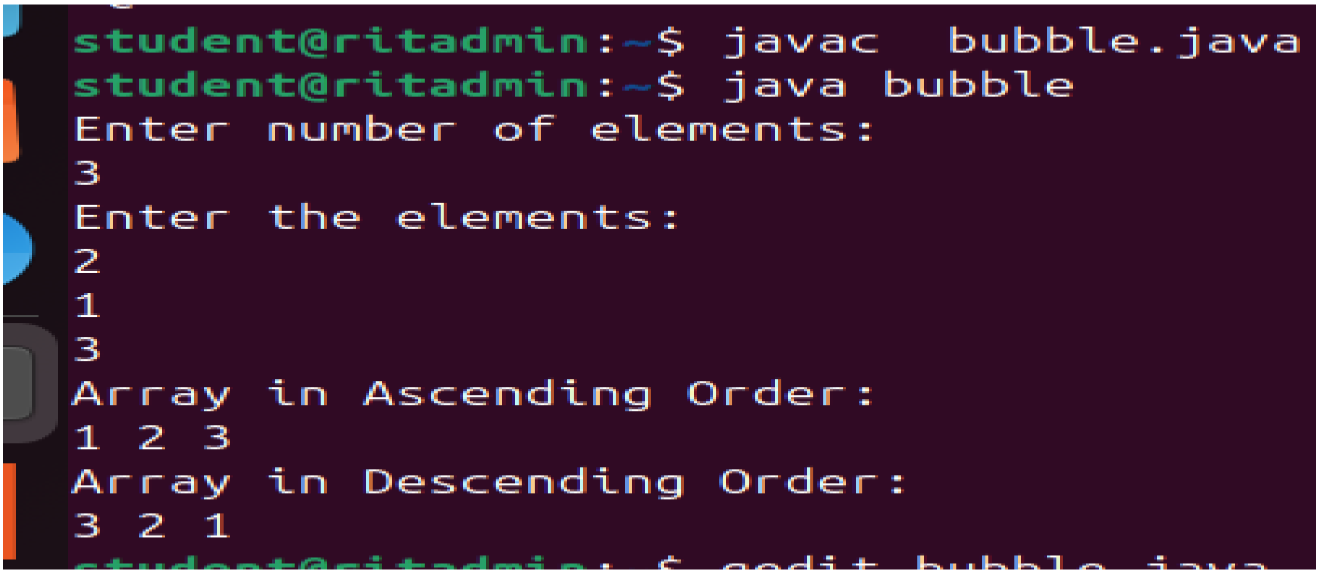
BUBBLE SORT—>>

code=

```
import java.util.Scanner;

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


        System.out.println("Enter number of elements:");
        int n = sc.nextInt();

        int arr[] = new int[n];
        System.out.println("Enter the elements:");
        for (int i = 0; i < n; i++) {
            arr[i] = sc.nextInt();
        }


        bubbleSortAscending(arr.clone());
        bubbleSortDescending(arr.clone());

        sc.close();
    }

    static void bubbleSortAscending(int arr[]) {
        int n = arr.length;
        for (int i = 0; i < n - 1; i++) {
            for (int j = 0; j < n - 1 - i; j++) {
                if (arr[j] > arr[j + 1]) {

                    int temp = arr[j];
                    arr[j] = arr[j + 1];
                    arr[j + 1] = temp;
                }
            }
        }

        System.out.println("Array in Ascending Order:");
        for (int num : arr) {
            System.out.print(num + " ");
        }
        System.out.println();
    }
    static void bubbleSortDescending(int arr[]) {
        int n = arr.length;
        for (int i = 0; i < n - 1; i++) {
            for (int j = 0; j < n - 1 - i; j++) {
                if (arr[j] < arr[j + 1]) {

                    int temp = arr[j];
                    arr[j] = arr[j + 1];
                    arr[j + 1] = temp;
                }
            }
        }

        System.out.println("Array in Descending Order:");
        for (int num : arr) {
            System.out.print(num + " ");
        }
        System.out.println();
    }
}
```



```
student@ritadmin:~$ javac  bubble.java
student@ritadmin:~$ java bubble
Enter number of elements:
3
Enter the elements:
2
1
3
Array in Ascending Order:
1 2 3
Array in Descending Order:
3 2 1
```

