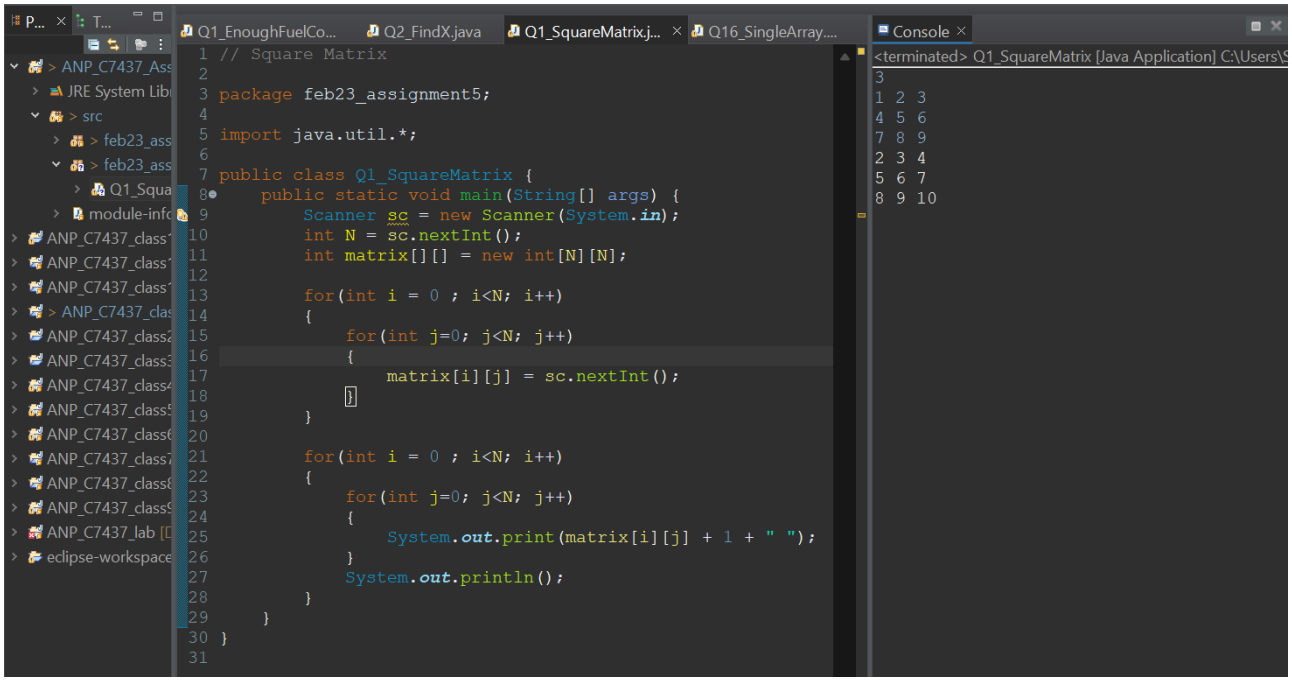
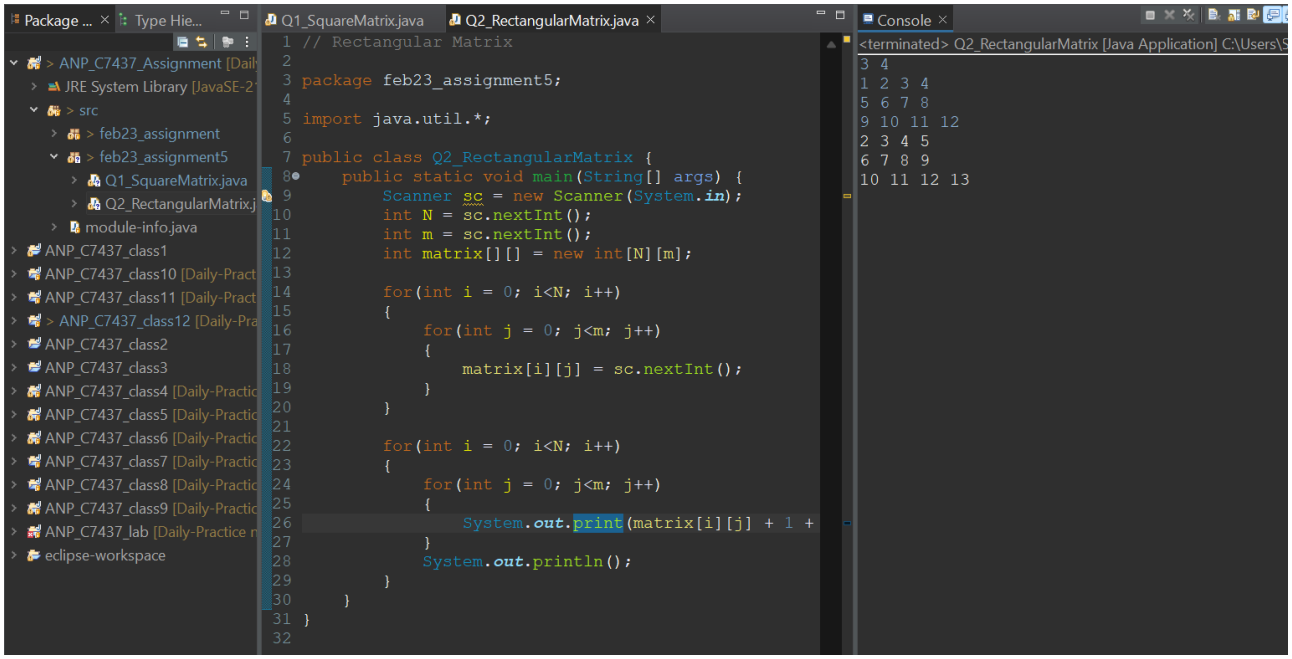
Q1. Square Matrix



```java
// Square Matrix

package feb23_assignment5;

import java.util.*;

public class Q1_SquareMatrix {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int N = sc.nextInt();
        int matrix[][] = new int[N][N];

        for(int i = 0 ; i<N; i++)
        {
            for(int j=0; j<N; j++)
            {
                matrix[i][j] = sc.nextInt();
            }
        }

        for(int i = 0 ; i<N; i++)
        {
            for(int j=0; j<N; j++)
            {
                System.out.print(matrix[i][j] + 1 + " ");
            }
            System.out.println();
        }
    }
}
```

```
<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
```

