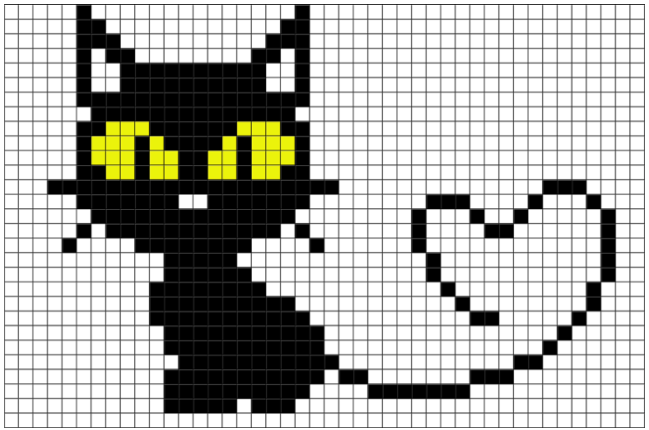
iki Boyutlu Diziler
Matrisler



Suhap SAHIN
Onur GÖK

Matris

0	1	2
3	4	5
6	7	8

$$\begin{bmatrix} 0 & 1 & 2 \\ 3 & 4 & 5 \\ 6 & 7 & 8 \end{bmatrix}$$

Matris

isim

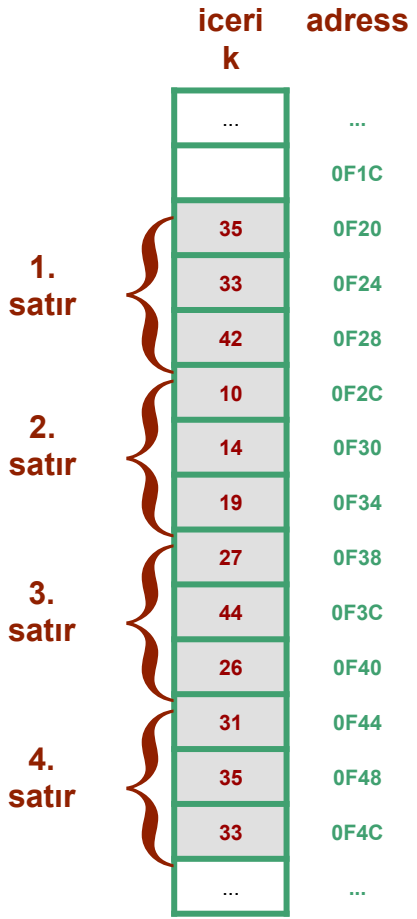
```
int matris[4][3]={35,33,42,10,14,19,27,44,26,31,35,33};
```

tip

boyut

```
int *matris = malloc(N*M*sizeof(int))
int matris[M][N]
matris[1][2]
matris[5]
```

1. satır	35	33	42
2. satır	10	14	19
3. satır	27	44	26
4. satır	31	35	33



Matris

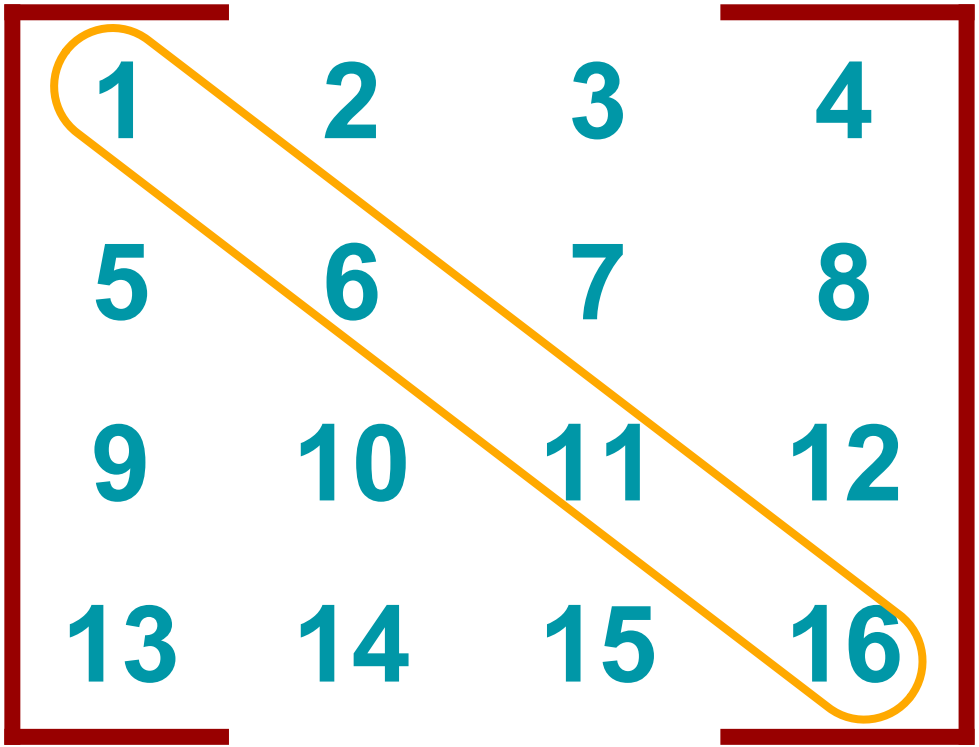
```c
#include <stdio.h>
int main() {
        int matris[3][3] = { {0, 1, 2}, {3, 4, 5}, {6, 7, 8} };
        int satir, sutun;
        for (satir = 0 ; satir < 3 ; satir++) {
                for (sutun = 0 ; sutun < 3 ; sutun++)
                        printf("%d ", matris[satir][sutun]);
                printf("\n");
        }
        printf("\n");
        matris[1][2] = 999;
        printf("0,2 -> %d\n\n", matris[0][2]);
        printf("2,0. elemana sayi girin:");
        scanf("%d", &matris[2][0]);
        printf("2,0 -> %d\n\n", matris[2][0]);
        for (satir = 0 ; satir < 3 ; satir++) {
                for (sutun = 0 ; sutun < 3 ; sutun++)
                        printf("%d ", matris[satir][sutun]);
                printf("\n");
        }
        return 0;
}
```

0	1	2
3	4	5
6	7	8

Matris Kösegeni

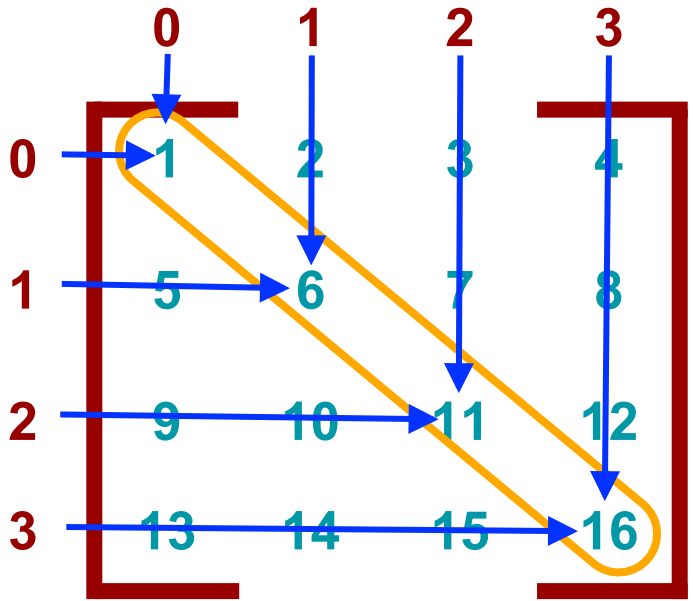
$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \\ 13 & 14 & 15 & 16 \end{bmatrix}$$

