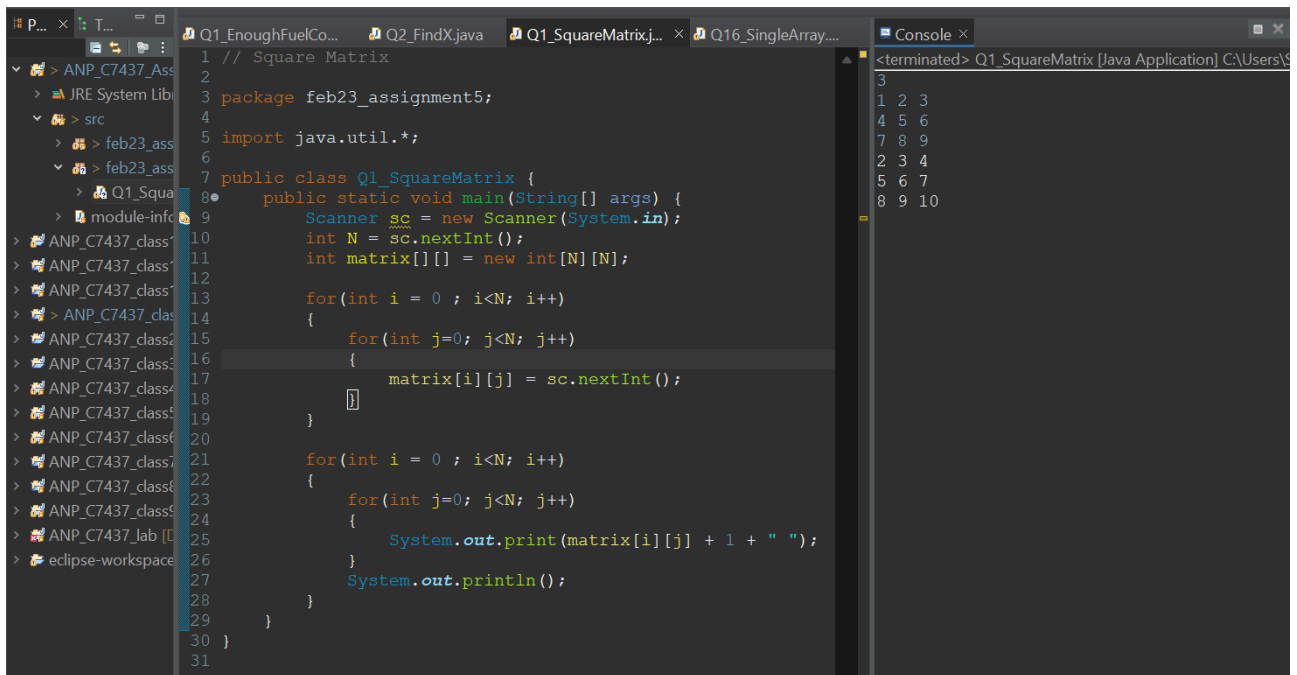


Q1. Square Matrix



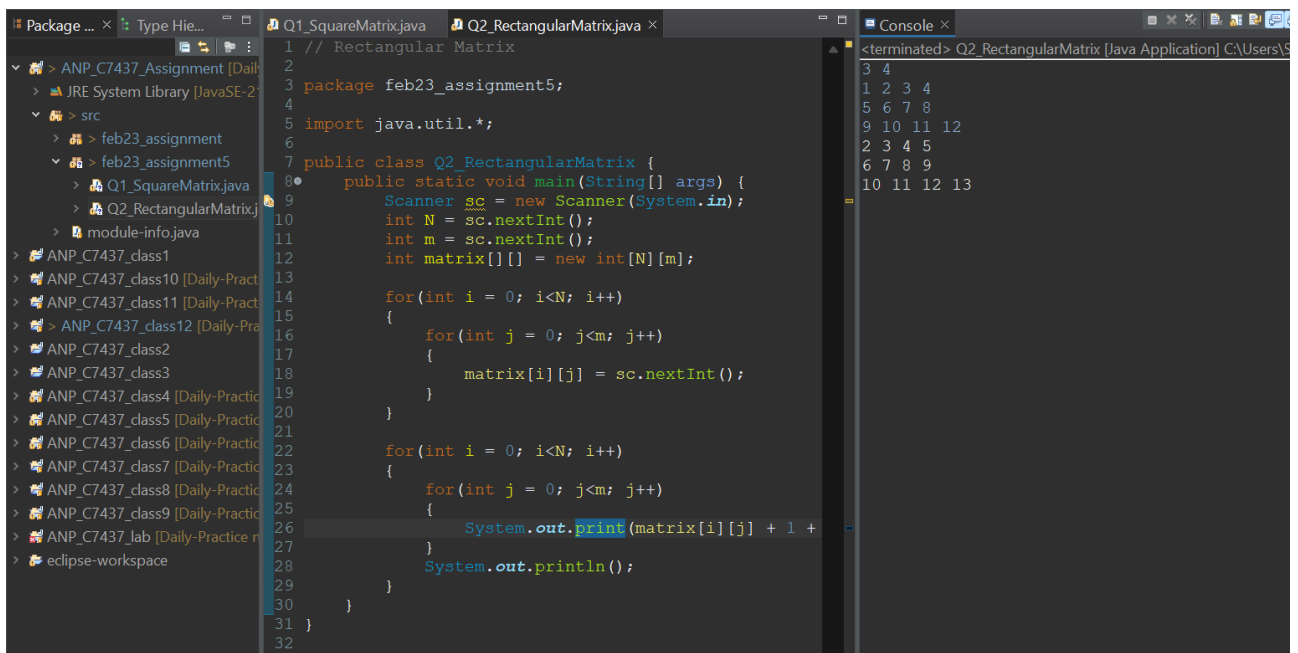
The screenshot shows the Eclipse IDE with the file `Q1_SquareMatrix.java` open. The code is as follows:

```
1 // Square Matrix
2
3 package feb23_assignment5;
4
5 import java.util.*;
6
7 public class Q1_SquareMatrix {
8     public static void main(String[] args) {
9         Scanner sc = new Scanner(System.in);
10        int N = sc.nextInt();
11        int matrix[][] = new int[N][N];
12
13        for(int i = 0 ; i<N; i++)
14        {
15            for(int j=0; j<N; j++)
16            {
17                matrix[i][j] = sc.nextInt();
18            }
19        }
20
21        for(int i = 0 ; i<N; i++)
22        {
23            for(int j=0; j<N; j++)
24            {
25                System.out.print(matrix[i][j] + 1 + " ");
26            }
27            System.out.println();
28        }
29    }
30 }
31
```

The console output shows the result of running the program:

```
<terminated> Q1_SquareMatrix [Java Application] C:\Users\S...
3
1 2 3
4 5 6
7 8 9
2 3 4
5 6 7
8 9 10
```