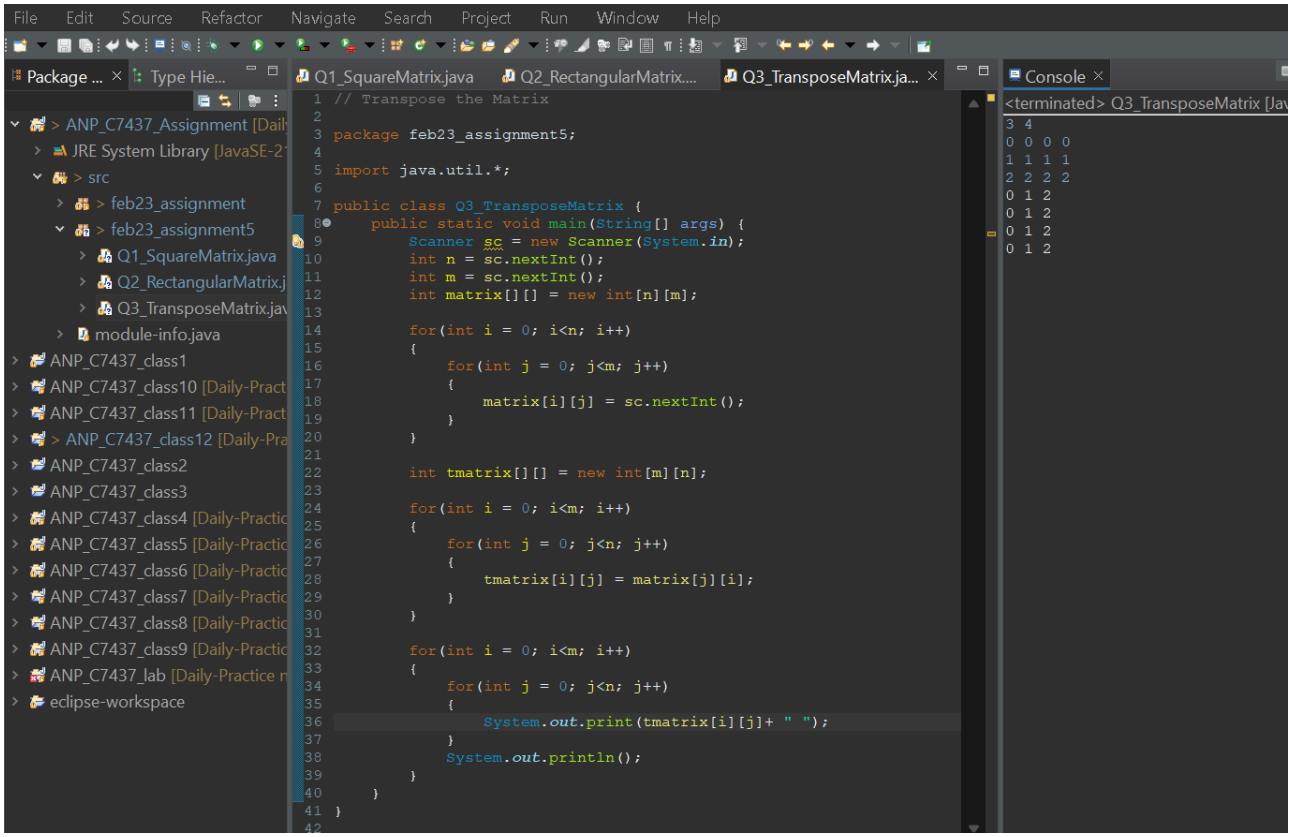
Q2. Rectangular Matrix



```java
// Rectangular Matrix

package feb23_assignment5;

import java.util.*;

public class Q2_RectangularMatrix {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int N = sc.nextInt();
        int m = sc.nextInt();
        int matrix[][] = new int[N][m];

        for(int i = 0; i<N; i++)
        {
            for(int j = 0; j<m; j++)
            {
                matrix[i][j] = sc.nextInt();
            }
        }

        for(int i = 0; i<N; i++)
        {
            for(int j = 0; j<m; j++)
            {
                System.out.print(matrix[i][j] + 1 +
            }
            System.out.println();
        }
    }
}
```

```
<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
```