Matris Kösegeni



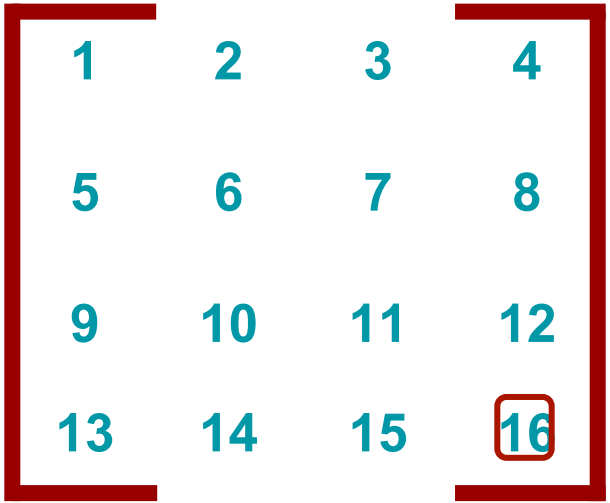
Matris Kösegeni

```c
#include <stdio.h>
int main() {
    int N = 4;
    int matris[4][4] = { {1, 2, 3, 4}, {5, 6, 7, 8}, {9, 10, 11, 12}, {13, 14, 15, 16}};
    int i, j;
    printf("matris:\n");
    for (i = 0 ; i < N ; i++) {
        for (j = 0 ; j < N ; j++) {
            printf("%2d ", matris[i][j]);
        }
        printf("\n");
    }
    printf("\n");
    printf("matrisin kosegeni: ");
    for (i = 0 ; i < N ; i++) {
        for (j = 0 ; j < N ; j++) {
            if (i == j)
                printf("%d ", matris[i][j]);
        }
    }
    printf("\n");
    return 0;
}
```

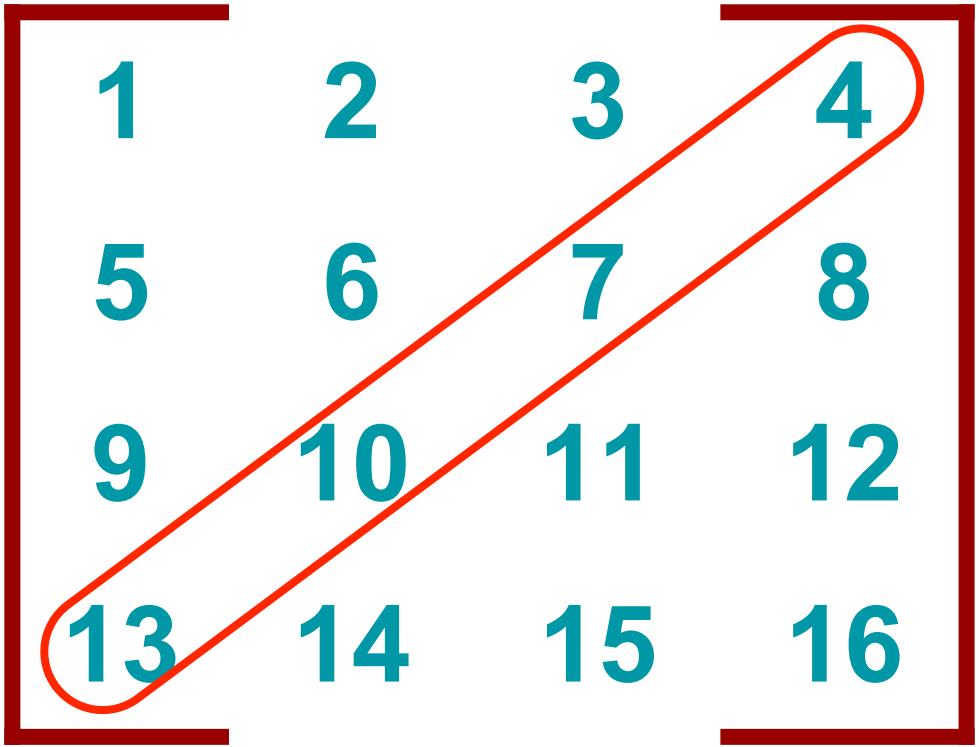


Matris Kösegeni

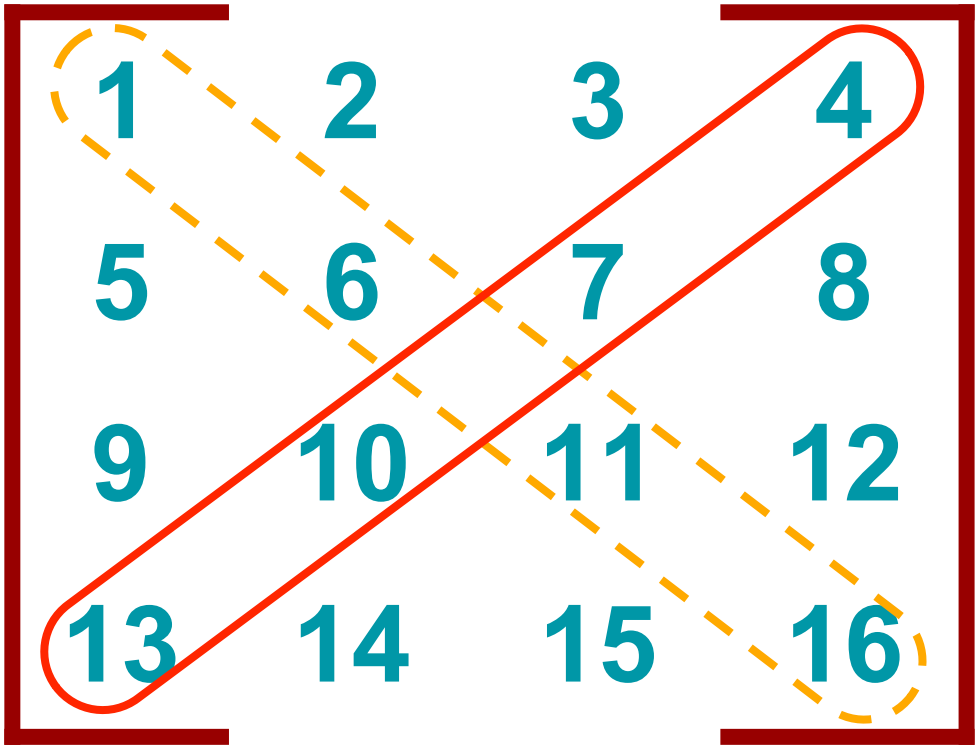
```c
#include <stdio.h>
int main() {
    int N = 4;
    int matris[4][4] = { {1, 2, 3, 4}, {5, 6, 7, 8}, {9, 10, 11, 12}, {13, 14, 15, 16}};
    int i, j;
    printf("matris:\n");
    for (i = 0 ; i < N ; i++) {
        for (j = 0 ; j < N ; j++) {
            printf("%2d ", matris[i][j]);
        }
        printf("\n");
    }
    printf("\n");
    printf("matrisin kosegeni: ");
    for (i = 0 ; i < N ; i++) {
                    printf("%d ", matris[i][i]);
    }
    printf("\n");
    return 0;
}
```



