out.print("Product of Diagonal matrix is: "+product);
        System.out.println("\n-----");
    }
}
```


8. Write a Java program to find the sum of each row and column of a matrix.



```
C:\Windows\System32\cmd.exe
C:\Users\Shree\Desktop\Assingment_Java_Codenera>java SumOfEachRowAndColoumn
Enter row of array:3
-----
Enter col of array:3
-----
Enter array element:
1 2 3
4 5 6
7 8 9
-----
Addition of row:
1 + 2 + 3 + = 6
4 + 5 + 6 + = 21
7 + 8 + 9 + = 45
-----
Addition of column:
1 + 4 + 7 + = 12
2 + 5 + 8 + = 27
3 + 6 + 9 + = 45
-----
C:\Users\Shree\Desktop\Assingment_Java_Codenera>
```

```
import java.util.*;
public class SumOfEachRowAndColoumn
{
    public static void main(String[]ar)
    {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter row of array:");
        int row = sc.nextInt();
        System.out.println("\n-----");
        System.out.print("Enter col of array:");
        int col = sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("\n-----");
        System.out.println("Enter array element:");
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                a[i][j]=sc.nextInt();
            }
        }
        System.out.println("\n-----");
        System.out.println("Addition of row: \n");
        int sum=0,sum1=0;
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                sum1+=a[i][j];
                System.out.print(a[i][j]+" + ");
            }
            System.out.print(" = "+sum1);
            System.out.println();
        }
        System.out.println("\n-----");
        System.out.println("Addition of column: \n");
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                sum+=a[j][i];
                System.out.print(a[j][i]+" + ");
            }
            System.out.print(" = "+sum);
            System.out.println();
        }
        System.out.println("\n-----");
    }
}
```

9. Write a Java program to find the maximum element in a matrix.

The image shows a Java IDE (IntelliJ IDEA) and a Windows Command Prompt. The IDE displays the source code for a Java program named `MaxEleInMatrix`. The program prompts the user to enter the number of rows and columns, then the elements of the matrix. It then prints the matrix and the maximum element found.

```
import java.util.*;

public class MaxEleInMatrix
{
    public static void main(String[] args)
    {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter row of array:");
        int row = sc.nextInt();
        System.out.println("\n-----");
        System.out.print("Enter col of array:");
        int col = sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("\n-----");
        System.out.print("Enter array element:");
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                a[i][j]=sc.nextInt();
            }
        }
        System.out.println("\n-----");
        System.out.println("given matrix is: \n");
        int max=0;
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                if(a[i][j]>max)
                {
                    max=a[i][j];
                }
            }
        }
        System.out.print(a[i][j]+" ");
    }
}
```

The Command Prompt shows the execution of the program. The user enters 3 for the number of rows and 3 for the number of columns. The matrix elements are entered as 1 2 3, 4 5 6, and 7 8 9. The program outputs the matrix and the maximum element, which is 9.

```
C:\Windows\System32\cmd.exe
C:\Users\Shree\Desktop\Assingment_Java_Codenera>javac MaxEleInMatrix.java
C:\Users\Shree\Desktop\Assingment_Java_Codenera>java MaxEleInMatrix
Enter row of array:3
Enter col of array:3
Enter array element:
1 2 3
4 5 6
7 8 9
given matrix is:
1 2 3
4 5 6
7 8 9
maximum element form matrix is: 9
C:\Users\Shree\Desktop\Assingment_Java_Codenera>
```

10. Write a Java program to find the minimum element in a matrix

The image shows a Java IDE (IntelliJ IDEA) and a Windows Command Prompt. The IDE window displays the source code for a Java program named `MinEleInMatrix`. The program uses a `Scanner` to take input for the number of rows and columns, then reads the matrix elements. It iterates through the matrix to find the minimum value and prints it.

