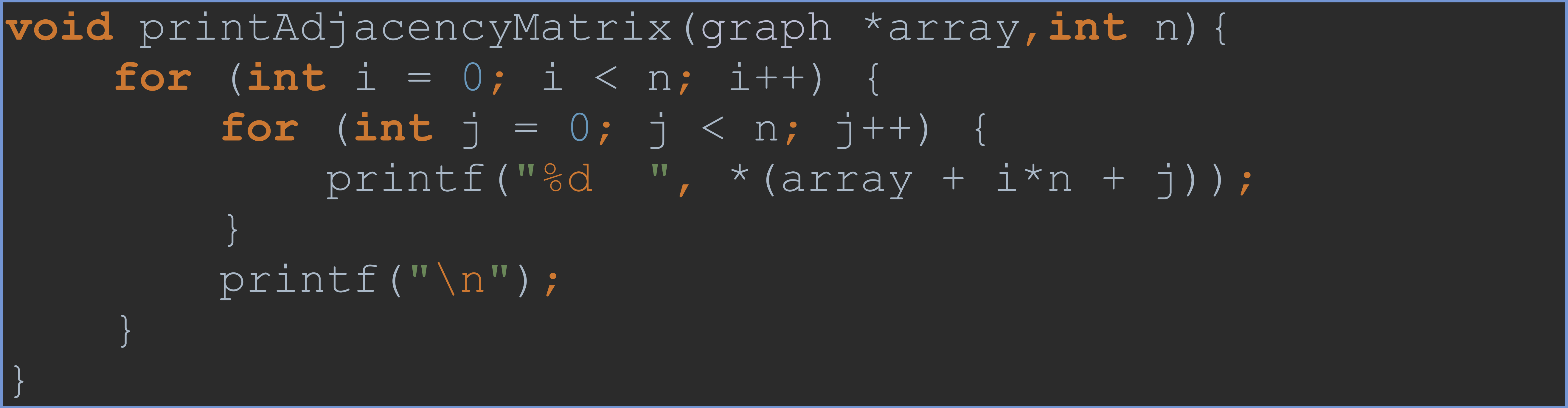
Data Structures

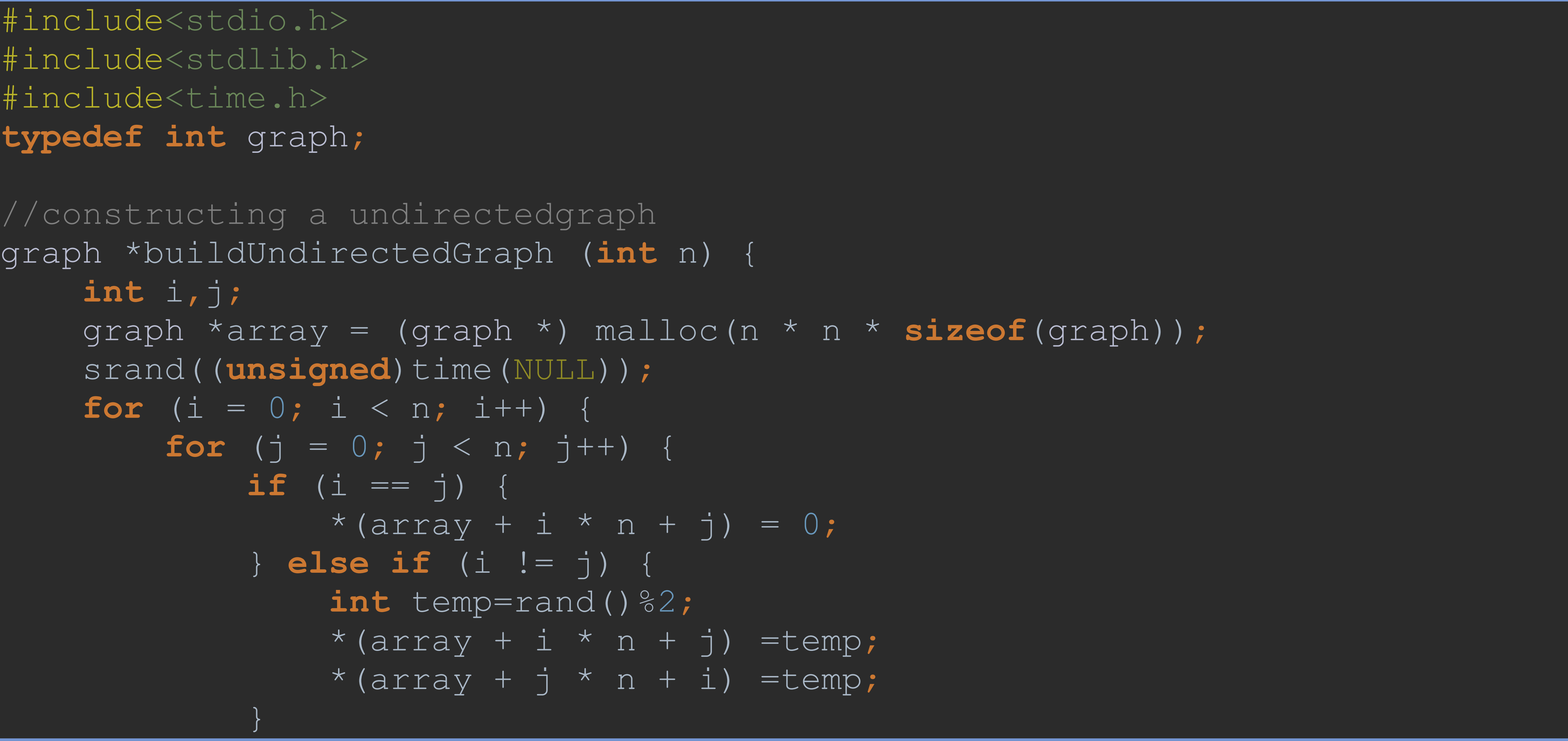
Printing Adjacency matrix of Directed And Undirected graphs

Function for printing Adjacency matrix of Directed and Undirected graphs:



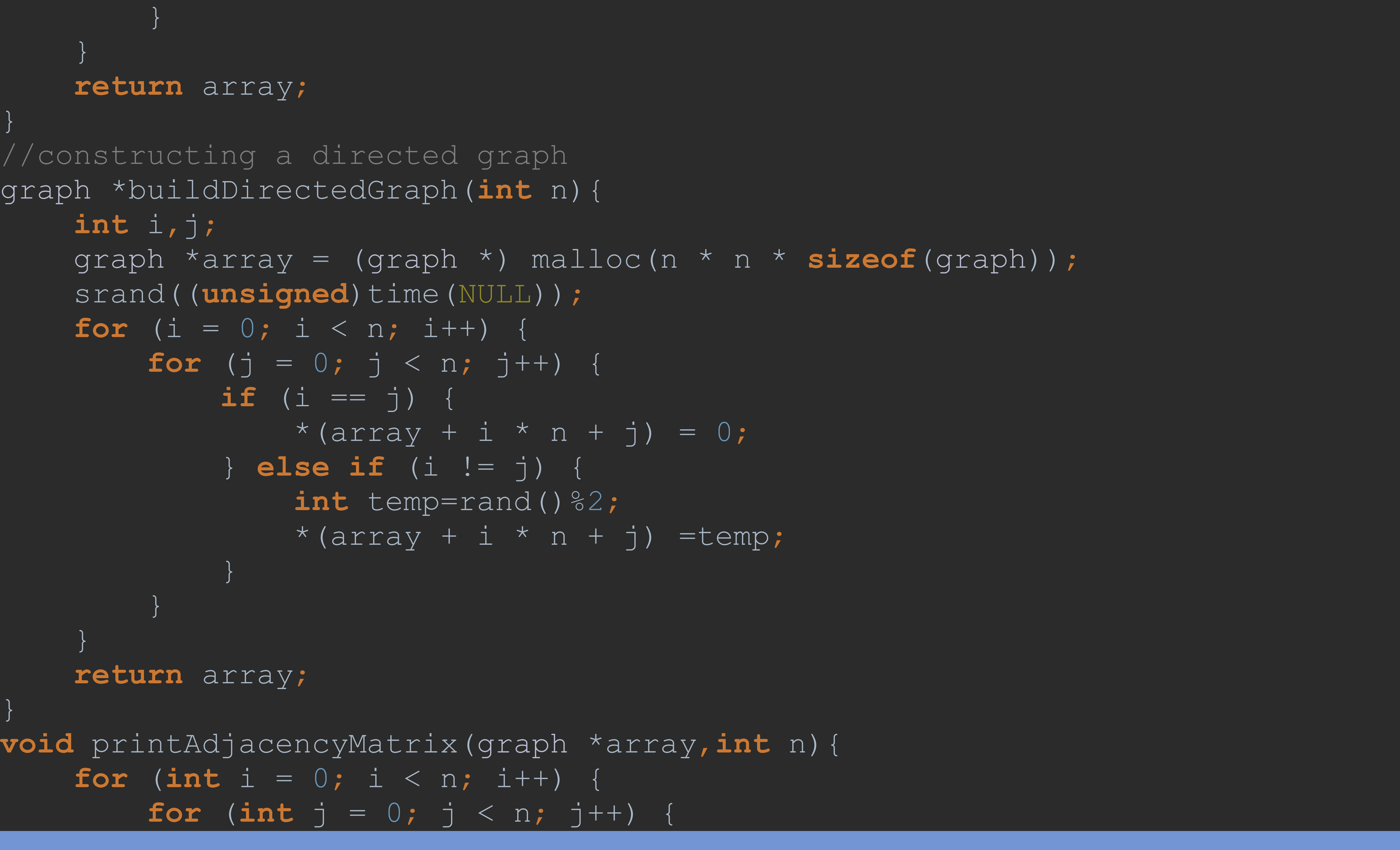
```c
void printAdjacencyMatrix(graph *array,int n){
    for (int i = 0; i < n; i++) {
        for (int j = 0; j < n; j++) {
            printf("%d  ", *(array + i*n + j));
        }
        printf("\n");
    }
}
```