Q2. Rectangular Matrix



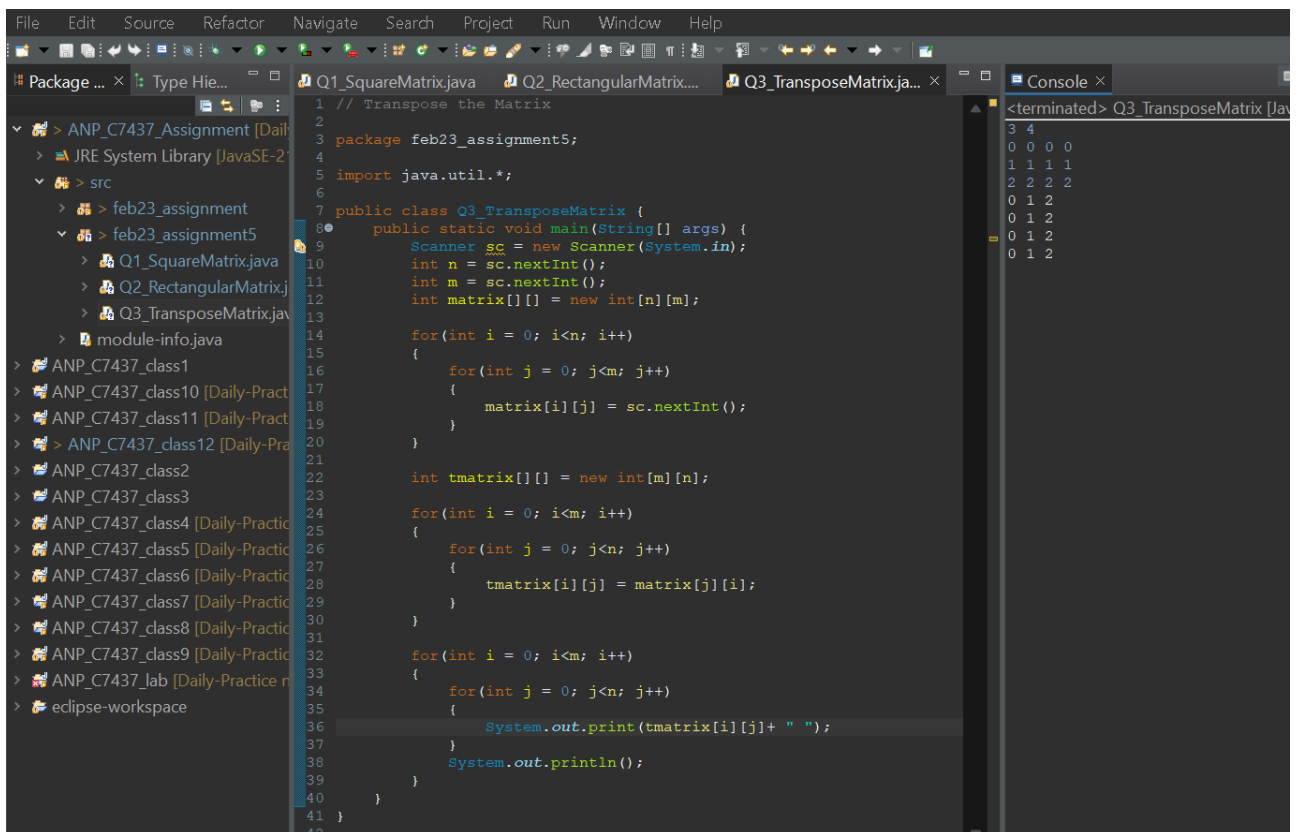
The screenshot shows the Eclipse IDE with the file `Q2_RectangularMatrix.java` open. The code is as follows:

```
1 // Rectangular Matrix
2
3 package feb23_assignment5;
4
5 import java.util.*;
6
7 public class Q2_RectangularMatrix {
8     public static void main(String[] args) {
9         Scanner sc = new Scanner(System.in);
10        int N = sc.nextInt();
11        int m = sc.nextInt();
12        int matrix[][] = new int[N][m];
13
14        for(int i = 0; i<N; i++)
15        {
16            for(int j = 0; j<m; j++)
17            {
18                matrix[i][j] = sc.nextInt();
19            }
20        }
21
22        for(int i = 0; i<N; i++)
23        {
24            for(int j = 0; j<m; j++)
25            {
26                System.out.print(matrix[i][j] + 1 + " ");
27            }
28            System.out.println();
29        }
30    }
31 }
32
```

The console output shows the result of running the program:

```
<terminated> Q2_RectangularMatrix [Java Application] C:\Users\S...
3 4
1 2 3 4
5 6 7 8
9 10 11 12
2 3 4 5
6 7 8 9
10 11 12 13
```

