

MATRİSLERDE ÇARPMA İŞLEMİ

$$\begin{matrix} A & B & C \\ \begin{pmatrix} 2 & -1 & 3 & 4 & 1 \\ 5 & 3 & 2 & 1 & 0 \\ 4 & 2 & 8 & -3 & 1 \\ 0 & 1 & 0 & 1 & 2 \end{pmatrix} & \begin{pmatrix} 3 & 1 & 0 \\ 2 & -2 & -1 \\ 1 & -1 & 0 \\ 0 & 3 & 4 \\ 3 & 2 & 3 \end{pmatrix} & = \begin{pmatrix} 10 & 15 & 20 \\ 23 & 0 & 1 \\ 27 & -15 & -11 \\ 8 & 5 & 9 \end{pmatrix} \end{matrix}$$

4x5 5x3 4x3

Matrisin son hali yandaki gibidir. Oluşma aşamaları aşağıda adım adım anlatılmıştır.

1.Adım

$$\begin{pmatrix} 2 & -1 & 3 & 4 & 1 \\ 5 & 3 & 2 & 1 & 0 \\ 4 & 2 & 8 & -3 & 1 \\ 0 & 1 & 0 & 1 & 2 \end{pmatrix} \begin{pmatrix} 3 & 1 & 0 \\ 2 & -2 & -1 \\ 1 & -1 & 0 \\ 0 & 3 & 4 \\ 3 & 2 & 3 \end{pmatrix} = \begin{pmatrix} 10 \\ \\ \\ \\ \end{pmatrix}$$

$$C[0][0]=A[0][0]*B[0][0] + A[0][1]*B[1][0] + A[0][2]*B[2][0] + A[0][3]*B[3][0] + A[0][4]*B[4][0] = 6-2+3+0+3=10$$

$2*3=6$ $-1*2=-2$ $3*1=3$ $4*0=0$ $1*3=3$

$$\begin{pmatrix} 2 & -1 & 3 & 4 & 1 \\ 5 & 3 & 2 & 1 & 0 \\ 4 & 2 & 8 & -3 & 1 \\ 0 & 1 & 0 & 1 & 2 \end{pmatrix} \begin{pmatrix} 3 & 1 & 0 \\ 2 & -2 & -1 \\ 1 & -1 & 0 \\ 0 & 3 & 4 \\ 3 & 2 & 3 \end{pmatrix} = \begin{pmatrix} 10 & 15 \\ \\ \\ \\ \end{pmatrix}$$

$$C[0][1]=A[0][0]*B[0][1] + A[0][1]*B[1][1] + A[0][2]*B[2][1] + A[0][3]*B[3][1] + A[0][4]*B[4][1] = 2+2-3+12+2=15$$

$2*1=2$ $-1*2=2$ $3*-1=-3$ $4*3=12$ $1*2=2$

$$\begin{pmatrix} 2 & -1 & 3 & 4 & 1 \\ 5 & 3 & 2 & 1 & 0 \\ 4 & 2 & 8 & -3 & 1 \\ 0 & 1 & 0 & 1 & 2 \end{pmatrix} \begin{pmatrix} 3 & 1 & 0 \\ 2 & -2 & -1 \\ 1 & -1 & 0 \\ 0 & 3 & 4 \\ 3 & 2 & 3 \end{pmatrix} = \begin{pmatrix} 10 & 15 & 20 \\ \\ \\ \\ \end{pmatrix}$$

$$C[0][2]=A[0][0]*B[0][2] + A[0][1]*B[1][2] + A[0][2]*B[2][2] + A[0][3]*B[3][2] + A[0][4]*B[4][2] = 0+1+0+16+3=20$$

$2*0=0$ $-1*-1=1$ $3*0=0$ $4*4=16$ $1*3=3$

2.Adım

$$\begin{pmatrix} 2 & -1 & 3 & 4 & 1 \\ 5 & 3 & 2 & 1 & 0 \\ 4 & 2 & 8 & -3 & 1 \\ 0 & 1 & 0 & 1 & 2 \end{pmatrix} \begin{pmatrix} 3 & 1 & 0 \\ 2 & -2 & -1 \\ 1 & -1 & 0 \\ 0 & 3 & 4 \\ 3 & 2 & 3 \end{pmatrix} = \begin{pmatrix} 10 & 15 & 20 \\ 23 & & \end{pmatrix}$$

$$C[1][0] = \underbrace{A[1][0]*B[0][0]}_{5*3=15} + \underbrace{A[1][1]*B[1][0]}_{3*2=6} + \underbrace{A[1][2]*B[2][0]}_{2*1=2} + \underbrace{A[1][3]*B[3][0]}_{1*0=0} + \underbrace{A[1][4]*B[4][0]}_{0*3=0} = 15+6+2=23$$