Program for printing Adjacency matrix of Directed and Undirected graphs:

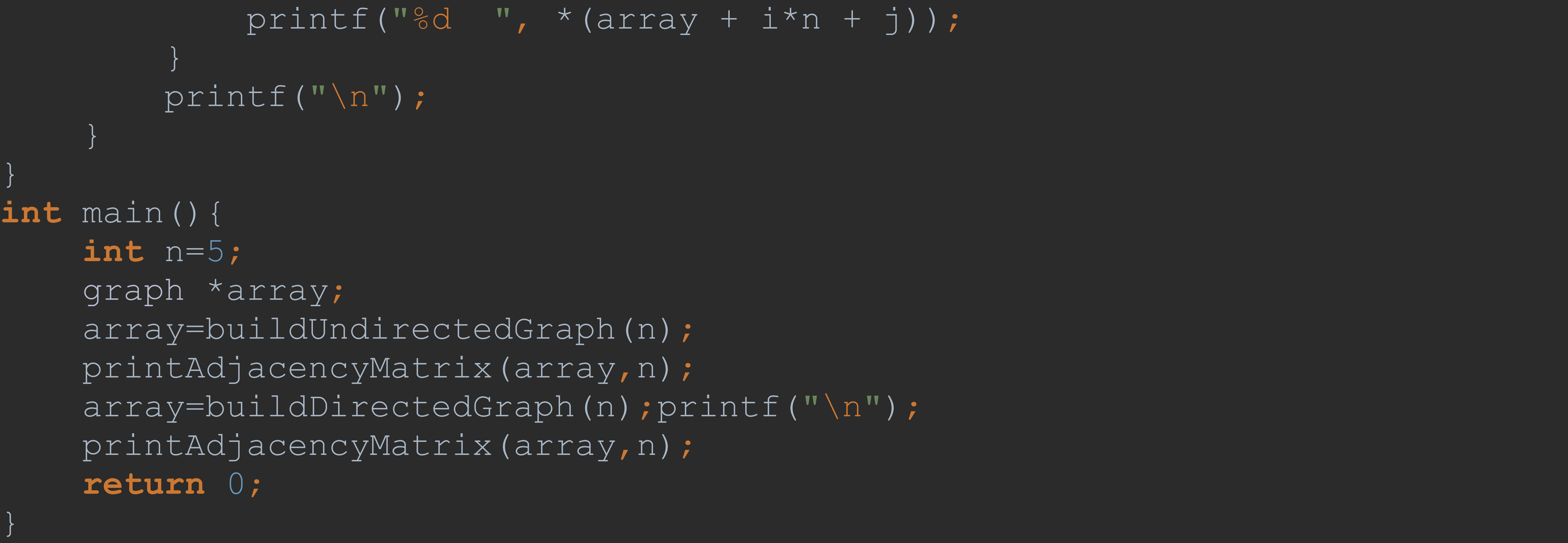


```c
#include<stdio.h>
#include<stdlib.h>
#include<time.h>
typedef int graph;

//constructing a undirectedgraph
graph *buildUndirectedGraph (int n) {
    int i,j;
    graph *array = (graph *) malloc(n * n * sizeof(graph));
    srand((unsigned)time(NULL));
    for (i = 0; i < n; i++) {
        for (j = 0; j < n; j++) {
            if (i == j) {
                *(array + i * n + j) = 0;