Matris Ters Kösegeni

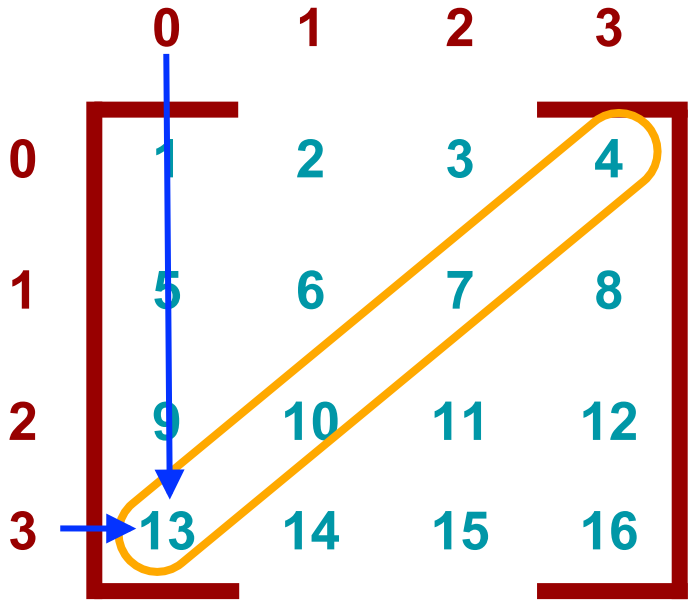


Matris Ters Kösegeni



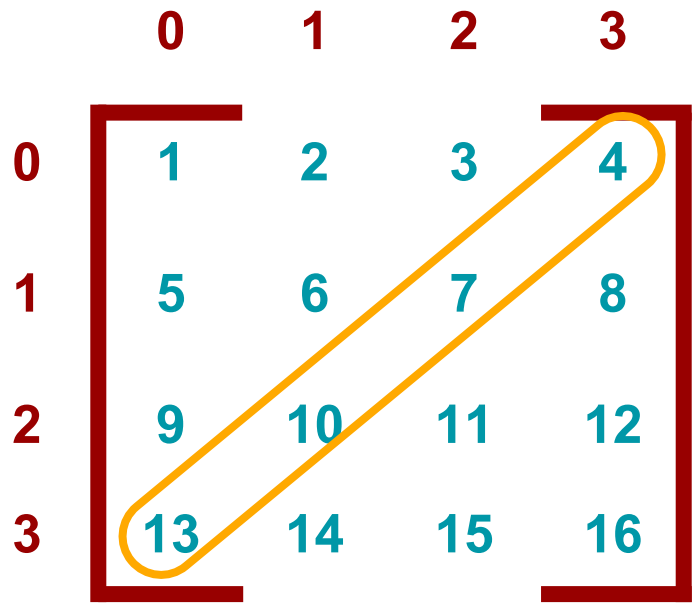
Matris Ters Kösegeni

```c
#include <stdio.h>
int main() {
    int N = 4;
    int matris[4][4] = { {1, 2, 3, 4}, {5, 6, 7, 8}, {9, 10, 11, 12}, {13, 14, 15, 16}};
    int i, j;
    printf("matris:\n");
    for (i = 0 ; i < N ; i++) {
        for (j = 0 ; j < N ; j++) {
            printf("%2d ", matris[i][j]);
        }
        printf("\n");
    }
    printf("\n");
    printf("matrisin ters kosegeni: ");
    for (i = 0 ; i < N ; i++) {
                for (j = 0 ; j < N ; j++) {
                        if (i == N-1-j)
                                printf("%d ", matris[i][j]);
                }
    }
    printf("\n");
    return 0;
}
```



Matris Ters Kösegeni

```c
#include <stdio.h>
int main() {
    int N = 4;
    int matris[4][4] = { {1, 2, 3, 4}, {5, 6, 7, 8}, {9, 10, 11, 12}, {13, 14, 15, 16}};
    int i, j;
    printf("matris:\n");
    for (i = 0 ; i < N ; i++) {
        for (j = 0 ; j < N ; j++) {
            printf("%2d ", matris[i][j]);
        }
        printf("\n");
    }
    printf("\n");
    printf("matrisin ters kosegeni: ");
    for (i = 0 ; i < N ; i++) {
                    printf("%d ", matris[i][N-1-i]);
    }
    printf("\n");
    return 0;
}
```



Matris

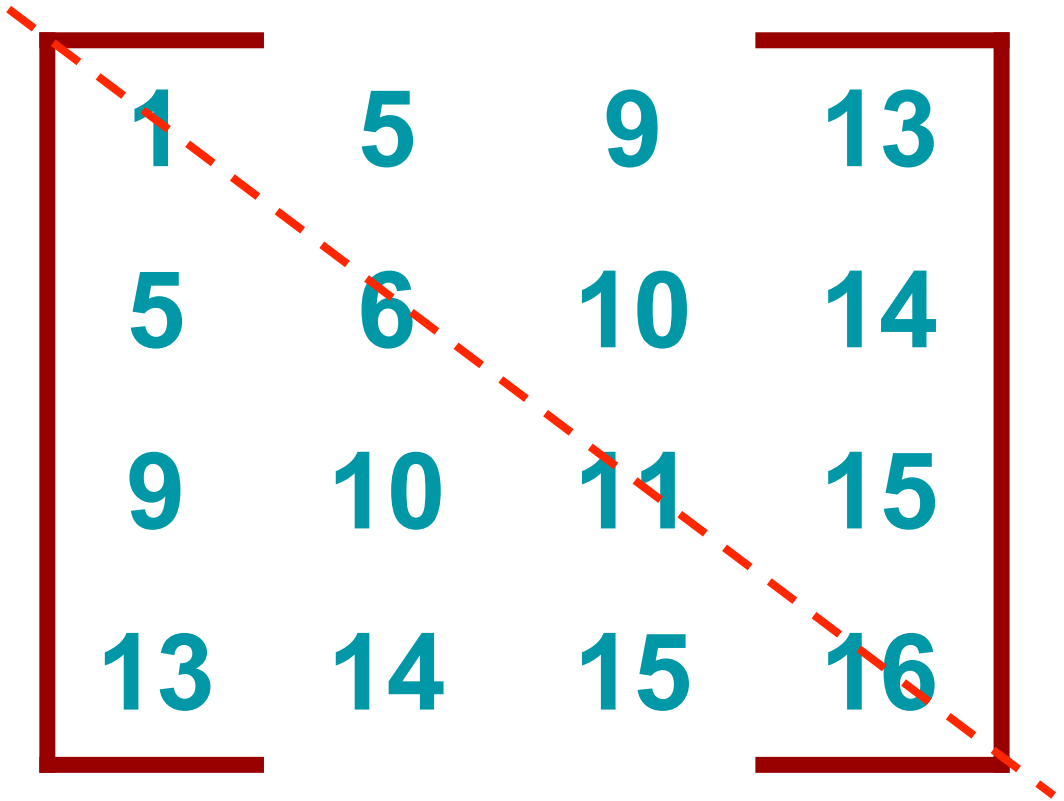
Matris transpozu alma

```c
#include <stdio.h>
int main() {
    int matris[3][3];
    int transpose[3][3];
    int satir = 0,sutun = 0;
    printf("\n3*3'luk matrisin degerlerini giriniz \n\n");
    for( satir = 0 ;  satir < 3; satir++ ) {
       for ( sutun = 0; sutun< 3; sutun++) {
          printf("Matrisin [%d][%d] elemani : ",satir+1,sutun+1);
          scanf("%d",&matris[satir][sutun]);
          transpose[sutun][satir] = matris[satir][sutun];
       }
    }
    printf("\nMatris\tve\tTranspozu\n");
    for( satir= 0 ;  satir < 3; satir++ ) {
       for ( sutun = 0; sutun< 3; sutun++) {
          printf("%d ",matris[satir][sutun]);
       }
       printf("\t\t"); // 2 tab boyutu bosluk birakir
       for ( sutun = 0; sutun< 3; sutun++) {
          printf("%d ",transpose[satir][sutun]);
       }
       printf("\n");
    }
    return 0;
}
```

