ASSIGNMENT _ 1

Solution :

```java
package College;

import java.util.Scanner;

public class Matrix_Patterns {

    static void patternA(int[][] arr, int rows, int cols) {  1 usage
        int sum = 0;
        for (int i = 0; i < cols; i++) {
            sum += arr[0][i];
            System.out.print(arr[0][i] + " ");
        }
        System.out.println();
        int middleRow = rows / 2;
        for (int i = 1; i < rows; i++) {
            sum += arr[i][0];
            sum += arr[i][cols - 1];
            for (int j = 0; j < cols; j++) {
                if (i == middleRow) {
                    sum += arr[middleRow][j];
                    System.out.print(arr[middleRow][j] + " ");
                } else if (j == 0 || j == cols - 1) {
                    System.out.print(arr[i][j] + " ");
                } else {
                    System.out.print(0 + " ");
                }
            }
            System.out.println();
        }
        sum -= arr[middleRow][0] + arr[middleRow][cols - 1];
        System.out.println("Sum of the pattern is: " + sum);
    }
```

```java

    static void patternX(int[][] arr, int rows, int cols) {  1 usage
        int sum = 0;
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < cols; j++) {
                if (i == j) {
                    sum += arr[i][j];
                    System.out.print(arr[i][j] + " ");
                } else if (i + j == rows - 1) {
                    sum += arr[i][j];
                    System.out.print(arr[i][j] + " ");
                } else {
                    System.out.print(0 + " ");
                }
            }
            System.out.println();
        }
        System.out.println("Sum of the pattern is: " + sum);
    }

```

```java
static void patternZ(int[][] arr, int rows, int cols) {  1 usage
    int sum = 0;
    for (int i = 0; i < cols; i++) {
        sum += arr[0][i];
        System.out.print(arr[0][i] + " ");
    }
    System.out.println();

    for (int i = 1; i < rows - 1; i++) {
        for (int j = 0; j < cols; j++) {
            if (i + j == rows - 1) {
                sum += arr[i][j];
                System.out.print(arr[i][j] + " ");
            } else {
                System.out.print(0 + " ");
            }
        }
        System.out.println();
    }

    for (int j = 0; j < cols; j++) {
        sum += arr[rows - 1][j];
        System.out.print(arr[rows - 1][j] + " ");
    }
    System.out.println();

    System.out.println("Sum of the pattern is: " + sum);
}
```

```java
static void patternD(int[][] arr, int rows, int cols) {  1 usage
    int sum = 0;
    for (int i = 0; i < cols; i++) {
        sum += arr[0][i];
        System.out.print(arr[0][i] + " ");
    }
    System.out.println();

    for (int i = 1; i < rows - 1; i++) {
        sum += arr[i][0];
        sum += arr[i][cols - 1];

        for (int j = 0; j < cols; j++) {
            if (j == 0) {
                System.out.print(arr[i][j] + " ");
            } else if (j == cols - 1) {
                System.out.print(arr[i][j] + " ");
            } else {
                System.out.print(0 + " ");
            }
        }
        System.out.println();
    }

    for (int j = 0; j < cols; j++) {
        sum += arr[rows - 1][j];
        System.out.print(arr[rows - 1][j] + " ");
    }
    System.out.println();

    System.out.println("Sum of the pattern is: " + sum);
}
```

```java

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

        System.out.print("Enter rows: ");
        int rows = sc.nextInt();

        System.out.print("Enter cols: ");
        int cols = sc.nextInt();

        int[][] arr = new int[rows][cols];
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < cols; j++) {
                arr[i][j] = sc.nextInt();
            }
        }

        System.out.println("Original Matrix: ");
        for (int i = 0; i < rows; i++) {
            for (int j = 0; j < cols; j++) {
                System.out.print(arr[i][j] + " ");
            }
            System.out.println();
        }

```

```java

        System.out.print("Enter Pattern: ");
        char ch = sc.next().charAt(0);

        switch (Character.toLowerCase(ch)) {
            case 'x':
                patternX(arr, rows, cols);
                break;

            case 'a':
                patternA(arr, rows, cols);
                break;

            case 'd':
                patternD(arr, rows, cols);
                break;

            case 'z':
                patternZ(arr, rows, cols);
                break;

            default:
                System.out.println("choose a correct pattern!!");
                break;
        }
    }
}
```

OUTPUT :

X

```
Enter rows: 5
Enter cols: 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
Original Matrix:
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
Enter Pattern: x
1 0 0 0 5
0 2 0 4 0
0 0 3 0 0
0 2 0 4 0
1 0 0 0 5
Sum of the pattern is: 27

Process finished with exit code 0
```

A

```
Enter rows: 5
Enter cols: 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
Original Matrix:
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
Enter Pattern: a
1 2 3 4 5
1 0 0 0 5
1 2 3 4 5
1 0 0 0 5
1 0 0 0 5
Sum of the pattern is: 48

Process finished with exit code 0
```

D

```
Enter rows: 5
Enter cols: 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
Original Matrix:
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
Enter Pattern: d
1 2 3 4 5
1 0 0 0 5
1 0 0 0 5
1 0 0 0 5
1 2 3 4 5
Sum of the pattern is: 48
```

Z

```
Enter rows: 5
Enter cols: 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
Original Matrix:
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
Enter Pattern: z
1 2 3 4 5
0 0 0 4 0
0 0 3 0 0
0 2 0 0 0
1 2 3 4 5
Sum of the pattern is: 39
```