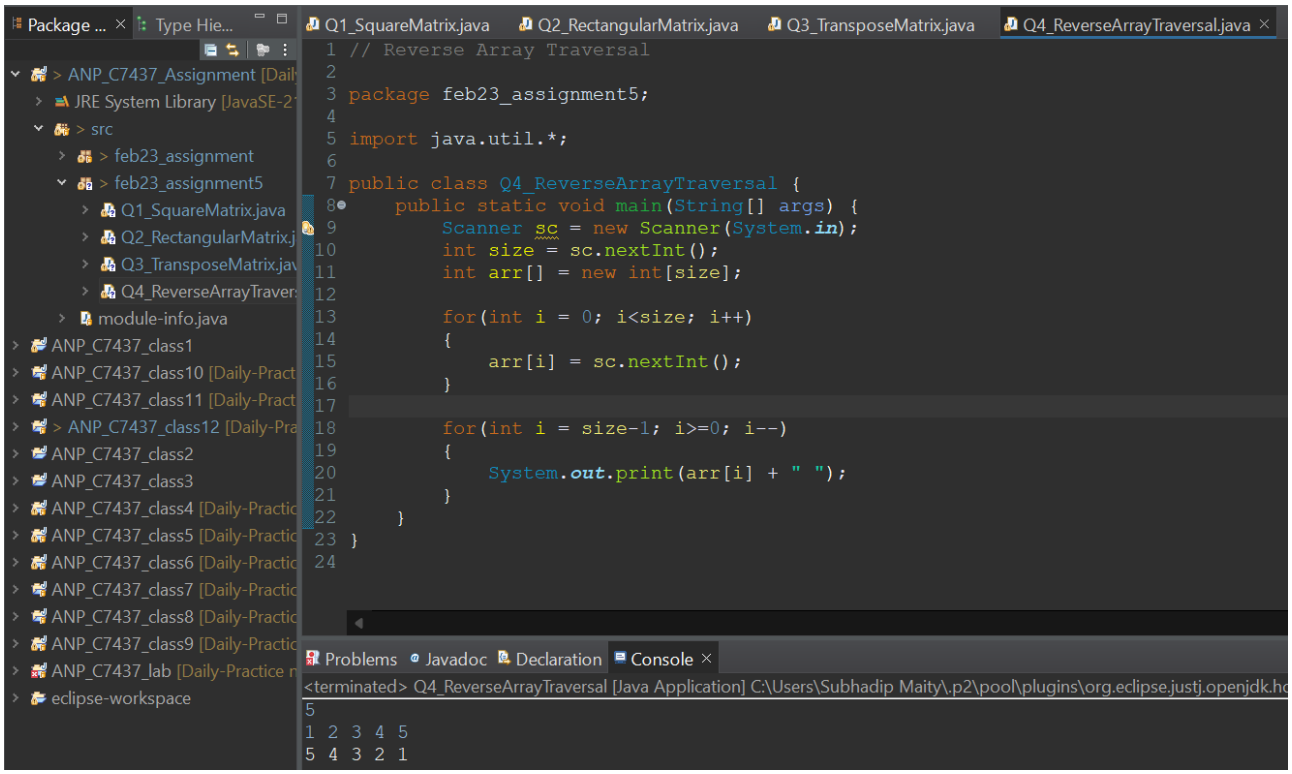
Q3. Transpose the Matrix



```
// Transpose the Matrix

package feb23_assignment5;

import java.util.*;

public class Q3_TransposeMatrix {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        int m = sc.nextInt();
        int matrix[][] = new int[n][m];

        for(int i = 0; i<n; i++)
        {
            for(int j = 0; j<m; j++)
            {
                matrix[i][j] = sc.nextInt();
            }
        }

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

        for(int i = 0; i<m; i++)
        {
            for(int j = 0; j<n; j++)
            {
                tmatrix[i][j] = matrix[j][i];
            }
        }

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