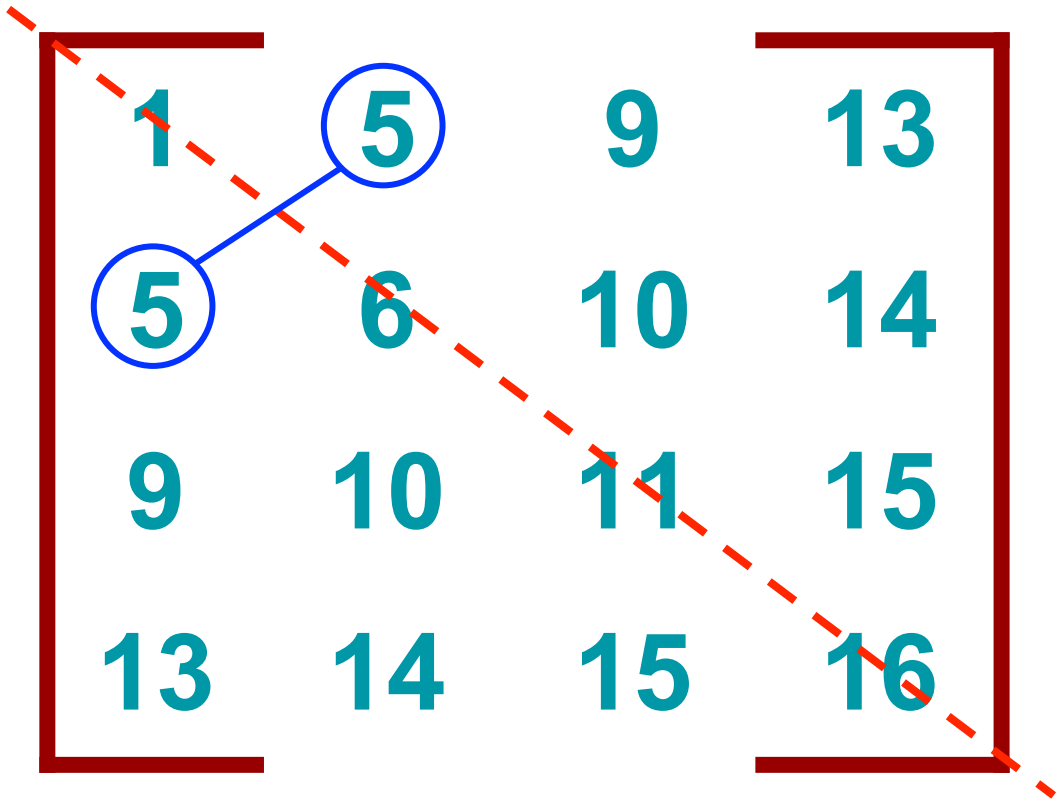
Simetrik Matris

$$\begin{bmatrix} 1 & 5 & 9 & 13 \\ 5 & 6 & 10 & 14 \\ 9 & 10 & 11 & 15 \\ 13 & 14 & 15 & 16 \end{bmatrix}$$