Q3. Transpose the Matrix

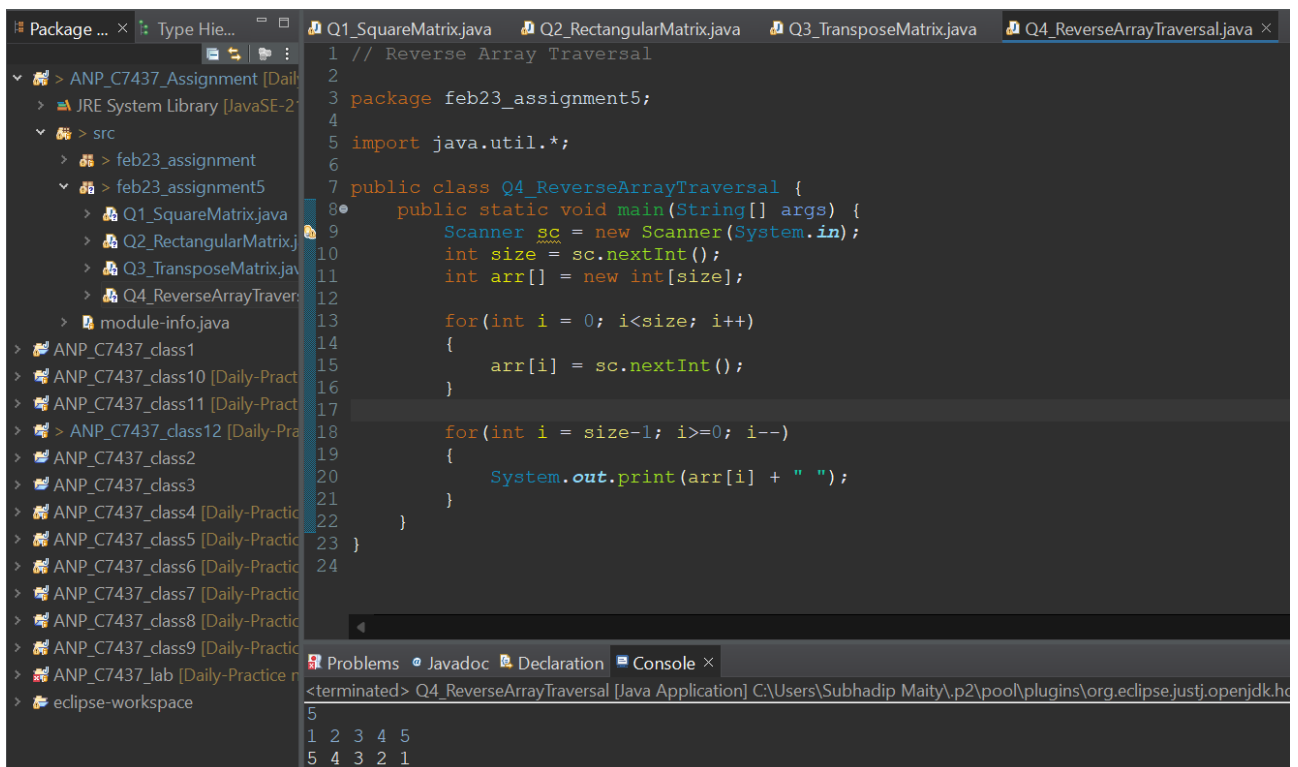


```
1 // Transpose the Matrix
2
3 package feb23_assignment5;
4
5 import java.util.*;
6
7 public class Q3_TransposeMatrix {
8     public static void main(String[] args) {
9         Scanner sc = new Scanner(System.in);
10        int n = sc.nextInt();
11        int m = sc.nextInt();
12        int matrix[][] = new int[n][m];
13
14        for(int i = 0; i<n; i++)
15        {
16            for(int j = 0; j<m; j++)
17            {
18                matrix[i][j] = sc.nextInt();
19            }
20        }
21
22        int tmatrix[][] = new int[m][n];
23
24        for(int i = 0; i<m; i++)
25        {
26            for(int j = 0; j<n; j++)
27            {
28                tmatrix[i][j] = matrix[j][i];
29            }
30        }
31
32        for(int i = 0; i<m; i++)
33        {
34            for(int j = 0; j<n; j++)
35            {
36                System.out.print(tmatrix[i][j]+ " ");
37            }
38            System.out.println();
39        }
40    }
41 }
42
```

Console Output:

```
<terminated> Q3_TransposeMatrix [Java Application] C:\Users\Subhadip\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full\jre\bin\java.exe
3 4
0 0 0 0
1 1 1 1
2 2 2 2
0 1 2
0 1 2
0 1 2
0 1 2
```

Q4. Reverse Array Traversal



```
1 // Reverse Array Traversal
2
3 package feb23_assignment5;
4
5 import java.util.*;
6
7 public class Q4_ReverseArrayTraversal {
8     public static void main(String[] args) {
9         Scanner sc = new Scanner(System.in);
10        int size = sc.nextInt();
11        int arr[] = new int[size];
12
13        for(int i = 0; i<size; i++)
14        {
15            arr[i] = sc.nextInt();
16        }
17
18        for(int i = size-1; i>=0; i--)
19        {
20            System.out.print(arr[i] + " ");
21        }
22    }
23 }
24
```

Console Output:

```
<terminated> Q4_ReverseArrayTraversal [Java Application] C:\Users\Subhadip\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full\jre\bin\java.exe
5
1 2 3 4 5
5 4 3 2 1
```