```
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
```

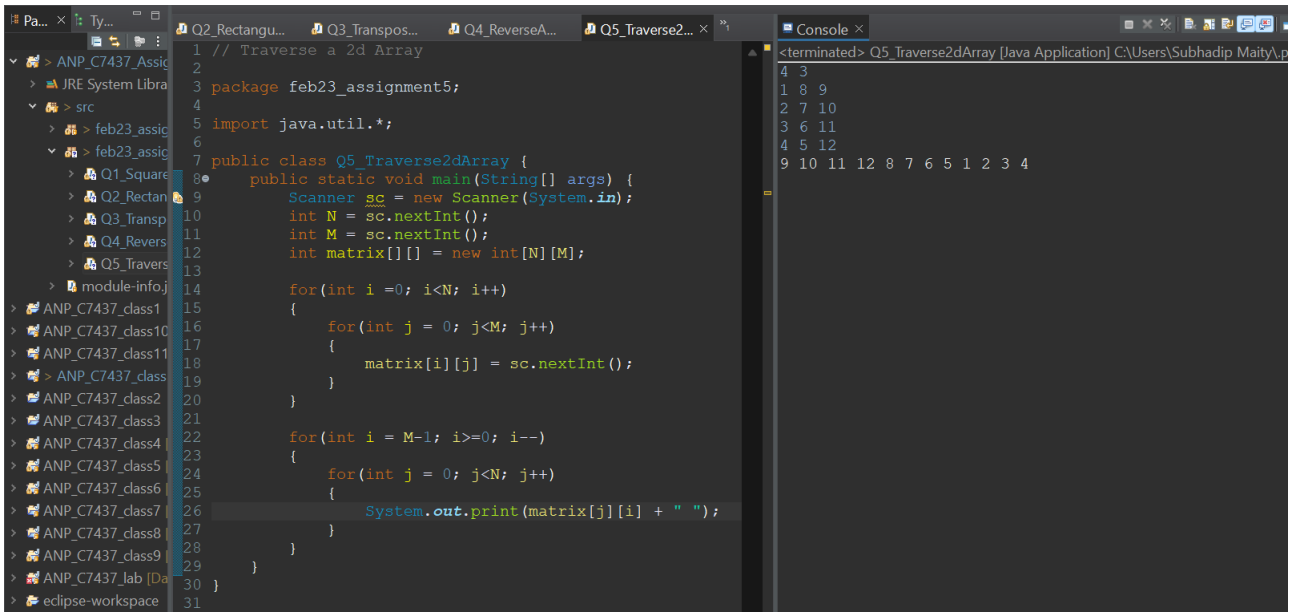
Q4. Reverse Array Traversal



```
// Reverse Array Traversal

package feb23_assignment5;

import java.util.*;

public class Q4_ReverseArrayTraversal {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int size = sc.nextInt();
        int arr[] = new int[size];

        for(int i = 0; i<size; i++)
        {
            arr[i] = sc.nextInt();
        }

        for(int i = size-1; i>=0; i--)
        {
            System.out.print(arr[i] + " ");
        }
    }
}
```

```
5
1 2 3 4 5
5 4 3 2 1
```

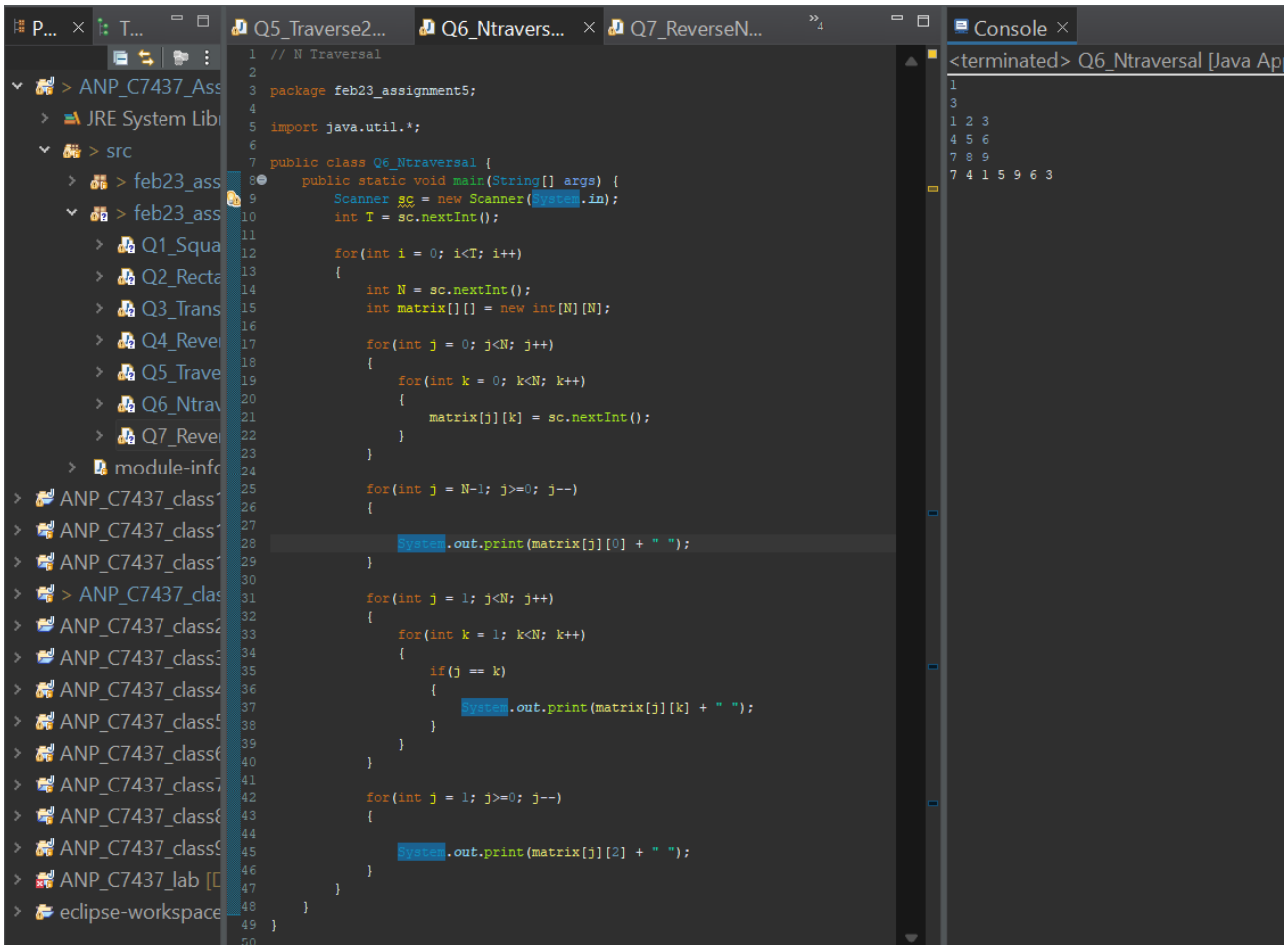
Q5. Traverse a 2d Array