            } else if (i != j) {
                int temp=rand()%2;
                *(array + i * n + j) =temp;
                *(array + j * n + i) =temp;
            }
```



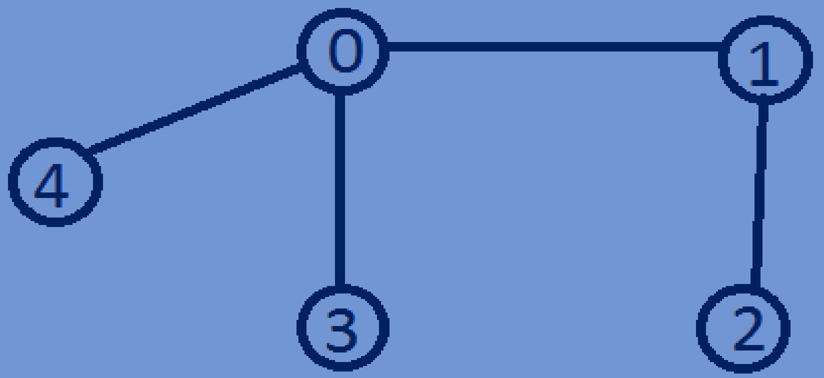
```
        }
    }
    return array;
}
//constructing a directed graph
graph *buildDirectedGraph(int n){
    int i,j;
    graph *array = (graph *) malloc(n * n * sizeof(graph));
    srand((unsigned)time(NULL));
    for (i = 0; i < n; i++) {
        for (j = 0; j < n; j++) {