Q5. Traverse a 2d Array

The screenshot shows the Eclipse IDE with a project named 'feb23_assignment5'. The source code for 'Q5_Traverse2dArray.java' is displayed. The program uses a Scanner to take input for the dimensions of a 2D array (N and M) and then reads the array elements. It traverses the array row by row, printing each element followed by a space. The console output shows the input dimensions and the resulting 2D array.

```
1 // Traverse a 2d Array
2
3 package feb23_assignment5;
4
5 import java.util.*;
6
7 public class Q5_Traverse2dArray {
8     public static void main(String[] args) {
9         Scanner sc = new Scanner(System.in);
10        int N = sc.nextInt();
11        int M = sc.nextInt();
12        int matrix[][] = new int[N][M];
13
14        for(int i=0; i<N; i++)
15        {
16            for(int j = 0; j<M; j++)
17            {
18                matrix[i][j] = sc.nextInt();
19            }
20        }
21
22        for(int i = M-1; i>=0; i--)
23        {
24            for(int j = 0; j<N; j++)
25            {
26                System.out.print(matrix[j][i] + " ");
27            }
28        }
29    }
30 }
31
```

Console Output:

```
<terminated> Q5_Traverse2dArray [Java Application] C:\Users\Subhadip Maity\p
4 3
1 8 9
2 7 10
3 6 11
4 5 12
9 10 11 12 8 7 6 5 1 2 3 4
```

Q6. N Traversal

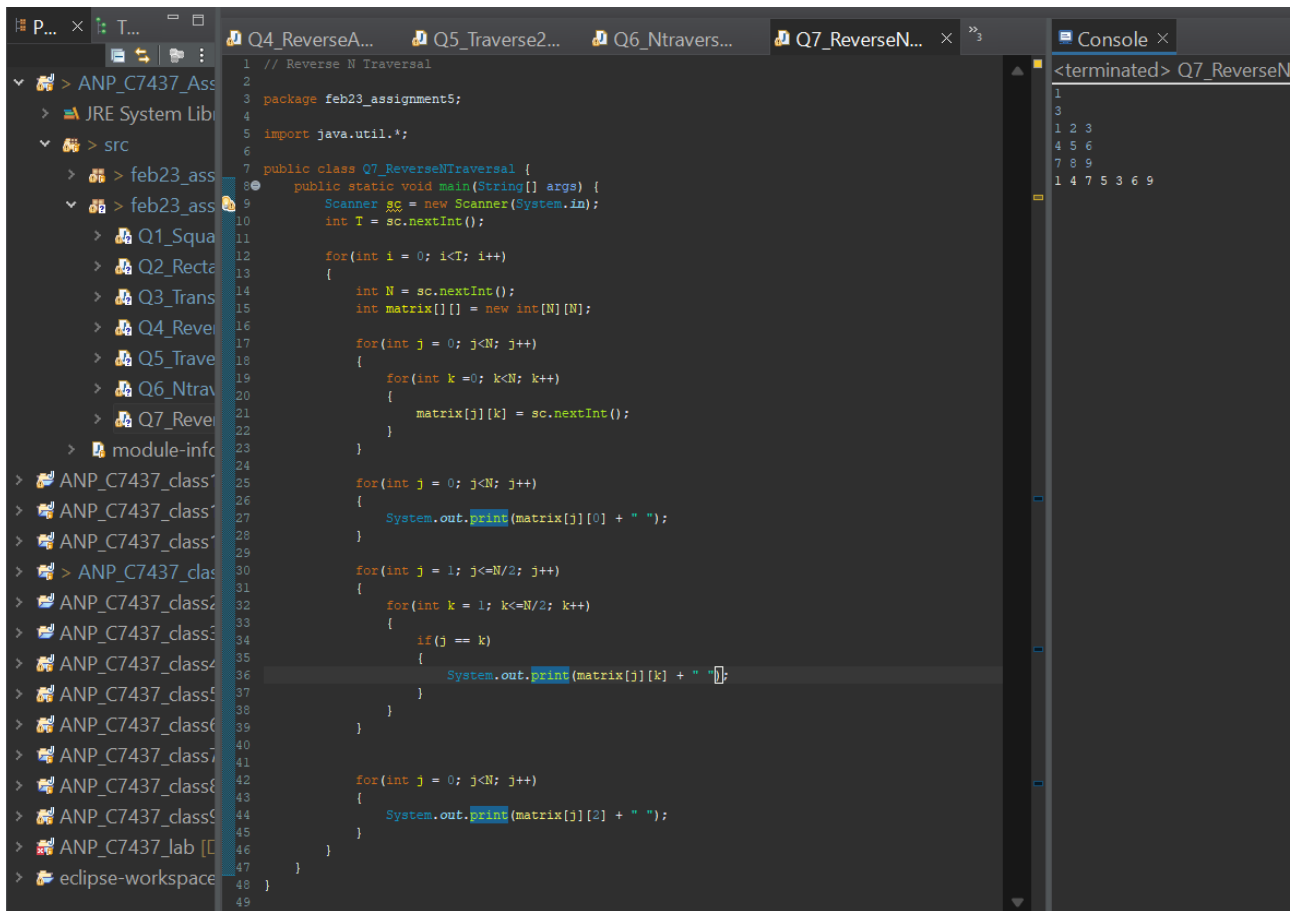