```
// Traverse a 2d Array

package feb23_assignment5;

import java.util.*;

public class Q5_Traverse2dArray {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int N = sc.nextInt();
        int M = sc.nextInt();
        int matrix[][] = new int[N][M];

        for(int i =0; i<N; i++)
        {
            for(int j = 0; j<M; j++)
            {
                matrix[i][j] = sc.nextInt();
            }
        }

        for(int i = M-1; i>=0; i--)
        {
            for(int j = 0; j<N; j++)
            {
                System.out.print(matrix[j][i] + " ");
            }
        }
    }
}
```

```
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
```

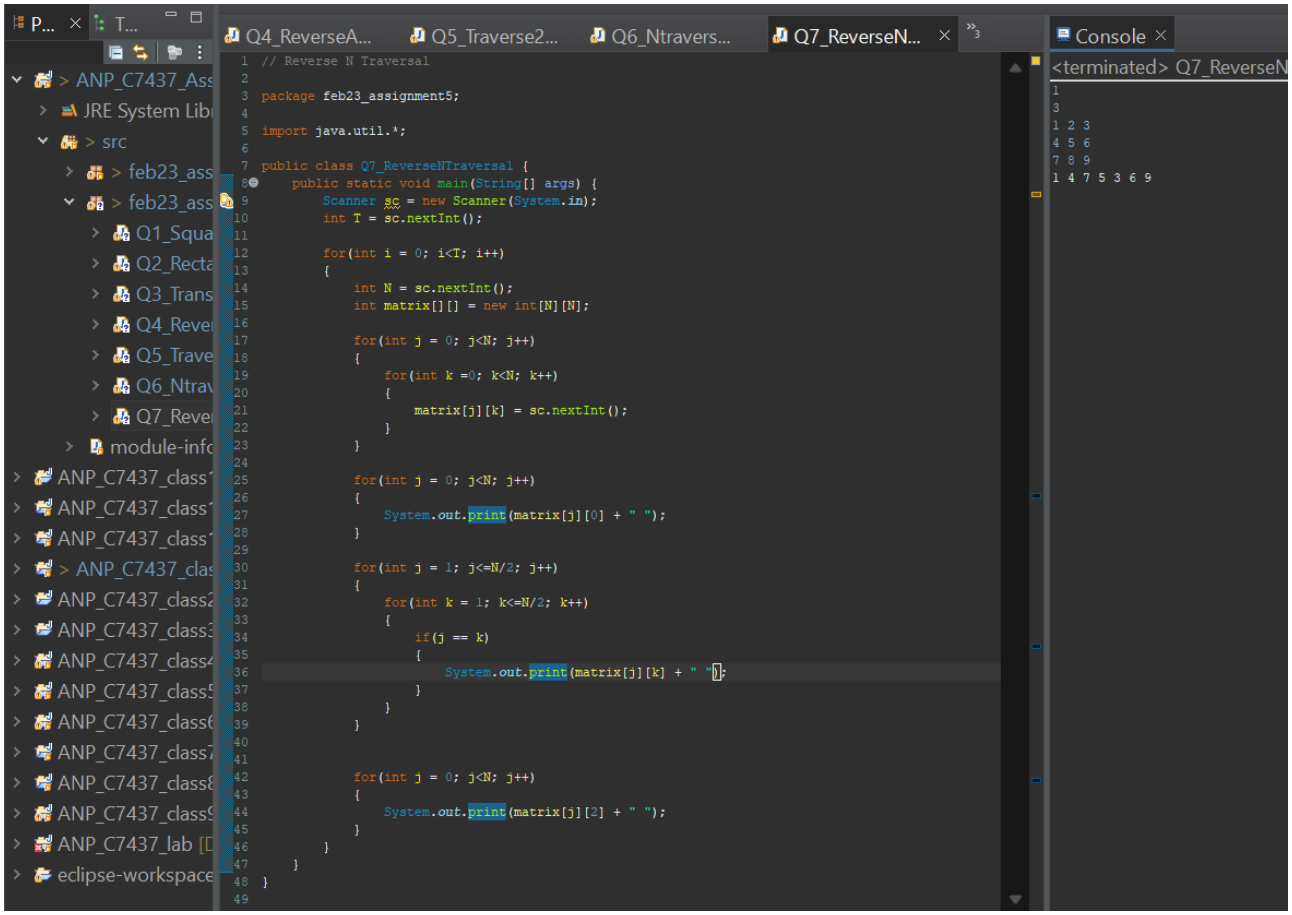
Q6. N Traversal