            if (i == j) {
                *(array + i * n + j) = 0;
            } else if (i != j) {
                int temp=rand()%2;
                *(array + i * n + j) =temp;
            }
        }
    }
    return array;
}
void printAdjacencyMatrix(graph *array,int n){
    for (int i = 0; i < n; i++) {
        for (int j = 0; j < n; j++) {
```



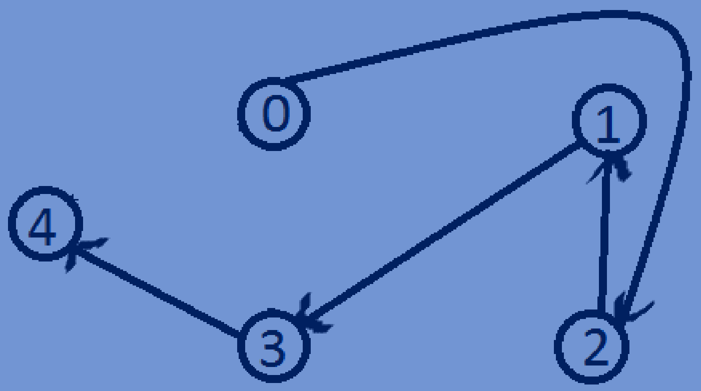
```
            printf("%d  ", *(array + i*n + j));
        }
        printf("\n");
    }
}
int main(){