```
import java.util.*;

public class MinEleInMatrix
{
    public static void main(String[] Jar)
    {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter row of array:");
        int row = sc.nextInt();
        System.out.println("\n-----");
        System.out.print("Enter col of array:");
        int col = sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("\n-----");
        System.out.print("Enter array element:");
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                a[i][j]=sc.nextInt();
            }
        }
        System.out.println("\n-----");
        System.out.println("given matrix is: \n");
        int min=Integer.MAX_VALUE;
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                if(a[i][j]<min)
                {
                    min=a[i][j];
                }
            }
        }
        System.out.print(a[i][j]+" ");
    }
}
```

The Command Prompt window shows the execution of the program. It prompts the user to enter the row and column counts, then the matrix elements. The output shows the given matrix and the minimum element found.

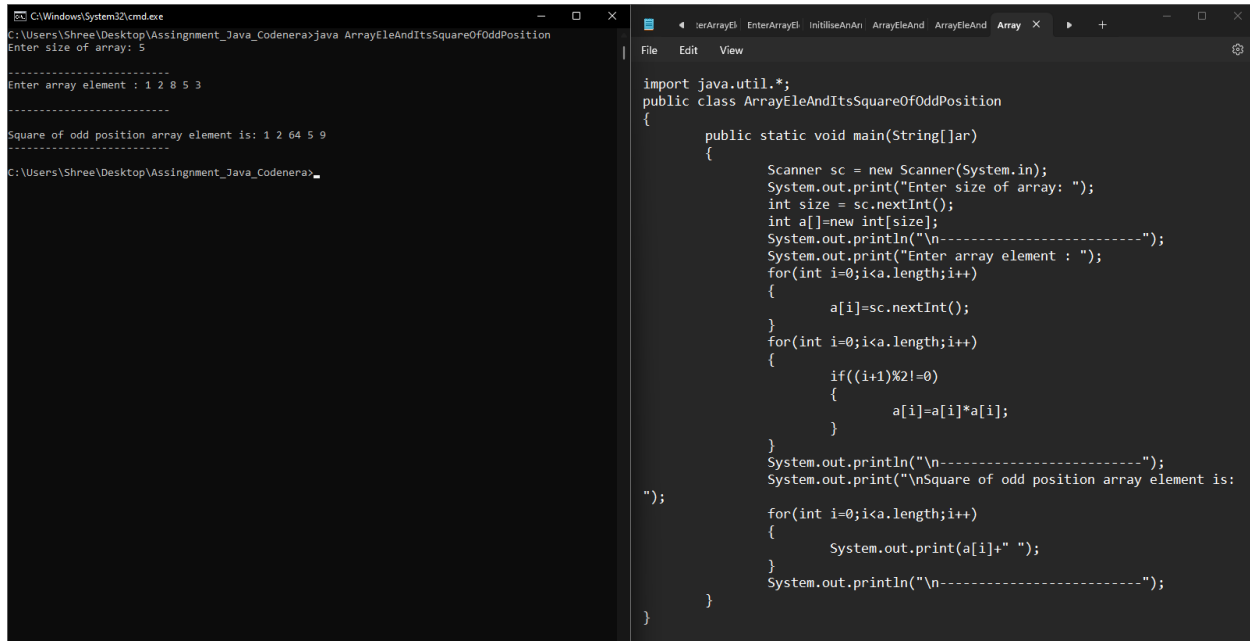
```
C:\Windows\System32\cmd.exe
C:\Users\Shree\Desktop\Assingment_Java_Codenera>javac MinEleInMatrix.java
C:\Users\Shree\Desktop\Assingment_Java_Codenera>java MinEleInMatrix
Enter row of array:3
-----
Enter col of array:3
-----
Enter array element:
1 2 3
4 5 6
7 8 9
-----
given matrix is:
1 2 3
4 5 6
7 8 9
-----
minimum element form matrix is: 1
-----
C:\Users\Shree\Desktop\Assingment_Java_Codenera>
```

11. Write a Java program to sort the elements of each row of a matrix.

```
C:\Windows\System32\cmd.exe
C:\Users\Shree\Desktop\Assingment_Java_Codenera>java SortArrayInAscendingOfEachRow
Enter row of array:3
-----
Enter col of array:3
-----
Enter array element:
3 5 2
4 3 6
2 8 1
-----
given sort matrix is:
2 3 5
3 4 6
1 2 8
C:\Users\Shree\Desktop\Assingment_Java_Codenera>
```