The screenshot shows the Eclipse IDE with a project named 'feb23_assignment5'. The source code for 'Q6_Ntraversal.java' is displayed. The program takes input for the size of a square matrix (N) and then reads the elements. It performs an N-traversal, which means it prints the first column, then the elements from the second column to the diagonal, then the elements from the diagonal to the last column, and finally the last column. The console output shows the input size and the resulting sequence of elements.

```
1 // N Traversal
2
3 package feb23_assignment5;
4
5 import java.util.*;
6
7 public class Q6_Ntraversal {
8     public static void main(String[] args) {
9         Scanner sc = new Scanner(System.in);
10        int T = sc.nextInt();
11
12        for(int i = 0; i<T; i++)
13        {
14            int N = sc.nextInt();
15            int matrix[][] = new int[N][N];
16
17            for(int j = 0; j<N; j++)
18            {
19                for(int k = 0; k<N; k++)
20                {
21                    matrix[j][k] = sc.nextInt();
22                }
23            }
24
25            for(int j = N-1; j>=0; j--)
26            {
27                System.out.print(matrix[j][0] + " ");
28            }
29
30            for(int j = 1; j<N; j++)
31            {
32                for(int k = 1; k<N; k++)
33                {
34                    if(j == k)
35                    {
36                        System.out.print(matrix[j][k] + " ");
37                    }
38                }
39            }
40
41            for(int j = 1; j>=0; j--)
42            {
43                System.out.print(matrix[j][2] + " ");
44            }
45        }
46    }
47 }
48
49
50
```