$$\begin{pmatrix} 2 & -1 & 3 & 4 & 1 \\ 5 & 3 & 2 & 1 & 0 \\ 4 & 2 & 8 & -3 & 1 \\ 0 & 1 & 0 & 1 & 2 \end{pmatrix} \begin{pmatrix} 3 & 1 & 0 \\ 2 & -2 & -1 \\ 1 & -1 & 0 \\ 0 & 3 & 4 \\ 3 & 2 & 3 \end{pmatrix} = \begin{pmatrix} 10 & 15 & 20 \\ 23 & 0 & \end{pmatrix}$$

$$C[1][1] = \underbrace{A[1][0]*B[0][1]}_{5*1=5} + \underbrace{A[1][1]*B[1][1]}_{3*-2=-6} + \underbrace{A[1][2]*B[2][1]}_{2*-1=-2} + \underbrace{A[1][3]*B[3][1]}_{1*3=3} + \underbrace{A[1][4]*B[4][1]}_{0*2=0} = 5-6-2+3+0=0$$

$$\begin{pmatrix} 2 & -1 & 3 & 4 & 1 \\ 5 & 3 & 2 & 1 & 0 \\ 4 & 2 & 8 & -3 & 1 \\ 0 & 1 & 0 & 1 & 2 \end{pmatrix} \begin{pmatrix} 3 & 1 & 0 \\ 2 & -2 & -1 \\ 1 & -1 & 0 \\ 0 & 3 & 4 \\ 3 & 2 & 3 \end{pmatrix} = \begin{pmatrix} 10 & 15 & 20 \\ 23 & 0 & 1 \end{pmatrix}$$

$$C[1][2] = \underbrace{A[1][0]*B[0][2]}_{5*0=0} + \underbrace{A[1][1]*B[1][2]}_{3*-1=-3} + \underbrace{A[1][2]*B[2][2]}_{2*0=0} + \underbrace{A[1][3]*B[3][2]}_{1*4=4} + \underbrace{A[1][4]*B[4][2]}_{0*3=0} = 0-3+0+4+0=1$$

3.Adım

$$\begin{pmatrix} 2 & -1 & 3 & 4 & 1 \\ 5 & 3 & 2 & 1 & 0 \\ 4 & 2 & 8 & -3 & 1 \\ 0 & 1 & 0 & 1 & 2 \end{pmatrix} \begin{pmatrix} 3 & 1 & 0 \\ 2 & -2 & -1 \\ 1 & -1 & 0 \\ 0 & 3 & 4 \\ 3 & 2 & 3 \end{pmatrix} = \begin{pmatrix} 10 & 15 & 20 \\ 23 & 0 & 1 \\ 27 & & \end{pmatrix}$$

$$C[2][0] = \underbrace{A[2][0]*B[0][0]}_{4*3=12} + \underbrace{A[2][1]*B[1][0]}_{2*2=4} + \underbrace{A[2][2]*B[2][0]}_{8*1=8} + \underbrace{A[2][3]*B[3][0]}_{-3*0=0} + \underbrace{A[2][4]*B[4][0]}_{1*3=3} = 12+4+8+0+3=27$$

$$\begin{pmatrix} 2 & -1 & 3 & 4 & 1 \\ 5 & 3 & 2 & 1 & 0 \\ 4 & 2 & 8 & -3 & 1 \\ 0 & 1 & 0 & 1 & 2 \end{pmatrix} \begin{pmatrix} 3 & 1 & 0 \\ 2 & -2 & -1 \\ 1 & -1 & 0 \\ 0 & 3 & 4 \\ 3 & 2 & 3 \end{pmatrix} = \begin{pmatrix} 10 & 15 & 20 \\ 23 & 0 & 1 \\ 27 & -15 & \end{pmatrix}$$

$$C[2][1] = \underbrace{A[2][0]*B[0][1]}_{4*1=4} + \underbrace{A[2][1]*B[1][1]}_{2*(-2)=-4} + \underbrace{A[2][2]*B[2][1]}_{8*(-1)=-8} + \underbrace{A[2][3]*B[3][1]}_{-3*3=-9} + \underbrace{A[2][4]*B[4][1]}_{1*2=2} = 4-4-8-9+2=-15$$

$$\begin{pmatrix} 2 & -1 & 3 & 4 & 1 \\ 5 & 3 & 2 & 1 & 0 \\ 4 & 2 & 8 & -3 & 1 \\ 0 & 1 & 0 & 1 & 2 \end{pmatrix} \begin{pmatrix} 3 & 1 & 0 \\ 2 & -2 & -1 \\ 1 & -1 & 0 \\ 0 & 3 & 4 \\ 3 & 2 & 3 \end{pmatrix} = \begin{pmatrix} 10 & 15 & 20 \\ 23 & 0 & 1 \\ 27 & -15 & -11 \end{pmatrix}$$

$$C[2][2] = \underbrace{A[2][0]*B[0][2]}_{4*0=0} + \underbrace{A[2][1]*B[1][2]}_{2*(-1)=-2} + \underbrace{A[2][2]*B[2][2]}_{8*0=0} + \underbrace{A[2][3]*B[3][2]}_{-3*4=-12} + \underbrace{A[2][4]*B[4][2]}_{1*3=3} = 0-2+0-12+3=-11$$