```
import java.util.*;
public class SortArrayInAscendingOfEachRow
{
    public static void main(String[]ar)
    {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter row of array:");
        int row = sc.nextInt();
        System.out.println("\n-----");
        System.out.print("Enter col of array:");
        int col = sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("\n-----");
        System.out.print("Enter array element:");
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                a[i][j]=sc.nextInt();
            }
        }
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                for(int k=j+1;k<a[i].length;k++)
                {
                    if(a[i][j]>a[i][k])
                    {
                        int t=a[i][j];
                        a[i][j]=a[i][k];
                        a[i][k]=t;
                    }
                }
            }
        }
        System.out.println("\n-----");
        System.out.print("given sort matrix is: \n");
        for(int i=0;i<a.length;i++)
        {
            for(int j=0;j<a[i].length;j++)
            {
                System.out.print(a[i][j]+" ");
            }
            System.out.println();
        }
    }
}
```

12. Write a program enter an array and print the square of the element which is present at odd position.

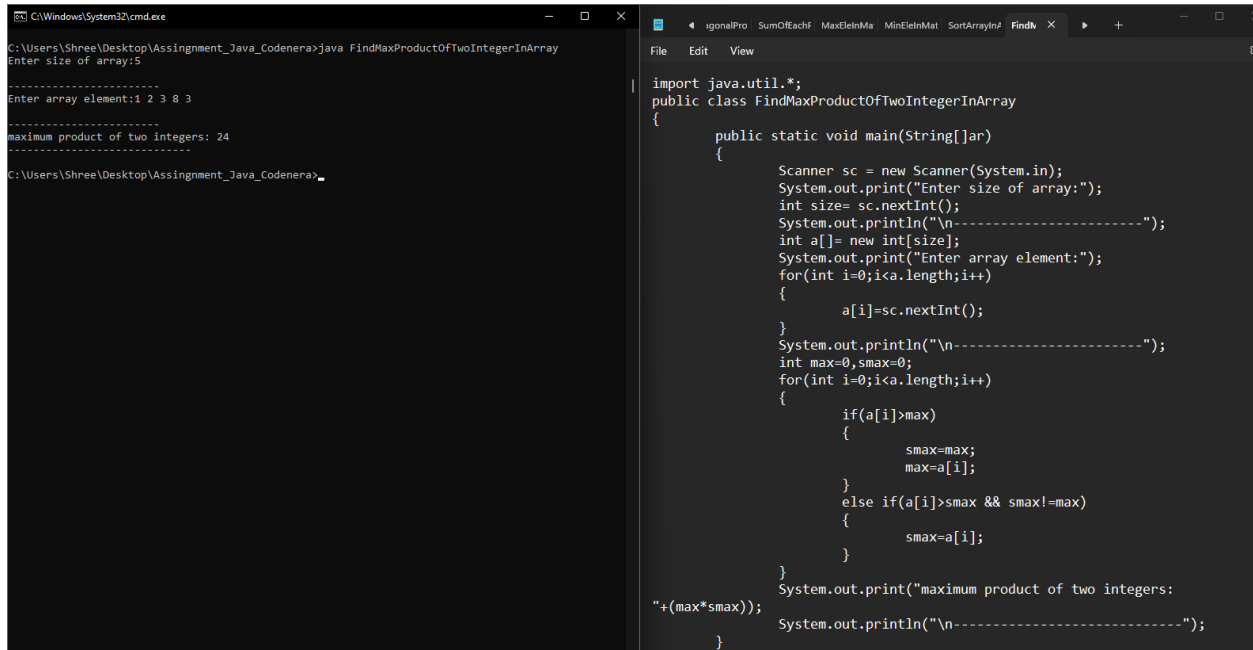


The image shows a screenshot of a Java program being executed in a command prompt and its source code in an IDE. The command prompt on the left shows the execution of the program, which prompts the user to enter the size of the array (5) and the array elements (1 2 8 5 3). The output shows the square of the elements at odd positions (1, 8, 5), resulting in 1 2 64 5 9. The IDE on the right shows the source code of the program, which uses a Scanner to read input, calculates the square of elements at odd positions, and prints the result.