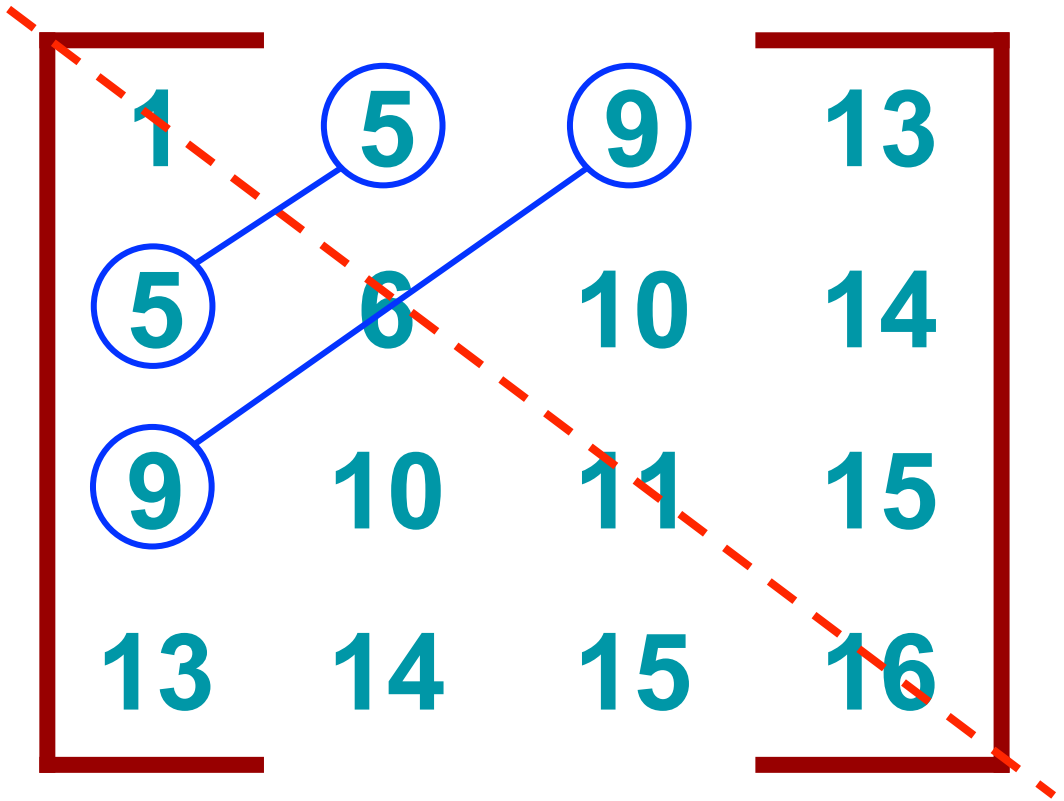
Simetrik Matris



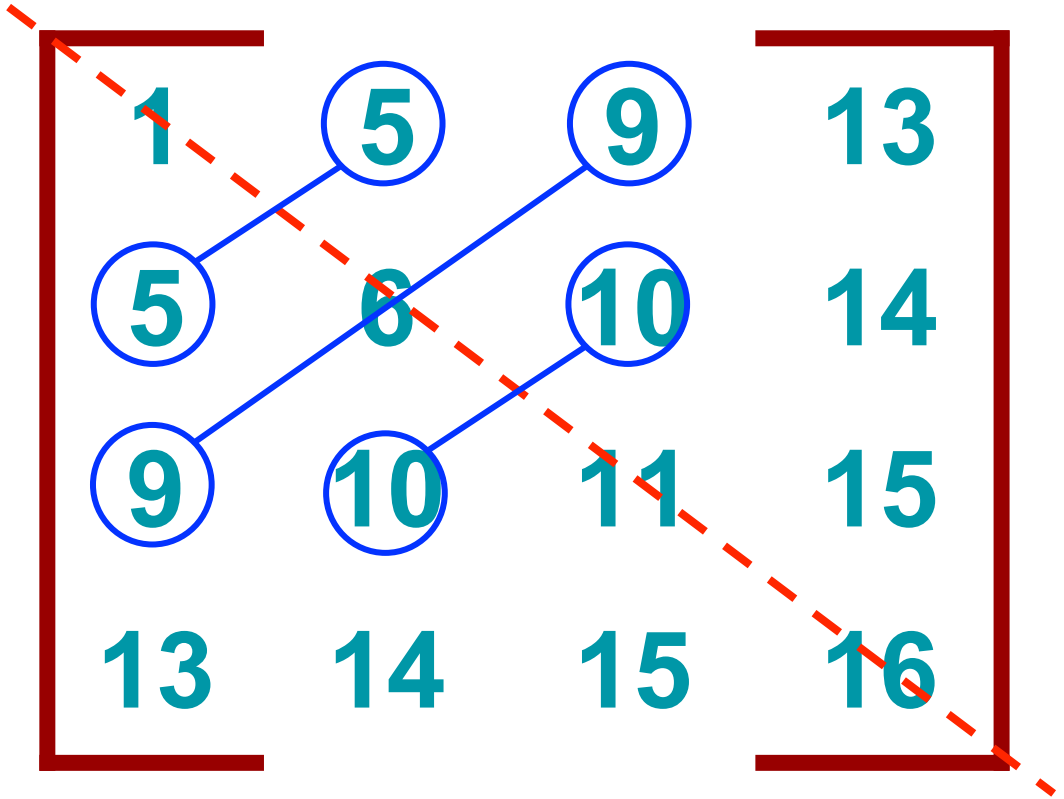
Simetrik Matris



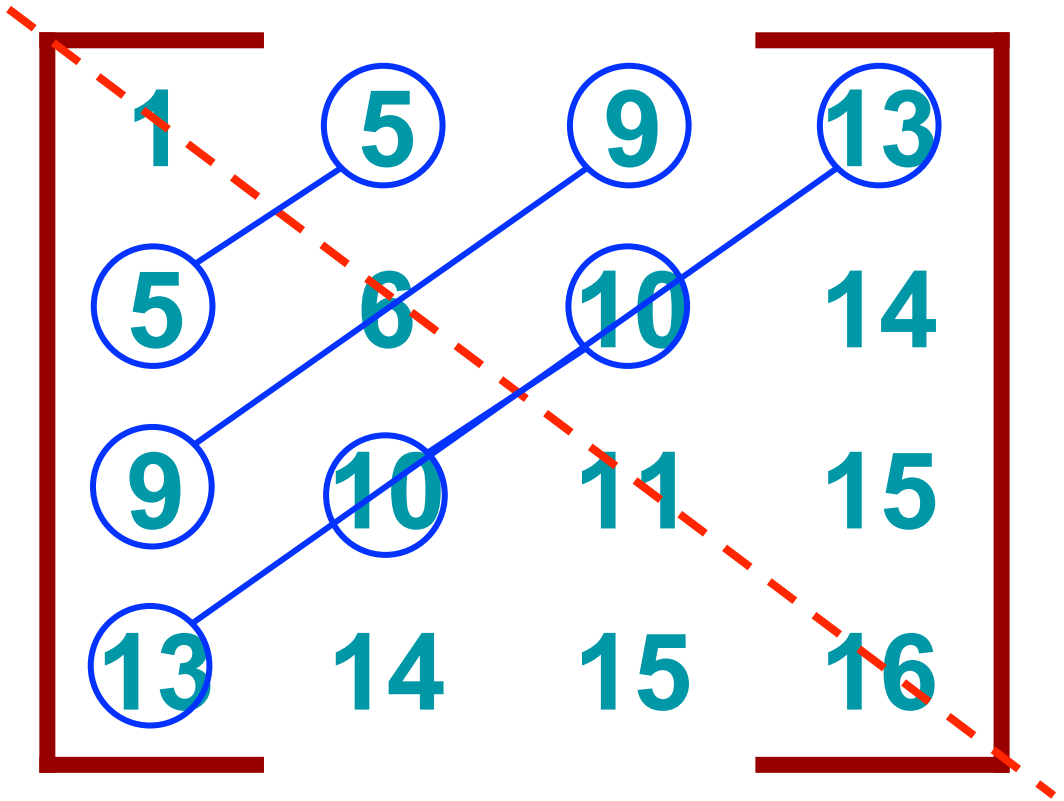
Simetrik Matris



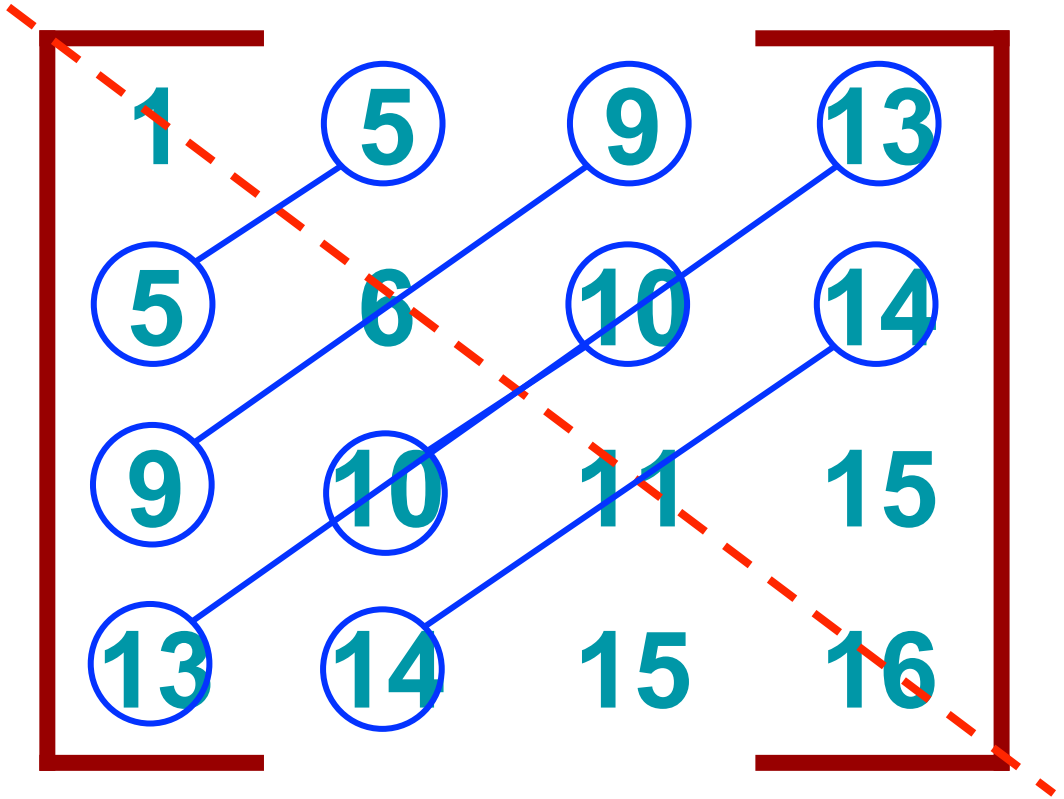
Simetrik Matris



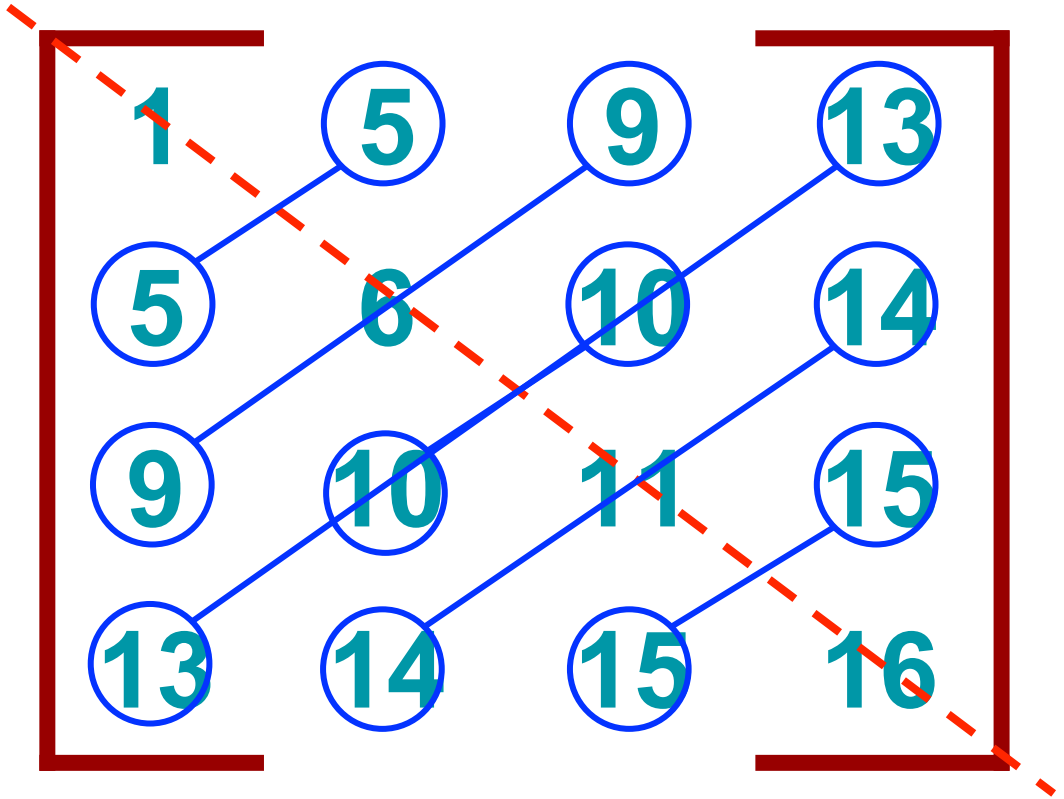
Simetrik Matris



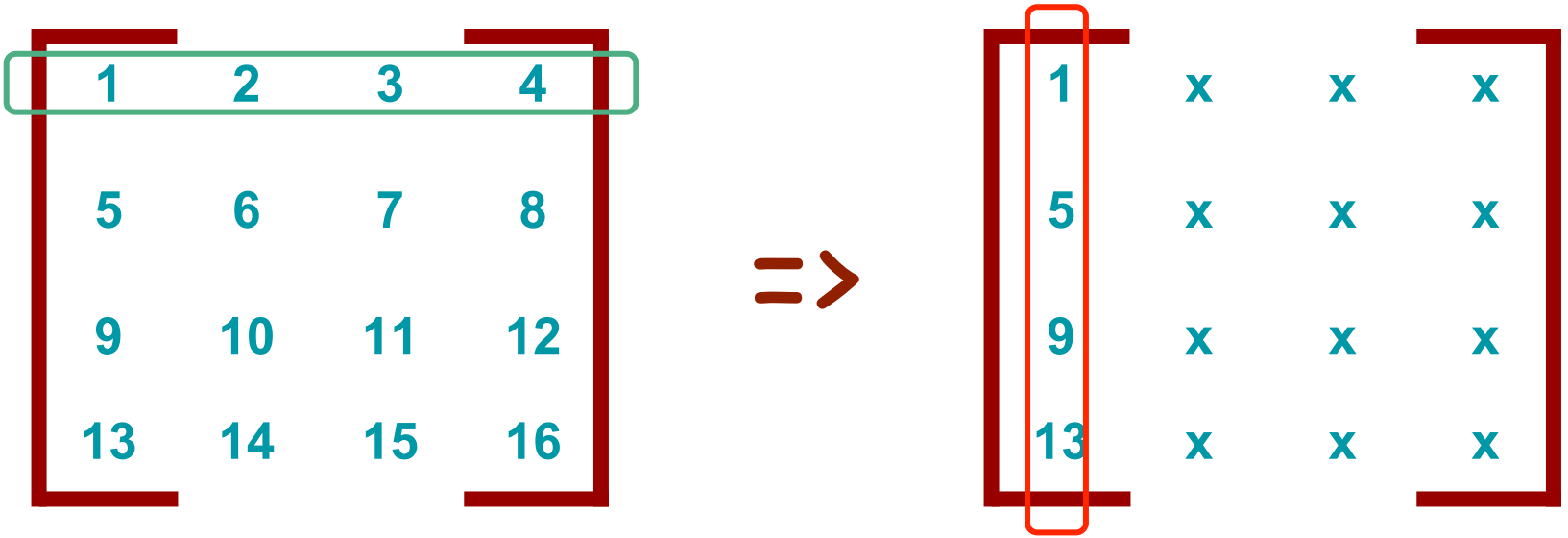
Simetrik Matris



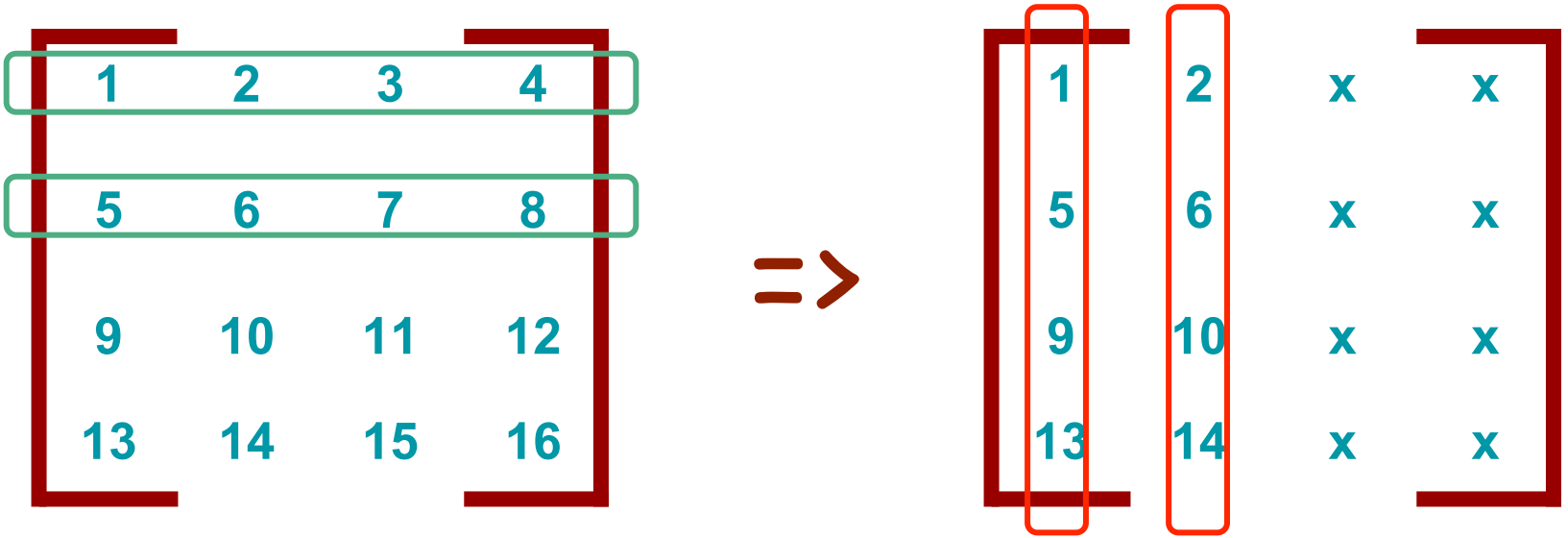
Simetrik Matris



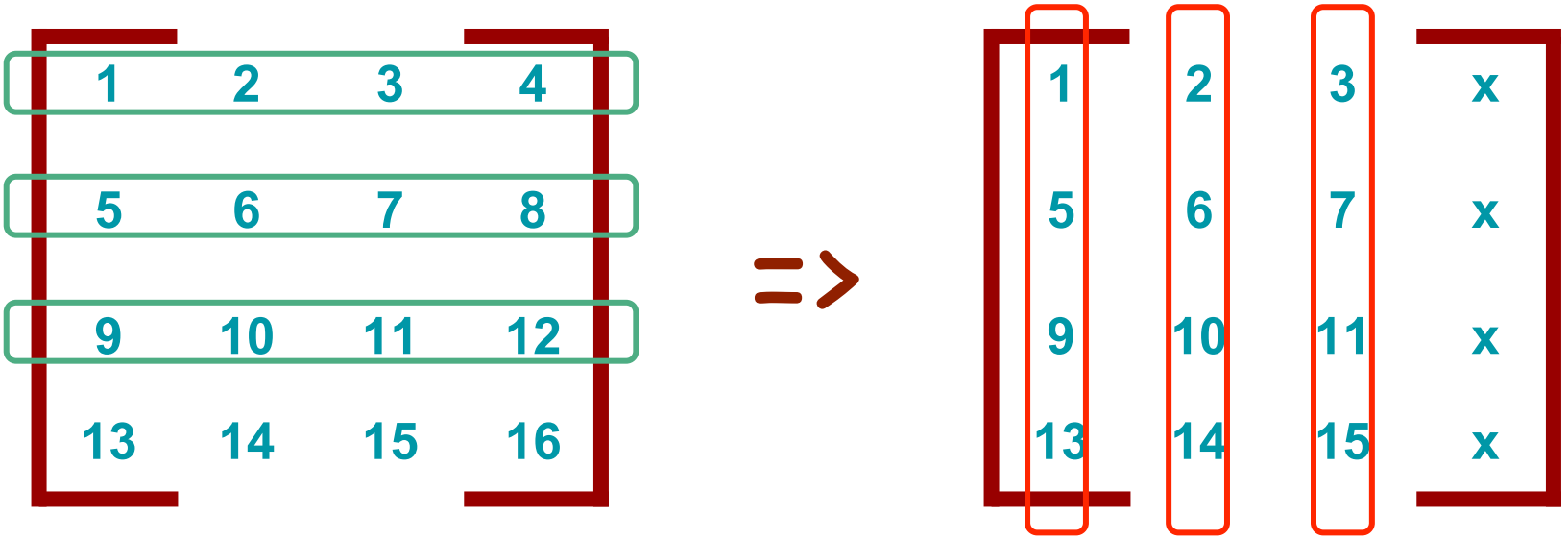
Simetrik Matris



Simetrik Matris

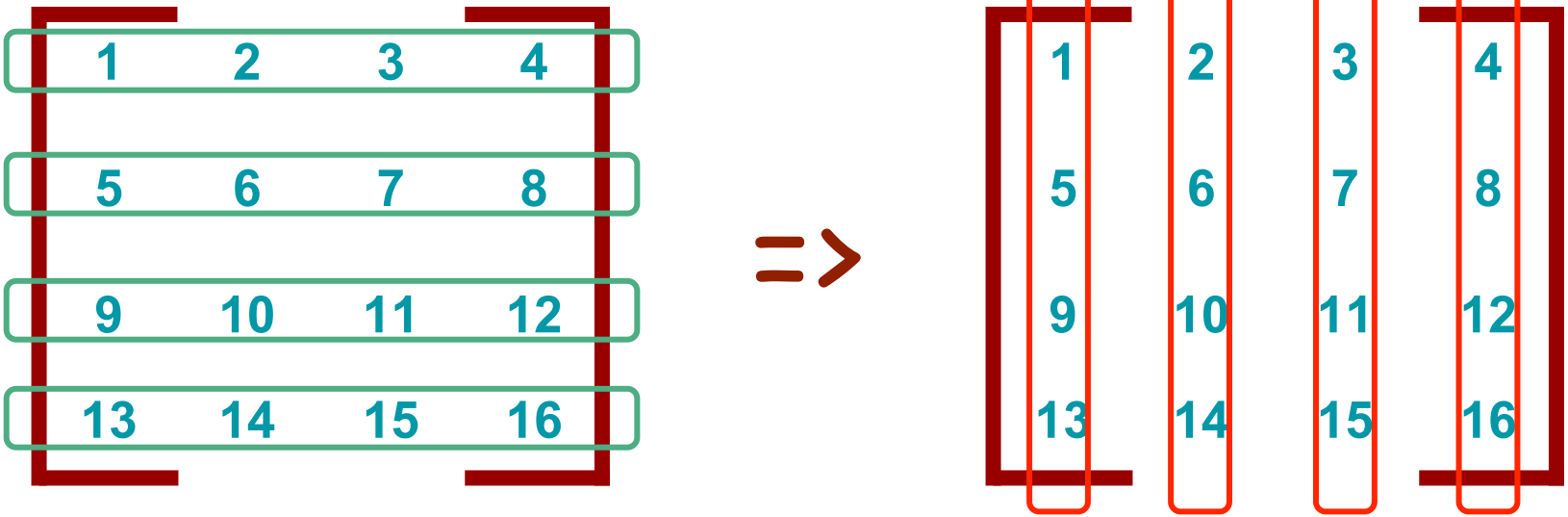


Simetrik Matris



Simetrik Matris

$A=A^T$



```c
#include <stdio.h>
int simetrik_mi_yontem_1(int matris[4][4]) {
        int i,j;
        for (i = 0 ; i < 4 ; i++) {
                for (j = 0 ; j < 4 ; j++) {
                        if (matris[i][j] != matris[j][i]) {
                                return 0;
                        }
                }