```
// N Traversal

package feb23_assignment5;

import java.util.*;

public class Q6_Ntraversal {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int T = sc.nextInt();

        for(int i = 0; i<T; i++)
        {
            int N = sc.nextInt();
            int matrix[][] = new int[N][N];

            for(int j = 0; j<N; j++)
            {
                for(int k = 0; k<N; k++)
                {
                    matrix[j][k] = sc.nextInt();
                }
            }

            for(int j = N-1; j>=0; j--)
            {

                System.out.print(matrix[j][0] + " ");
            }

            for(int j = 1; j<N; j++)
            {
                for(int k = 1; k<N; k++)
                {
                    if(j == k)
                    {
                        System.out.print(matrix[j][k] + " ");
                    }
                }
            }

            for(int j = 1; j>=0; j--)
            {

                System.out.print(matrix[j][2] + " ");
            }
        }
    }
}
```

```
1
3
1 2 3
4 5 6
7 8 9
7 4 1 5 9 6 3
```

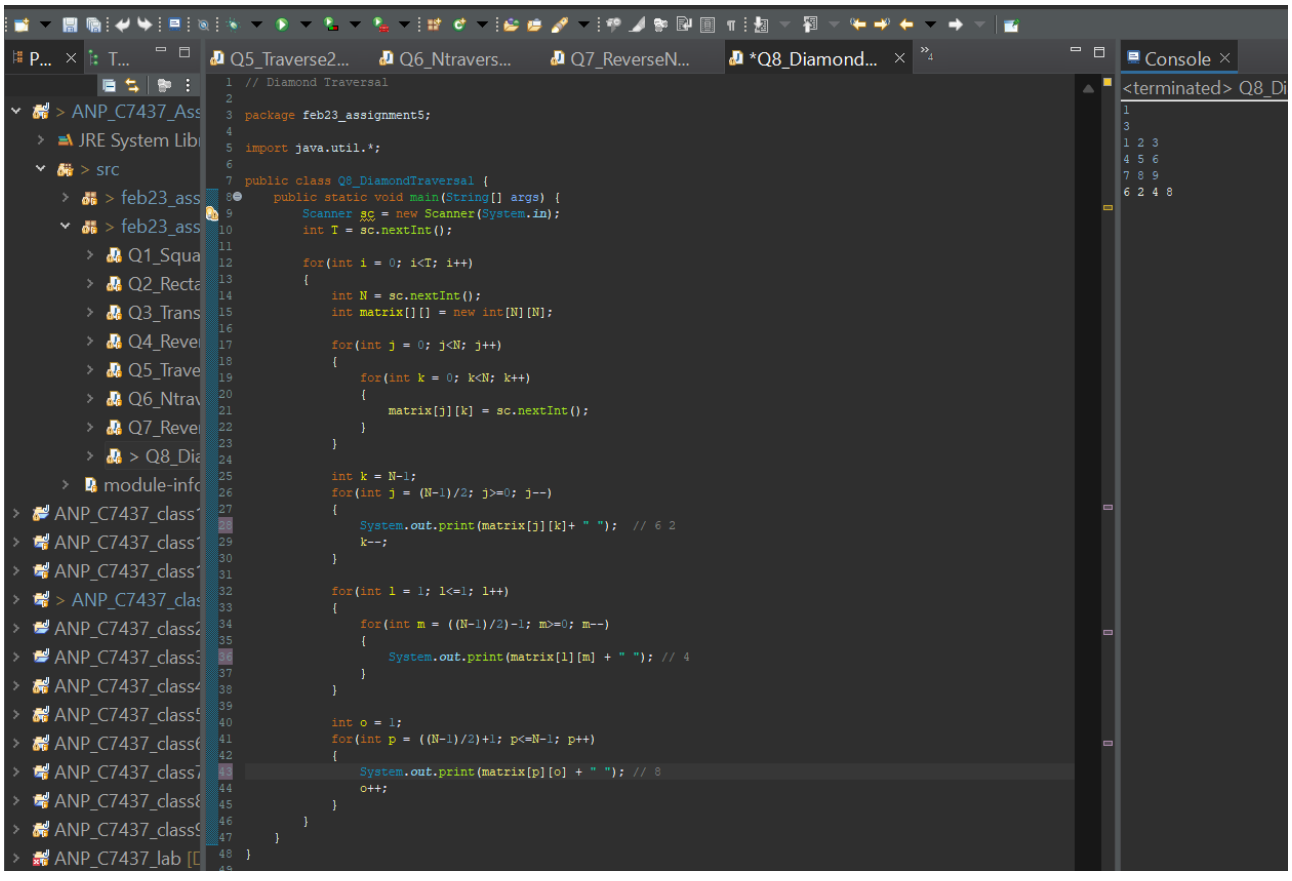
Q7. Reverse N Traversal