```
C:\Windows\System32\cmd.exe
C:\Users\Shree\Desktop\Assingment_Java_Codenera>java ArrayEleAndItsSquareOfOddPosition
Enter size of array: 5
-----
Enter array element : 1 2 8 5 3
-----
Square of odd position array element is: 1 2 64 5 9
-----
C:\Users\Shree\Desktop\Assingment_Java_Codenera>
```

```
import java.util.*;
public class ArrayEleAndItsSquareOfOddPosition
{
    public static void main(String[] ar)
    {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter size of array: ");
        int size = sc.nextInt();
        int a[]=new int[size];
        System.out.println("\n-----");
        System.out.print("Enter array element : ");
        for(int i=0;i<a.length;i++)
        {
            a[i]=sc.nextInt();
        }
        for(int i=0;i<a.length;i++)
        {
            if((i+1)%2!=0)
            {
                a[i]=a[i]*a[i];
            }
        }
        System.out.println("\n-----");
        System.out.print("\nSquare of odd position array element is: ");
        for(int i=0;i<a.length;i++)
        {
            System.out.print(a[i]+" ");
        }
        System.out.println("\n-----");
    }
}
```

1. Write a Java program to find maximum product of two integers in a given array of integers.



The image shows a screenshot of a Java program being executed in a command prompt and its source code in an IDE. The command prompt on the left shows the execution of the program, which prompts the user to enter the size of the array (5) and the array elements (1 2 3 8 3). It then outputs the maximum product of two integers as 24. The IDE on the right shows the source code of the program, which uses a Scanner to read input, initializes an array, and iterates through it to find the maximum product of two integers.

```
C:\Windows\System32\cmd.exe
C:\Users\Shree\Desktop\Assignment_Java_Codenera>java FindMaxProductOfTwoIntegerInArray
Enter size of array:5
-----
Enter array element:1 2 3 8 3
-----
maximum product of two integers: 24
-----
C:\Users\Shree\Desktop\Assignment_Java_Codenera>

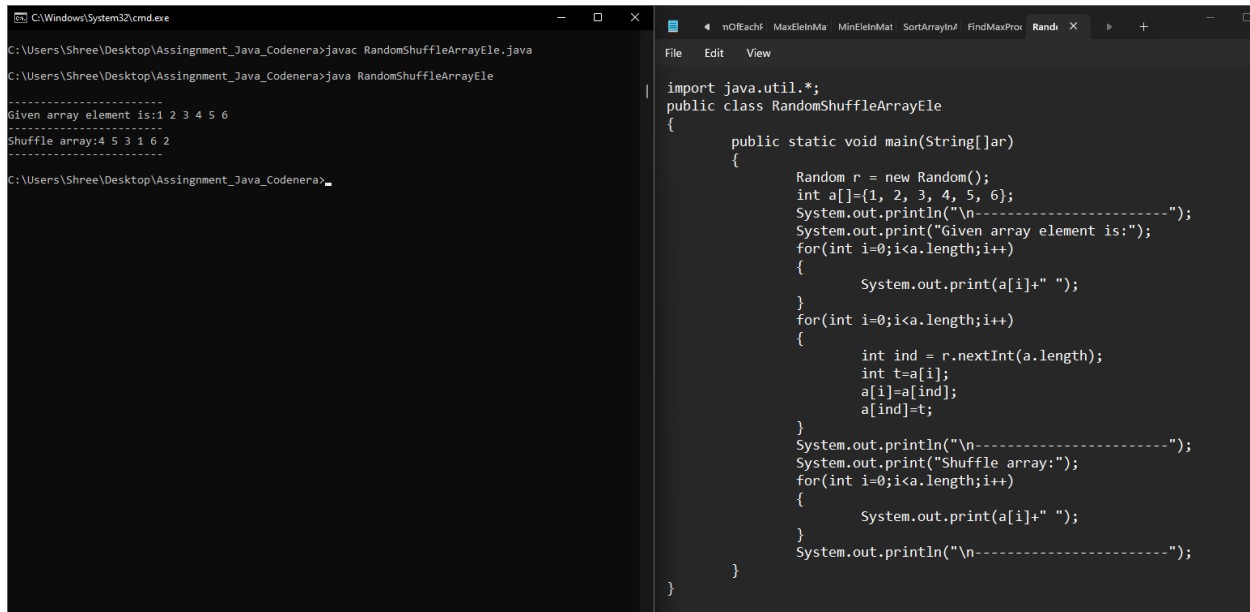
import java.util.*;
public class FindMaxProductOfTwoIntegerInArray
{
    public static void main(String[]ar)
    {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter size of array:");
        int size= sc.nextInt();
        System.out.println("\n-----");
        int a[]= new int[size];
        System.out.print("Enter array element:");
        for(int i=0;i<a.length;i++)
        {
            a[i]=sc.nextInt();
        }
        System.out.println("\n-----");
        int max=0,smax=0;
        for(int i=0;i<a.length;i++)
        {
            if(a[i]>max)
            {
                smax=max;
                max=a[i];
            }
            else if(a[i]>smax && smax!=max)
            {
                smax=a[i];
            }
        }
        System.out.print("maximum product of two integers:
        "+(max*smax));
        System.out.println("\n-----");
    }
}
```

2. Write a Java program to shuffle a given array of integers.

Example:

Input: nums = {1, 2, 3, 4, 5, 6}

Output: Shuffle Array: [4, 2, 6, 5, 1, 3]