        }
        return 1;
}
int simetrik_mi_yontem_2(int matris[4][4]) {
        int i,j;
        // kontrolu sadece ust ucgeni dolasarak yap
        for (i = 0 ; i < 4 ; i++) {
                for (j = i+1 ; j < 4 ; j++) {
                        if (matris[i][j] != matris[j][i]) {
                                return
0; // simetrik degildir
                        }
                }
        }
        return 1;
}
void main() {
        int m1[4][4] = { {1,  2,  3,  4}, {5,  6,  7,  8}, {9,  10, 11, 12}, {13, 14, 15, 16}};
        int m2[4][4] = { {1,  2,  3,  4}, {2,  6,  7,  8}, {3,  7, 11, 12}, {4,  8, 12, 16}};
        if (simetrik_mi_yontem_1(m1) == 1)      printf("m1 simetriktir\n");
        else                    printf("m1 simetrik degildir\n");
        if (simetrik_mi_yontem_1(m2) == 1)      printf("m2 simetriktir\n");
        else                    printf("m2 simetrik degildir\n");
        if (simetrik_mi_yontem_2(m1) == 1)      printf("m1 simetriktir\n");
        else                    printf("m1 simetrik degildir\n");
        if (simetrik_mi_yontem_2(m2) == 1)      printf("m2 simetriktir\n");
        else                    printf("m2 simetrik degildir\n");
}
```

Simetrik mi?

m1

	0	1	2	3
0	1	2	3	4
1	5	6	7	8
2	9	10	11	12
3	13	14	15	16

m2

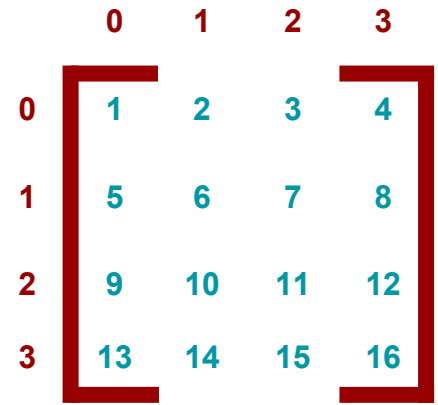
	0	1	2	3
0	1	2	3	4
1	2	6	7	8
2	3	7	11	12
3	4	8	12	16

Matriste Arama

```c
#include <stdio.h>

int main() {
    int matris[4][4] = {{1, 2, 3, 4}, {5, 6, 7, 8}, {9, 10, 11, 12}, {13, 14, 15, 16}};

    return 0;
}
```



Matriste Arama

```c
#include <stdio.h>

int main() {
    int matris[4][4] = {{1, 2, 3, 4}, {5, 6, 7, 8}, {9, 10, 11, 12}, {13, 14, 15, 16}};
    int i, aranan;
    printf("aramak istediginiz sayiyi giriniz:");
    scanf("%d", &aranan);

    return 0;
}
```