4.Adım

$$\begin{pmatrix} 2 & -1 & 3 & 4 & 1 \\ 5 & 3 & 2 & 1 & 0 \\ 4 & 2 & 8 & -3 & 1 \\ 0 & 1 & 0 & 1 & 2 \end{pmatrix} \begin{pmatrix} 3 & 1 & 0 \\ 2 & -2 & -1 \\ 1 & -1 & 0 \\ 0 & 3 & 4 \\ 3 & 2 & 3 \end{pmatrix} = \begin{pmatrix} 10 & 15 & 20 \\ 23 & 0 & 1 \\ 27 & -15 & -11 \\ 8 \end{pmatrix}$$

$$C[3][0]=A[3][0]*B[0][0] + A[3][1]*B[1][0] + A[3][2]*B[2][0] + A[3][3]*B[3][0] + A[3][4]*B[4][0] = 0+2+0+0+6=8$$

$0*3=0 \quad 1*2=2 \quad 0*1=0 \quad 1*0=0 \quad 2*3=6$

$$\begin{pmatrix} 2 & -1 & 3 & 4 & 1 \\ 5 & 3 & 2 & 1 & 0 \\ 4 & 2 & 8 & -3 & 1 \\ 0 & 1 & 0 & 1 & 2 \end{pmatrix} \begin{pmatrix} 3 & 1 & 0 \\ 2 & -2 & -1 \\ 1 & -1 & 0 \\ 0 & 3 & 4 \\ 3 & 2 & 3 \end{pmatrix} = \begin{pmatrix} 10 & 15 & 20 \\ 23 & 0 & 1 \\ 27 & -15 & -11 \\ 8 & 5 \end{pmatrix}$$

$$C[3][1]=A[3][0]*B[0][1] + A[3][1]*B[1][1] + A[3][2]*B[2][1] + A[3][3]*B[3][1] + A[3][4]*B[4][1] = 0-2+0+3+4=5$$

$0*1=0 \quad 1*-2=-2 \quad 0*-1=0 \quad 1*3=3 \quad 2*2=4$

$$\begin{pmatrix} 2 & -1 & 3 & 4 & 1 \\ 5 & 3 & 2 & 1 & 0 \\ 4 & 2 & 8 & -3 & 1 \\ 0 & 1 & 0 & 1 & 2 \end{pmatrix} \begin{pmatrix} 3 & 1 & 0 \\ 2 & -2 & -1 \\ 1 & -1 & 0 \\ 0 & 3 & 4 \\ 3 & 2 & 3 \end{pmatrix} = \begin{pmatrix} 10 & 15 & 20 \\ 23 & 0 & 1 \\ 27 & -15 & -11 \\ 8 & 5 & 9 \end{pmatrix}$$

$$C[3][2]=A[3][0]*B[0][2] + A[3][1]*B[1][2] + A[3][2]*B[2][2] + A[3][3]*B[3][2] + A[3][4]*B[4][2] = 0-1+0+4+6=9$$

$0*0=0 \quad 1*-1=-1 \quad 0*0=0 \quad 1*4=4 \quad 2*3=6$

```

import java.util.Random;
public class Matriks {

    public static void main(String[] args) {
        Random rast = new Random();
        int a,b,c,d,count=0,f=0;
        a=1+rast.nextInt(6);
        d=1+rast.nextInt(6);
        do
        {

            b=1+rast.nextInt(6);
            c=1+rast.nextInt(6);

                if(b==c)
                    f=1;
                count++;
        }while(f!=1);
        int [][]A = new int[a][b];
        int [][]B = new int[c][d];
        int [][]C = new int[a][d];
        System.out.println();
        System.out.println("A matriksi Oluşturuluyor");
        System.out.println();
        for(int i=0;i<A.length;i++)
        {
            for(int j=0;j<A[0].length;j++)
            {
                A[i][j]=1+rast.nextInt(5);
                System.out.print(A[i][j]+" ");
            }System.out.println();
        }
        System.out.println();
        System.out.println("B matriksi Oluşturuluyor");
        System.out.println();
        for(int i=0;i<B.length;i++)
        {
            for(int j=0;j<B[0].length;j++)
            {
                B[i][j]=1+rast.nextInt(5);
                System.out.print(B[i][j]+" ");
            }System.out.println();
        }
        System.out.println();

        for(int i=0;i<A.length;i++){
            for(int j=0;j<B[0].length;j++){
                for(int k=0;k<B.length;k++){
                    C[i][j]+=A[i][k]*B[k][j];
                }
            }
        }

        System.out.println();
        System.out.println("C matriksi Oluşturuluyor");
        System.out.println();
        for(int i=0;i<C.length;i++)
        {
            for(int j=0;j<C[0].length;j++)
            {
                System.out.print(C[i][j]+" ");
            }System.out.println();
        }
        System.out.println();
        System.out.println("Count : "+count);

    }
}

```