```
C:\Windows\System32\cmd.exe
C:\Users\Shree\Desktop\Assignment_Java_Codenera>javac RandomShuffleArrayEle.java
C:\Users\Shree\Desktop\Assignment_Java_Codenera>java RandomShuffleArrayEle
-----
Given array element is:1 2 3 4 5 6
-----
Shuffle array:4 5 3 1 6 2
-----
C:\Users\Shree\Desktop\Assignment_Java_Codenera>_

import java.util.*;
public class RandomShuffleArrayEle
{
    public static void main(String[] ar)
    {
        Random r = new Random();
        int a[]={1, 2, 3, 4, 5, 6};
        System.out.println("\n-----");
        System.out.print("Given array element is:");
        for(int i=0;i<a.length;i++)
        {
            System.out.print(a[i]+" ");
        }
        for(int i=0;i<a.length;i++)
        {
            int ind = r.nextInt(a.length);
            int t=a[i];
            a[i]=a[ind];
            a[ind]=t;
        }
        System.out.println("\n-----");
        System.out.print("Shuffle array:");
        for(int i=0;i<a.length;i++)
        {
            System.out.print(a[i]+" ");
        }
        System.out.println("\n-----");
    }
}
```

3. Write a Java program to rearrange a given array of unique elements such that every second element of the array is greater than its left and right elements.

Example:

Input: nums= { 1, 2, 4, 9, 5, 3, 8, 7, 10, 12, 14 }

Output: Array with every second element is greater than its left and right elements:

[1, 4, 2, 9, 3, 8, 5, 10, 7, 14, 12]

```
C:\Windows\System32\cmd.exe
Enter The Size Of array:
11
Enter array:
1 2 4 9 5 3 8 7 10 12 14
-----
1 4 2 9 3 8 5 10 7 14 12
C:\Users\Shree\Desktop\Assignment_Java_Codenera>
```

```
import java.util.*;
public class FindMaxDifferenceBetweenTwoEleInArray1
{
    public static void main(String[] args)
    {
        Scanner s=new Scanner(System.in);
        System.out.println("Enter The Size Of array:");
        int n1=s.nextInt();
        int[] a=new int[n1];
        System.out.println("Enter array:");
        for(int i=0;i<a.length;i++)
        {
            a[i]=s.nextInt();
        }
        System.out.println("-----");

        for (int i = 0;i<a.length-2;)
        {
            if(a[i]>a[i+1])
            {
                int temp=a[i];
                a[i]=a[i+1];
                a[i+1]=temp;
            }
            if(a[i+2]>a[i+1])
            {
                int temp=a[i+1];
                a[i+1]=a[i+2];
                a[i+2]=temp;
            }
            i=i+2;
        }
        for(int i=0;i<a.length;i++)
        {
            Scanner s=new Scanner(System.in);
            System.out.println("Enter The Size Of array:");
            int n1=s.nextInt();
            int[] a=new int[n1];
            System.out.println("Enter array:");
            for(int i=0;i<a.length;i++)
            {
                a[i]=s.nextInt();
            }
            System.out.println("-----");