```
// Reverse N Traversal

package feb23_assignment5;

import java.util.*;

public class Q7_ReverseNTraversal {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int T = sc.nextInt();

        for(int i = 0; i<T; i++)
        {
            int N = sc.nextInt();
            int matrix[][] = new int[N][N];

            for(int j = 0; j<N; j++)
            {
                for(int k =0; k<N; k++)
                {
                    matrix[j][k] = sc.nextInt();
                }
            }

            for(int j = 0; j<N; j++)
            {
                System.out.print(matrix[j][0] + " ");
            }

            for(int j = 1; j<=N/2; j++)
            {
                for(int k = 1; k<=N/2; k++)
                {
                    if(j == k)
                    {
                        System.out.print(matrix[j][k] + " ");
                    }
                }
            }


            for(int j = 0; j<N; j++)
            {
                System.out.print(matrix[j][2] + " ");
            }
        }
    }
}
```

```
1
3
1 2 3
4 5 6
7 8 9
1 4 7 5 3 6 9
```

Q8. Diamond Traversal



```
// Diamond Traversal

package feb23_assignment5;

import java.util.*;

public class Q8_DiamondTraversal {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int T = sc.nextInt();

        for(int i = 0; i<T; i++)
        {
            int N = sc.nextInt();
            int matrix[][] = new int[N][N];

            for(int j = 0; j<N; j++)
            {
                for(int k = 0; k<N; k++)
                {
                    matrix[j][k] = sc.nextInt();
                }
            }

            int k = N-1;
            for(int j = (N-1)/2; j>=0; j--)
            {
                System.out.print(matrix[j][k]+ " ");  // 6 2
                k--;
            }

            for(int l = 1; l<=1; l++)
            {
                for(int m = ((N-1)/2)-1; m>=0; m--)
                {
                    System.out.print(matrix[l][m] + " "); // 4
                }
            }

            int o = 1;
            for(int p = ((N-1)/2)+1; p<=N-1; p++)
            {
                System.out.print(matrix[p][o] + " "); // 8
                o++;
            }
        }
    }
}
```