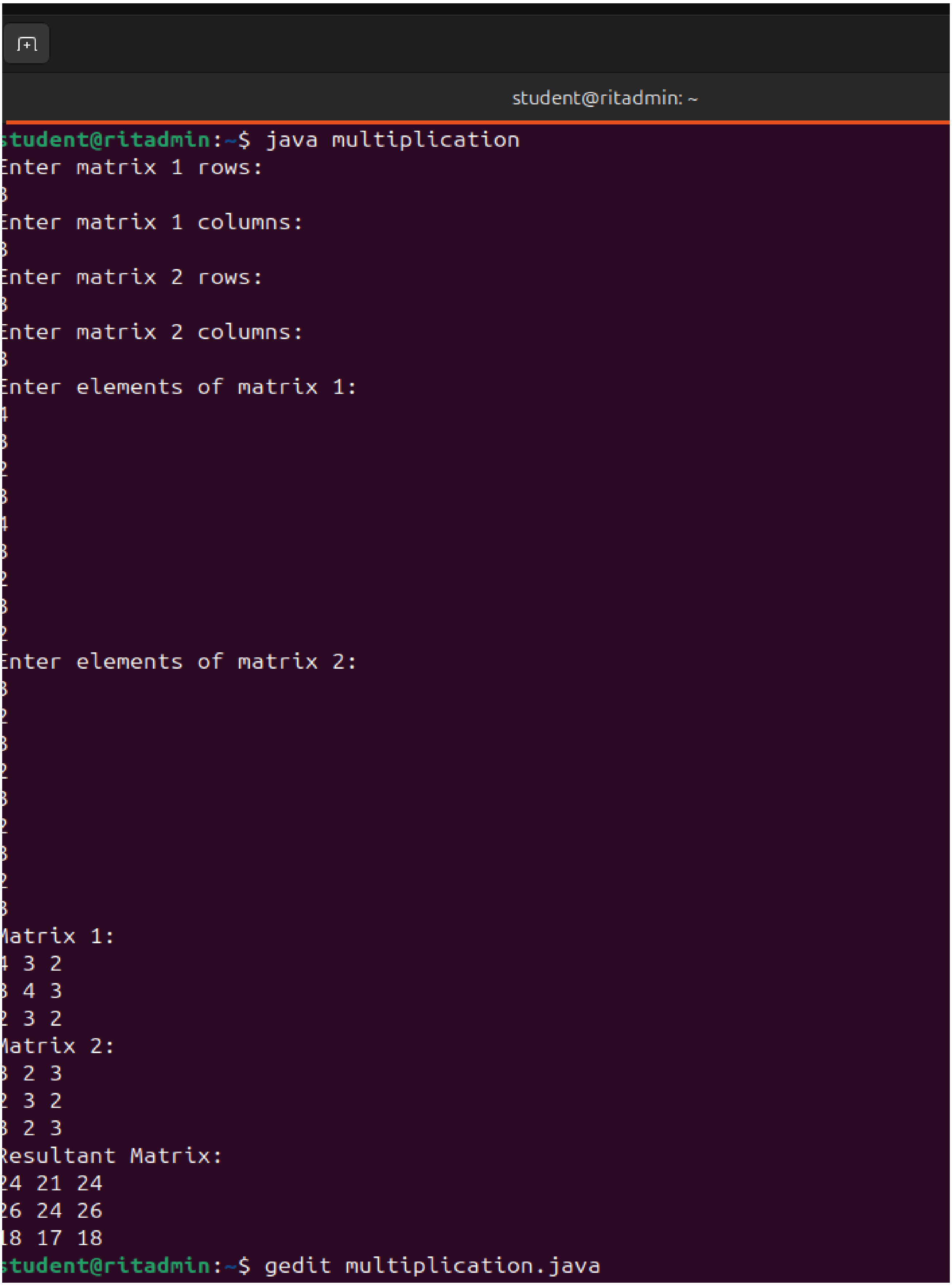
Multiplication of matrices→

code=

```
import java.util.Scanner;

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

        System.out.println("Enter matrix 1 rows:");
        int r1 = sc.nextInt();
```

```
System.out.println("Enter matrix 1 columns:");
int c1 = sc.nextInt();
System.out.println("Enter matrix 2 rows:");
int r2 = sc.nextInt();
System.out.println("Enter matrix 2 columns:");
int c2 = sc.nextInt();

// Condition for matrix multiplication
if (c1 == r2) {
    int mat1[][] = new int[r1][c1];
    int mat2[][] = new int[r2][c2];

    // Input for matrix 1
    System.out.println("Enter elements of matrix 1:");
    for (int i = 0; i < r1; i++) {
        for (int j = 0; j < c1; j++) {
            mat1[i][j] = sc.nextInt();
        }
    }

    // Input for matrix 2
    System.out.println("Enter elements of matrix 2:");
    for (int i = 0; i < r2; i++) {
        for (int j = 0; j < c2; j++) {
            mat2[i][j] = sc.nextInt();
        }
    }

    // Printing matrix 1
    System.out.println("Matrix 1:");
    for (int i = 0; i < r1; i++) {
        for (int j = 0; j < c1; j++) {
            System.out.print(mat1[i][j] + " ");
        }
        System.out.println();
    }

    // Printing matrix 2
    System.out.println("Matrix 2:");
    for (int i = 0; i < r2; i++) {
        for (int j = 0; j < c2; j++) {
            System.out.print(mat2[i][j] + " ");
        }
        System.out.println();
```

```
            }

            // Result matrix
            int res[][] = new int[r1][c2];
            for (int i = 0; i < r1; i++) {
                for (int j = 0; j < c2; j++) {
                    for (int k = 0; k < c1; k++) {
                        res[i][j] += mat1[i][k] * mat2[k][j];
                    }
                }
            }

            // Printing result
            System.out.println("Resultant Matrix:");
            for (int i = 0; i < r1; i++) {
                for (int j = 0; j < c2; j++) {
                    System.out.print(res[i][j] + " ");
                }
                System.out.println();
            }
        } else {
            System.out.println("Invalid dimensions! Multiplication not possible.");
        }
        sc.close();
    }
}
```



```
student@ritadmin:~$ java multiplication
Enter matrix 1 rows:
3
Enter matrix 1 columns:
3
Enter matrix 2 rows:
3
Enter matrix 2 columns:
3
Enter elements of matrix 1:
4
3
2
3
4
3
2
3
2
Enter elements of matrix 2:
3
2
3
2
3
2
3
2
3
Matrix 1:
4 3 2
3 4 3
2 3 2
Matrix 2:
3 2 3
2 3 2
3 2 3
Resultant Matrix:
24 21 24
26 24 26
18 17 18
student@ritadmin:~$ gedit multiplication.java
```