Console Output:

```
<terminated> Q6_Ntraversal [Java Ap
1
3
1 2 3
4 5 6
7 8 9
7 4 1 5 9 6 3
```

Q7. Reverse N Traversal

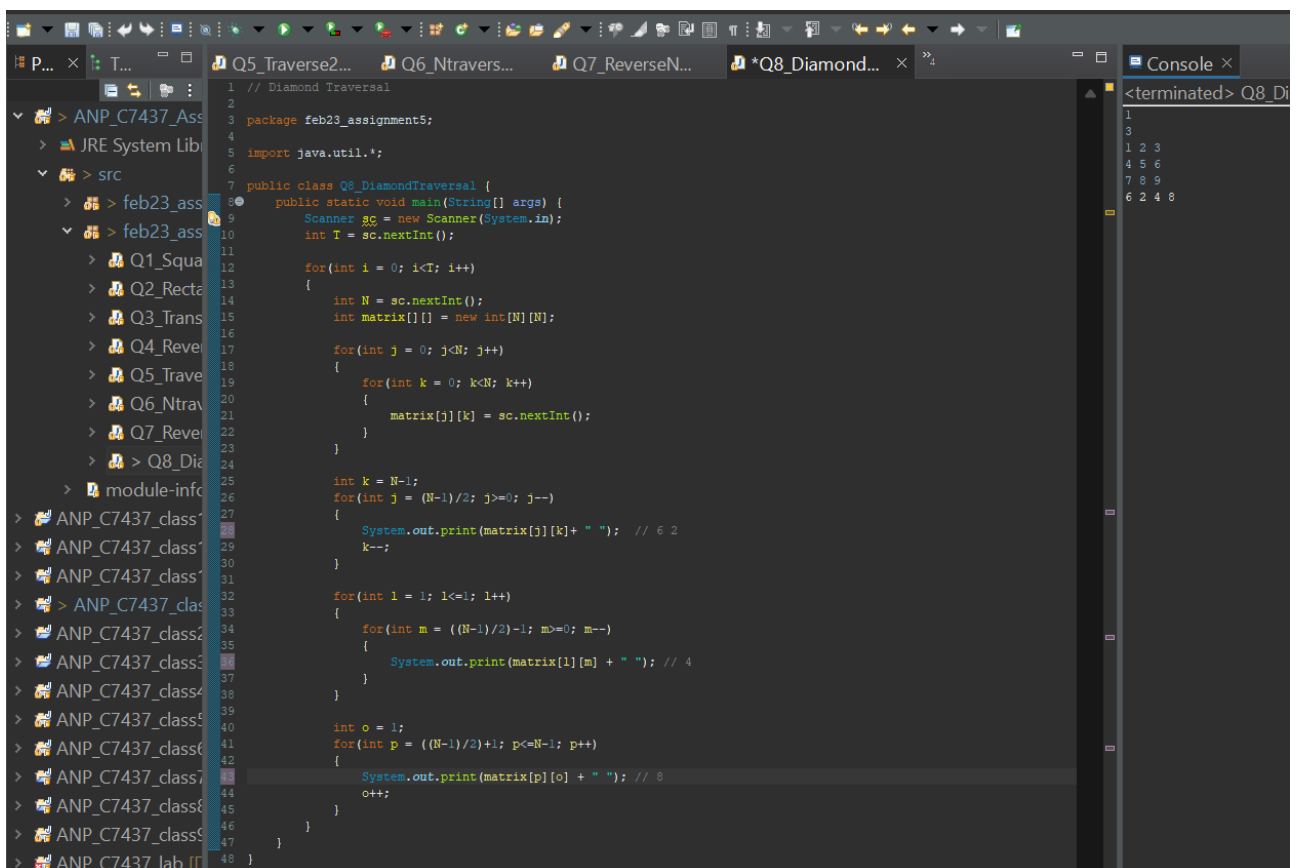


```
1 // Reverse N Traversal
2
3 package feb23_assignment5;
4
5 import java.util.*;
6
7 public class Q7_ReverseNTraversal {
8     public static void main(String[] args) {
9         Scanner sc = new Scanner(System.in);
10        int T = sc.nextInt();
11
12        for(int i = 0; i<T; i++)
13        {
14            int N = sc.nextInt();
15            int matrix[][] = new int[N][N];
16
17            for(int j = 0; j<N; j++)
18            {
19                for(int k = 0; k<N; k++)
20                {
21                    matrix[j][k] = sc.nextInt();
22                }
23            }
24
25            for(int j = 0; j<N; j++)
26            {
27                System.out.print(matrix[j][0] + " ");
28            }
29
30            for(int j = 1; j<=N/2; j++)
31            {
32                for(int k = 1; k<=N/2; k++)
33                {
34                    if(j == k)
35                    {
36                        System.out.print(matrix[j][k] + " ");
37                    }
38                }
39            }
40
41            for(int j = 0; j<N; j++)
42            {
43                System.out.print(matrix[j][2] + " ");
44            }
45        }
46    }
47 }
48
49
```

Console output for N=9:

```
<terminated> Q7_ReverseN
1
3
1 2 3
4 5 6
7 8 9
1 4 7 5 3 6 9
```

Q8. Diamond Traversal



```
1 // Diamond Traversal
2
3 package feb23_assignment5;
4
5 import java.util.*;
6
7 public class Q8_DiamondTraversal {
8     public static void main(String[] args) {
9         Scanner sc = new Scanner(System.in);
10        int T = sc.nextInt();
11
12        for(int i = 0; i<T; i++)
13        {
14            int N = sc.nextInt();
15            int matrix[][] = new int[N][N];
16
17            for(int j = 0; j<N; j++)
18            {
19                for(int k = 0; k<N; k++)
20                {
21                    matrix[j][k] = sc.nextInt();
22                }
23            }
24
25            int k = N-1;
26            for(int j = (N-1)/2; j>=0; j--)
27            {
28                System.out.print(matrix[j][k] + " "); // 6 2
29                k--;
30            }
31
32            for(int l = 1; l<=1; l++)
33            {
34                for(int m = ((N-1)/2)-1; m>=0; m--)
35                {
36                    System.out.print(matrix[l][m] + " "); // 4
37                }
38            }
39
40            int o = 1;
41            for(int p = ((N-1)/2)+1; p<=N-1; p++)
42            {
43                System.out.print(matrix[p][o] + " "); // 8
44                o++;
45            }
46        }
47    }
48 }
49
```