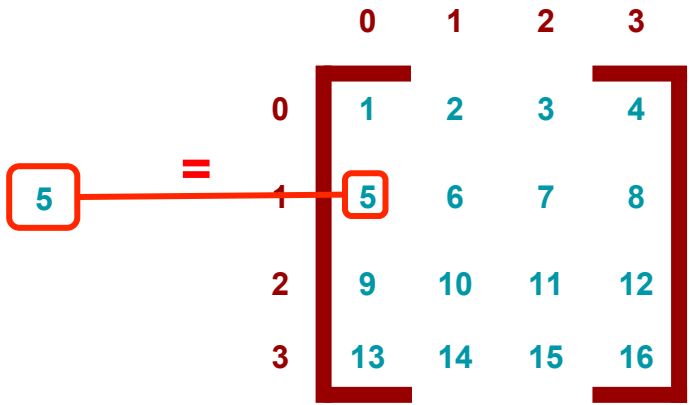
5

	0	1	2	3
0	1	2	3	4
1	5	6	7	8
2	9	10	11	12
3	13	14	15	16

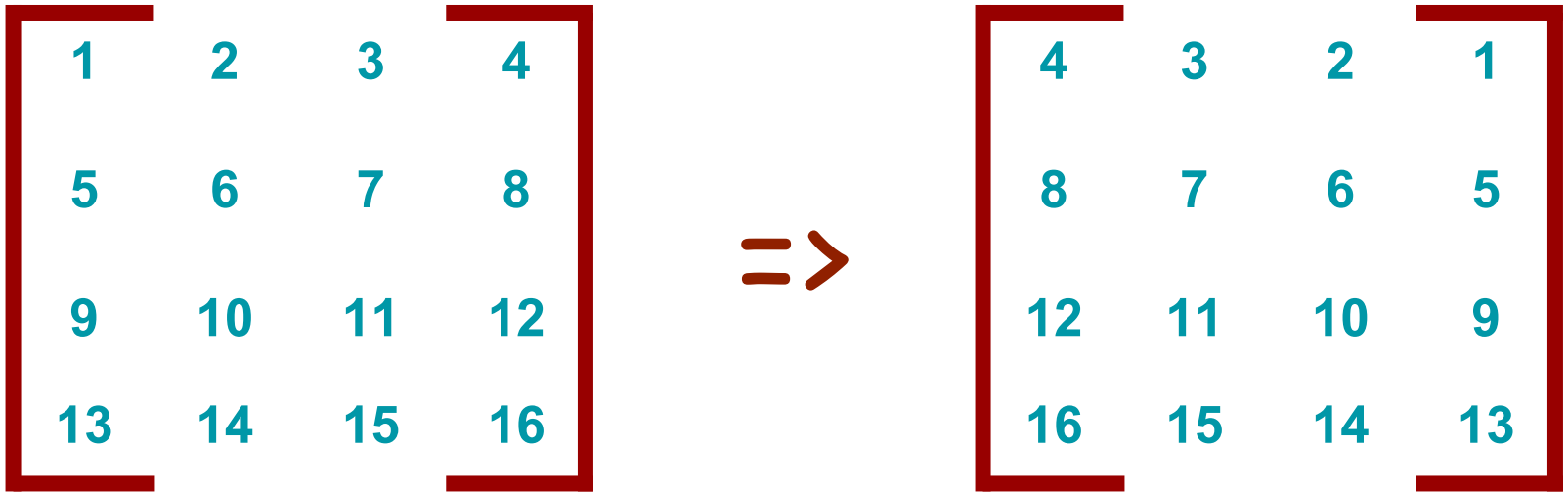
Matriste Arama

```c
#include <stdio.h>
void ara(int fmatris[][4],int boy,int bul){
    int i,j;
    for (i = 0 ; i < boy ; i++) {
        for (j = 0 ; j < boy ; j++) {
            if (fmatris[i][j]==bul){
                printf("%d sayisi matriste %d .satir %d. sutundadir",bul,i,j);
                break;
            }
        }
    }
}

int main() {
    int matris[4][4] = {{1, 2, 3, 4}, {5, 6, 7, 8}, {9, 10, 11, 12}, {13, 14, 15, 16}};
    int i, aranan;
    printf("aramak istediginiz sayiyi giriniz:");
    scanf("%d", &aranan);
    ara(matris,4,aranan);
    return 0;
}
```

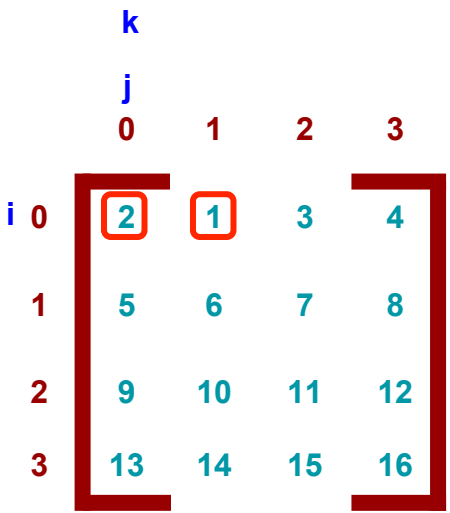


Satırları Sıralama (b -> k)



Satırları Sıralama (b -> k)

```c
#include <stdio.h>
void sirala(int fmatris[][4],int boy)
{
    int i,j,k,degis;
    for (i = 0 ; i < boy ; i++) {
        for (j = 0 ; j < boy ; j++) {
            for (k = 0 ; k < boy-1 ; k++) {
                if(fmatris[i][k]<fmatris[i][k+1]){
                    degis=fmatris[i][k];
                    fmatris[i][k]=fmatris[i][k+1];
                    fmatris[i][k+1]=degis;
                }
            }
        }
    }
}
int main() {
    int matris[4][4] = {{1, 2, 3, 4}, {5, 6, 7, 8}, {9, 10, 11, 12}, {13, 14, 15, 16}};
    sirala(matris,4);
    int i, j;
    printf("matris:\n");
    for (i = 0 ; i < 4 ; i++) {
        for (j = 0 ; j < 4 ; j++) {
            printf("%2d ", matris[i][j]);
        }
        printf("\n");
    }
    printf("\n");
    return 0;
}
```



Matris

SOS Oyunu

```
// 8x8 T matrisi global degisken olarak tanimlandi
char T[N][N];
// fonksiyon prototipi
void ciz();
int main() {
        int i, j;
        for (i = 0 ; i < N ; i++) {
                for (j = 0 ; j < N ; j++) {
                        T[i][j] = '.';
                }
        }
        T[3][3] = 'S';
        T[4][4] = 'O';
        T[5][5] = 'S';
        ciz();
        return 0;
}
void ciz() {
        int i, j;
        for (i = 0 ; i < N ; i++) {
                for (j = 0 ; j < N ; j++) {
                        printf("%c ", T[i][j]);
                }
                printf("\n");
```

Matris

SOS Oyunu

```
#include <stdio.h>
#define N 8
//  8x8 T matrisi global degisken olarak tanimlandi
char T[N][N];
// fonksiyon prototipleri
void ciz();
void oyuncudan_giris_iste();
int main() {
        int i, j;
        for (i = 0 ; i < N ; i++) {
                for (j = 0 ; j < N ; j++) {
                        T[i][j] = '.';
                }
        }
        while (1) {
                ciz();
                oyuncudan_giris_iste();
                // burada oyununun bitip bitmedigi kontrol edilebilir
        }
        return 0;
}
```

Matris

SOS Oyunu

```
/**
 * oyuncudan yapacagi hamlenin koordinatini ve secimi ister
 */
void oyuncudan_giris_iste() {
        int x, y;
        while (1) {
                printf("(x y): ");
                scanf("%d %d", &x, &y);

                if (x < 0 || x >= N || y < 0 || y >= N) {
                        // 0'dan kucuk ya da N'e buyuk esit bir yer girilirse hata ver
                        printf("yanlis giris!!! ");
                } else if (T[x][y] != '.') {
                        printf("dolu!!! ");
                } else {
                        // dogru giris yapildi
                        break; // donguyu durdur
                }
        }
        printf("S / O ? ");
        char c;
        scanf(" %c", &c);
        // FIXME: kullanici baska harf girebilir. giris kontrol edilmeli
        T[x][y] = c;
}
```

Matris

SOS Oyunu

```
int i, j;

// ekrani temizleme komutu:
// system("clear"); // GNU/Linux
// system("cls"); // Windows

printf("\n   ");
for (i = 0 ; i < N ; i++)
        printf("%d ", i);
printf("\n");

for (i = 0 ; i < N ; i++) {
        printf("%d  ", i);
        for (j = 0 ; j < N ; j++) {
                printf("%c ", T[i][j]);
        }
        printf("\n");
}
printf("\n");
```