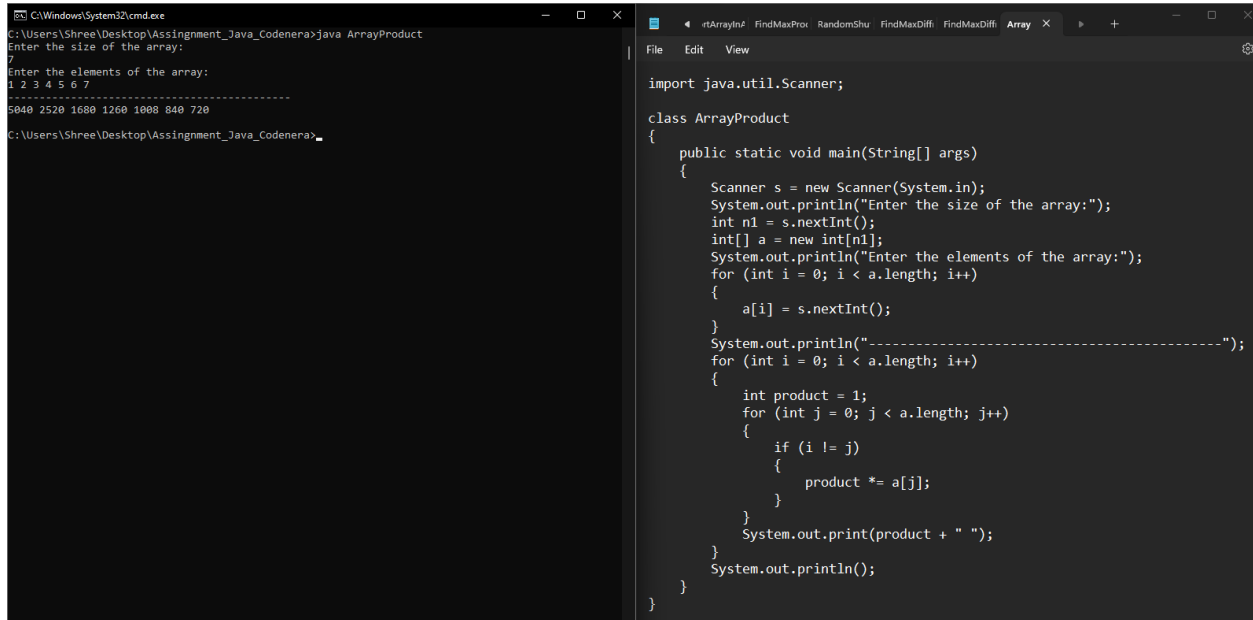
            for (int i = 0;i<a.length-2;)
            {
                if(a[i]>a[i+1])
                {
                    int temp=a[i];
                    a[i]=a[i+1];
                    a[i+1]=temp;
                }
                if(a[i+2]>a[i+1])
                {
                    int temp=a[i+1];
                    a[i+1]=a[i+2];
                    a[i+2]=temp;
                }
                i=i+2;
            }
            for(int i=0;i<a.length;i++)
            {
                System.out.print(a[i]+" ");
            }
            System.out.println();
        }
    }
}
```


4. Write a Java program to replace each element of the array with product of every other element in a given array of integers.

Example:

Input :nums1 = { 1, 2, 3, 4, 5, 6, 7}

Output: Array with product of every other element:[5040, 2520, 1680, 1260, 1008, 840, 720]



The screenshot displays a Java IDE with two windows. The left window, titled 'C:\Windows\System32\cmd.exe', shows the command prompt output for running the 'ArrayProduct' program. The right window, titled 'Array', shows the source code of the 'ArrayProduct' class.

Command Prompt Output:

```
C:\Users\Shree\Desktop\Assignment_Java_Codenera>java ArrayProduct
Enter the size of the array:
7
Enter the elements of the array:
1 2 3 4 5 6 7
-----
5040 2520 1680 1260 1008 840 720
C:\Users\Shree\Desktop\Assignment_Java_Codenera>_
```

Source Code (ArrayProduct.java):