```
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

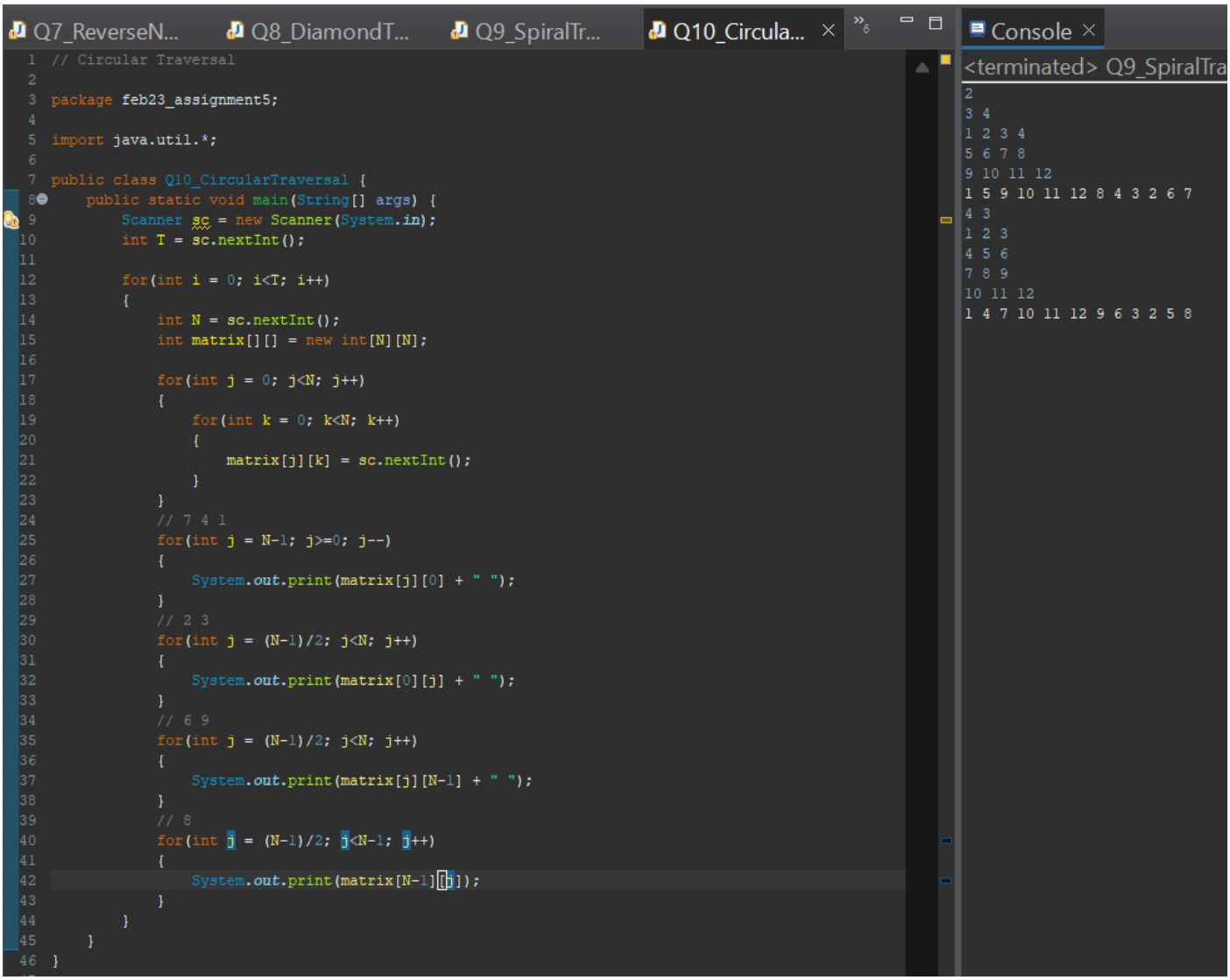
```java
// Spiral Traversal

package feb23_assignment5;

import java.util.*;

public class Q9_SpiralTraversal {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int T = sc.nextInt();

        for(int i = 0; i<T; i++)
        {
            int N = sc.nextInt();
            int M = sc.nextInt();
            int matrix[][] = new int[N][M];

            for(int j = 0; j<N; j++)
            {
                for(int k = 0; k<M; k++)
                {
                    matrix[j][k] = sc.nextInt();
                }
            }

            // 1 5 9
            for(int j = 0; j<N; j++)
            {
                System.out.print(matrix[j][0] + " ");
            }
            // 10 11 12
            for(int j = (M-1)/2; j<M; j++)
            {
                System.out.print(matrix[N-1][j] + " ");
            }
            // 8 4
            for(int j = (N-1)-1; j>=0; j--)
            {
                System.out.print(matrix[j][M-1] + " ");
            }

            // 3 2
            for(int j = (M-1)-1; j>0; j--)
            {
                System.out.print(matrix[0][j] + " ");
            }

            // 6 7
            for(int j = (N-1)/2; j<=(N-1)-1; j++)
            {
                for(int k = (M-1)/2; k<=M/2; k++)
                {
                    System.out.print(matrix[j][k] + " ");
                }
            }
//
        }
    }
}
```

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
```

Q10. Circular Traversal




```java
// Circular Traversal

package feb23_assignment5;

import java.util.*;

public class Q10_CircularTraversal {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int T = sc.nextInt();

        for(int i = 0; i<T; i++)
        {
            int N = sc.nextInt();
            int matrix[][] = new int[N][N];

            for(int j = 0; j<N; j++)
            {
                for(int k = 0; k<N; k++)
                {
                    matrix[j][k] = sc.nextInt();
                }
            }
            // 7 4 1
            for(int j = N-1; j>=0; j--)
            {
                System.out.print(matrix[j][0] + " ");
            }
            // 2 3
            for(int j = (N-1)/2; j<N; j++)
            {
                System.out.print(matrix[0][j] + " ");
            }
            // 6 9
            for(int j = (N-1)/2; j<N; j++)
            {
                System.out.print(matrix[j][N-1] + " ");
            }
            // 8
            for(int j = (N-1)/2; j<N-1; j++)
            {
                System.out.print(matrix[N-1][j]);
            }
        }
    }
}
```