Console output for N=8:

```
<terminated> Q8_Di
1
3
1 2 3
4 5 6
7 8 9
6 2 4 8
```

Q9. Spiral Traversal

Q7_ReverseN...

Q8_DiamondT...

*Q9_SpiralT... ×

»6

Console ×

<terminated> Q9_

```

2
3 4
1 2 3 4
5 6 7 8
9 10 11 12
1 5 9 10 11 12 8 4 3 2 6 7
4 3
1 2 3
4 5 6
7 8 9
10 11 12
1 4 7 10 11 12 9 6 3 2 5 8

```

```

1 // Spiral Traversal
2
3 package feb23_assignment5;
4
5 import java.util.*;
6
7 public class Q9_SpiralTraversal {
8     public static void main(String[] args) {
9         Scanner sc = new Scanner(System.in);
10        int T = sc.nextInt();
11
12        for(int i = 0; i<T; i++)
13        {
14            int N = sc.nextInt();
15            int M = sc.nextInt();
16            int matrix[][] = new int[N][M];
17
18            for(int j = 0; j<N; j++)
19            {
20                for(int k = 0; k<M; k++)
21                {
22                    matrix[j][k] = sc.nextInt();
23                }
24            }
25
26            // 1 5 9
27            for(int j = 0; j<N; j++)
28            {
29                System.out.print(matrix[j][0] + " ");
30            }
31            // 10 11 12
32            for(int j = (M-1)/2; j<M; j++)
33            {
34                System.out.print(matrix[N-1][j] + " ");
35            }
36            // 8 4
37            for(int j = (N-1)-1; j>=0; j--)
38            {
39                System.out.print(matrix[j][M-1] + " ");
40            }
41
42            // 3 2
43            for(int j = (M-1)-1; j>=0; j--)
44            {
45                System.out.print(matrix[0][j] + " ");
46            }
47
48            // 6 7
49            for(int j = (N-1)/2; j<=(N-1)-1; j++)
50            {
51                for(int k = (M-1)/2; k<=M/2; k++)
52                {
53                    System.out.print(matrix[j][k] + " ");
54                }
55            }
56        }
57    }
58 }
59
60

```

Q10. Circular Traversal

```

1 // Circular Traversal
2
3 package feb23_assignment5;
4
5 import java.util.*;
6
7 public class Q10_CircularTraversal {
8     public static void main(String[] args) {
9         Scanner sc = new Scanner(System.in);
10        int T = sc.nextInt();
11
12        for(int i = 0; i<T; i++)
13        {
14            int N = sc.nextInt();
15            int matrix[][] = new int[N][N];
16
17            for(int j = 0; j<N; j++)
18            {
19                for(int k = 0; k<N; k++)
20                {
21                    matrix[j][k] = sc.nextInt();
22                }
23            }
24            // 7 4 1
25            for(int j = N-1; j>=0; j--)
26            {
27                System.out.print(matrix[j][0] + " ");
28            }
29            // 2 3
30            for(int j = (N-1)/2; j<N; j++)
31            {
32                System.out.print(matrix[0][j] + " ");
33            }
34            // 6 9
35            for(int j = (N-1)/2; j<N; j++)
36            {
37                System.out.print(matrix[j][N-1] + " ");
38            }
39            // 8
40            for(int j = (N-1)/2; j<N-1; j++)
41            {
42                System.out.print(matrix[N-1][j]);
43            }
44        }
45    }
46 }

```

Console

<terminated> Q9_SpiralTra

2

3 4

1 2 3 4

5 6 7 8

9 10 11 12

1 5 9 10 11 12 8 4 3 2 6 7

4 3

1 2 3

4 5 6

7 8 9

10 11 12

1 4 7 10 11 12 9 6 3 2 5 8