```
import java.util.Scanner;

class ArrayProduct
{
    public static void main(String[] args)
    {
        Scanner s = new Scanner(System.in);
        System.out.println("Enter the size of the array:");
        int n1 = s.nextInt();
        int[] a = new int[n1];
        System.out.println("Enter the elements of the array:");
        for (int i = 0; i < a.length; i++)
        {
            a[i] = s.nextInt();
        }
        System.out.println("-----");
        for (int i = 0; i < a.length; i++)
        {
            int product = 1;
            for (int j = 0; j < a.length; j++)
            {
                if (i != j)
                {
                    product *= a[j];
                }
            }
            System.out.print(product + " ");
        }
        System.out.println();
    }
}
```

5. Write a Java program to find maximum difference between two elements in a given array of integers such that smaller element appears before larger element.

Example:

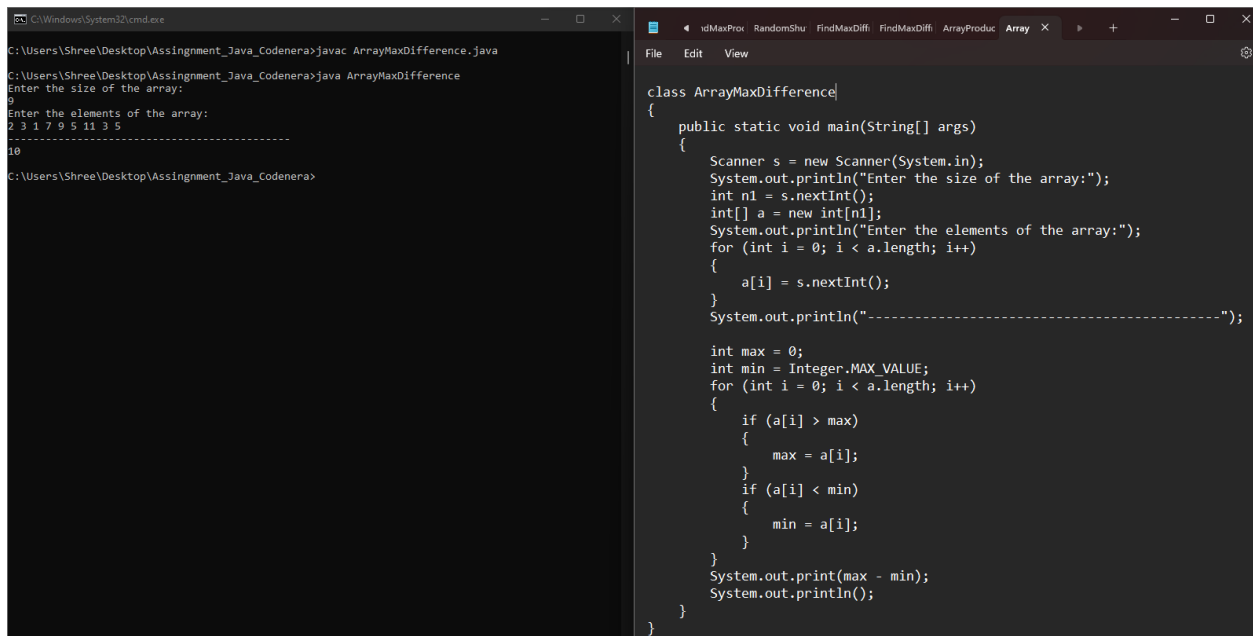
Input :

nums = { 2, 3, 1, 7, 9, 5, 11, 3, 5 }

Output:

The maximum difference between two elements of the said array elements

10



The screenshot shows a Java IDE with two windows. The left window is a command prompt showing the execution of the program. The right window shows the source code of the program.

```
C:\Windows\System32\cmd.exe
C:\Users\Shree\Desktop\Assingment_Java_Codenera>javac ArrayMaxDifference.java
C:\Users\Shree\Desktop\Assingment_Java_Codenera>java ArrayMaxDifference
Enter the size of the array:
9
Enter the elements of the array:
2 3 1 7 9 5 11 3 5
-----
10
C:\Users\Shree\Desktop\Assingment_Java_Codenera>
```

```
class ArrayMaxDifference
{
    public static void main(String[] args)
    {
        Scanner s = new Scanner(System.in);
        System.out.println("Enter the size of the array:");
        int n1 = s.nextInt();
        int[] a = new int[n1];
        System.out.println("Enter the elements of the array:");
        for (int i = 0; i < a.length; i++)
        {
            a[i] = s.nextInt();
        }
        System.out.println("-----");

        int max = 0;
        int min = Integer.MAX_VALUE;
        for (int i = 0; i < a.length; i++)
        {
            if (a[i] > max)
            {
                max = a[i];
            }
            if (a[i] < min)
            {
                min = a[i];
            }
        }
        System.out.print(max - min);
        System.out.println();
    }
}
```