    int n=5;
    graph *array;
    array=buildUndirectedGraph(n);
    printAdjacencyMatrix(array,n);
    array=buildDirectedGraph(n);printf("\n");
    printAdjacencyMatrix(array,n);
    return 0;
}
```

Output:

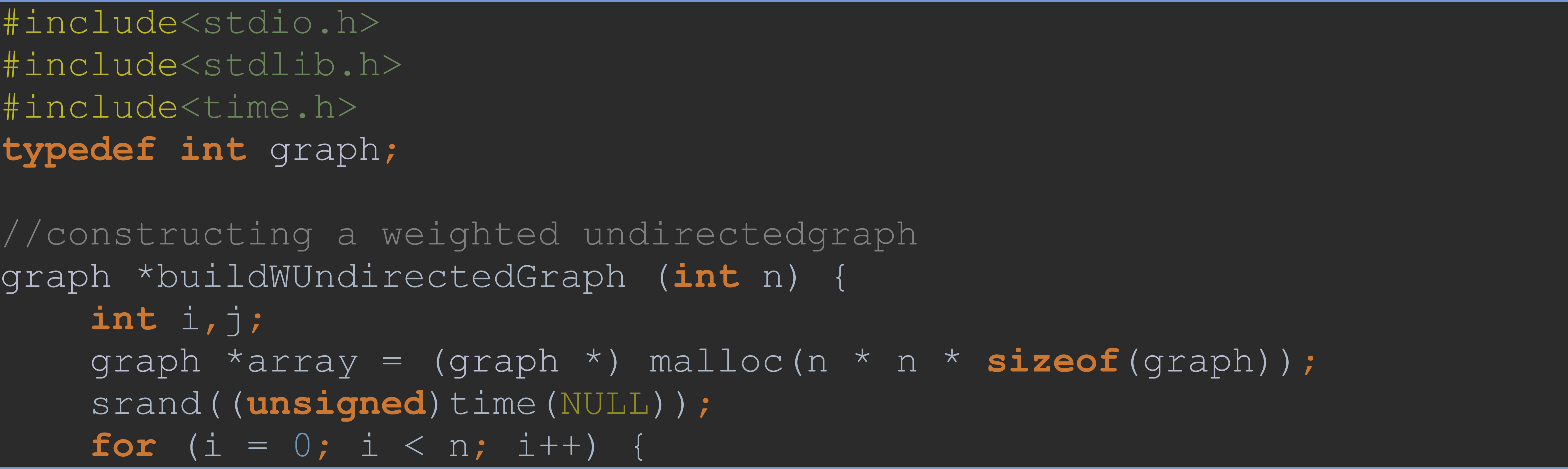
```
0 1 0 1 1
1 0 1 0 0
0 1 0 0 0
1 0 0 0 0
1 0 0 0 0
```



```
0 0 1 0 0
0 0 0 1 0
0 1 0 0 0
0 0 0 0 1
0 0 0 0 0
```

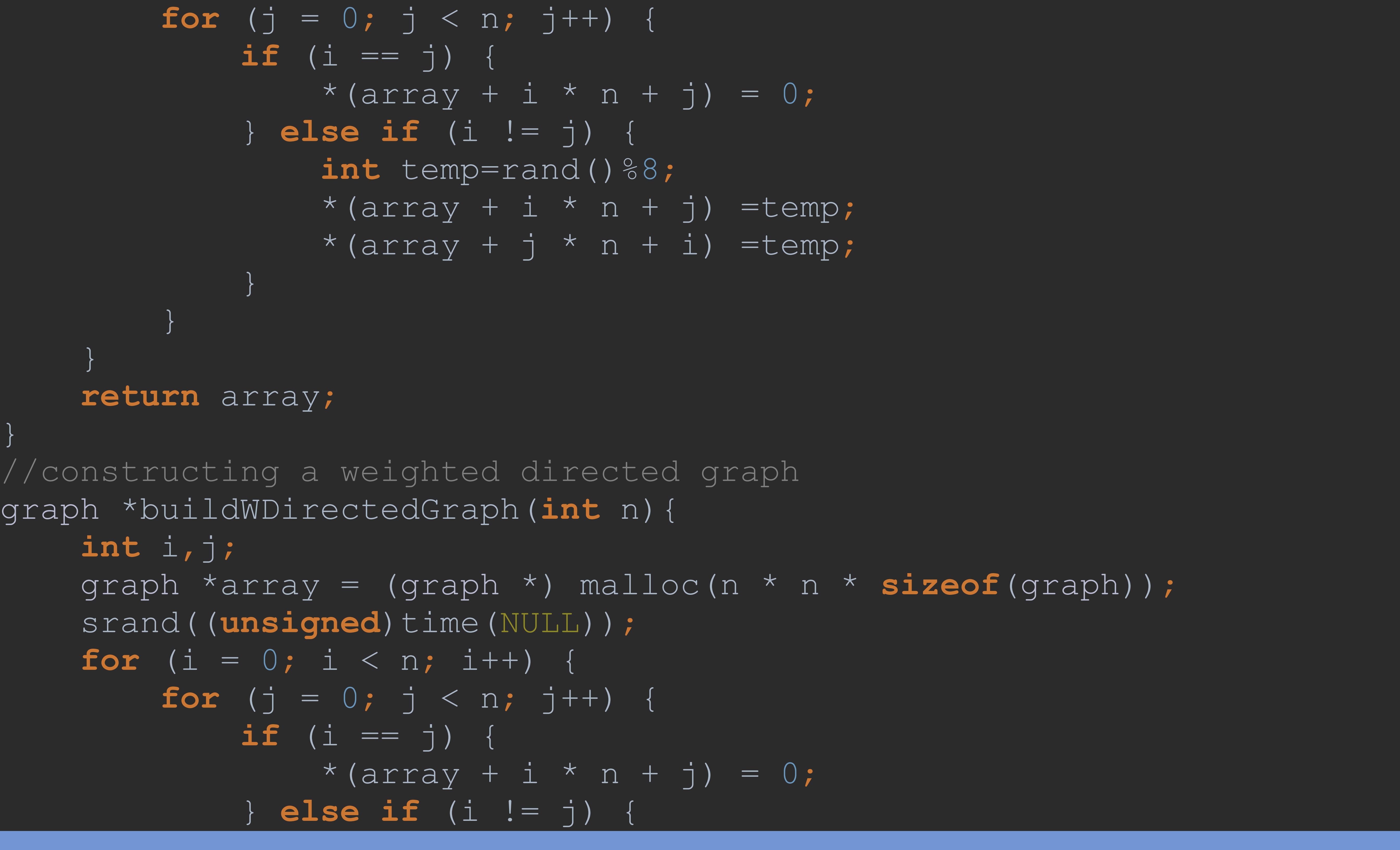


Implementing of weighted Graphs(Directed and Undirected)using Adjacency Matrix:

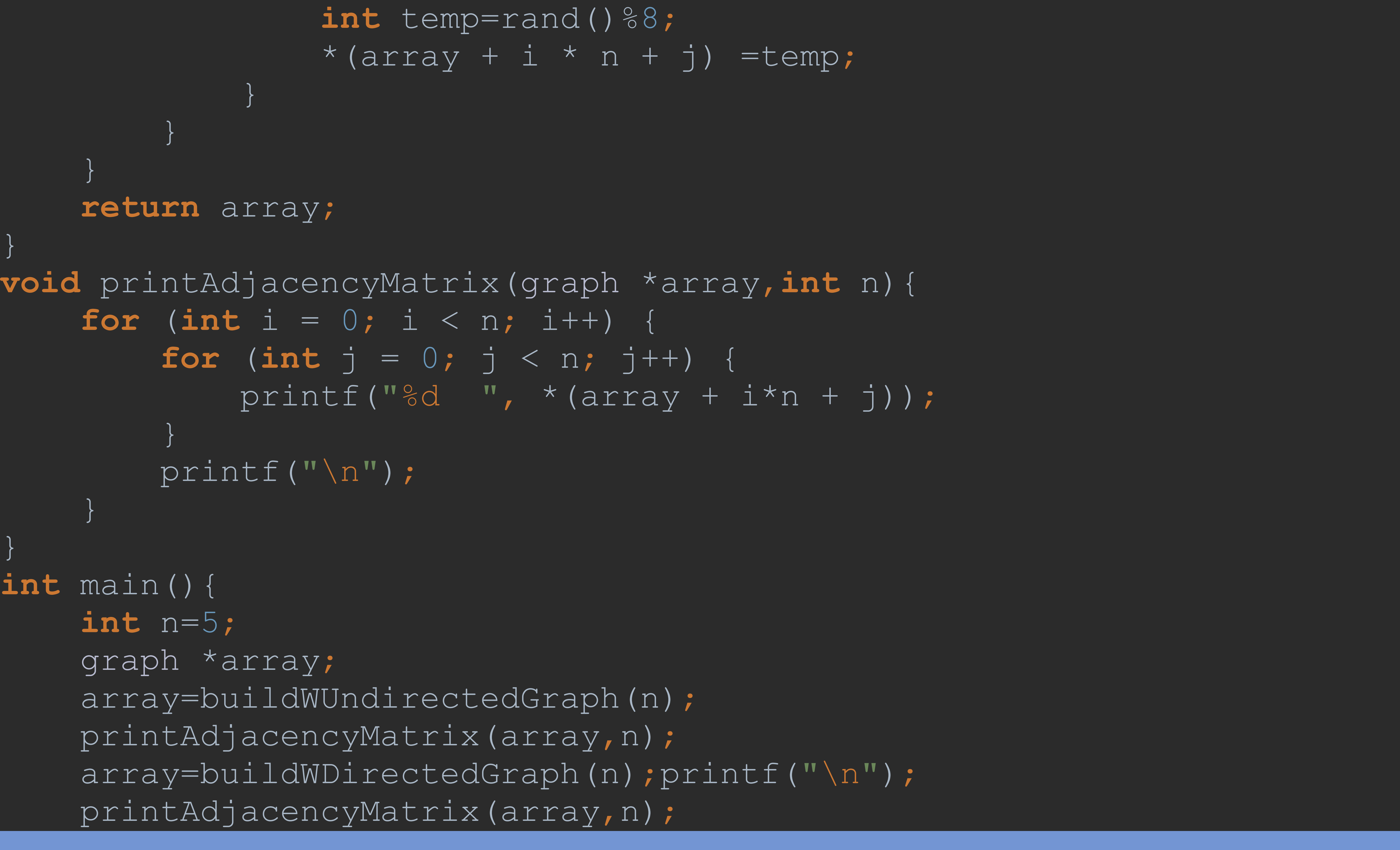


```
#include<stdio.h>
#include<stdlib.h>
#include<time.h>
typedef int graph;

//constructing a weighted undirectedgraph
graph *buildWUndirectedGraph (int n) {
    int i,j;
    graph *array = (graph *) malloc(n * n * sizeof(graph));
    srand((unsigned)time(NULL));
    for (i = 0; i < n; i++) {
```



```
        for (j = 0; j < n; j++) {
            if (i == j) {
                *(array + i * n + j) = 0;
            } else if (i != j) {
                int temp=rand()%8;
                *(array + i * n + j) =temp;
                *(array + j * n + i) =temp;
            }
        }
    }
    return array;
}
//constructing a weighted directed graph
graph *buildWDirectedGraph(int n){
    int i,j;
    graph *array = (graph *) malloc(n * n * sizeof(graph));
    srand((unsigned)time(NULL));
    for (i = 0; i < n; i++) {
        for (j = 0; j < n; j++) {
            if (i == j) {
                *(array + i * n + j) = 0;
            } else if (i != j) {
```

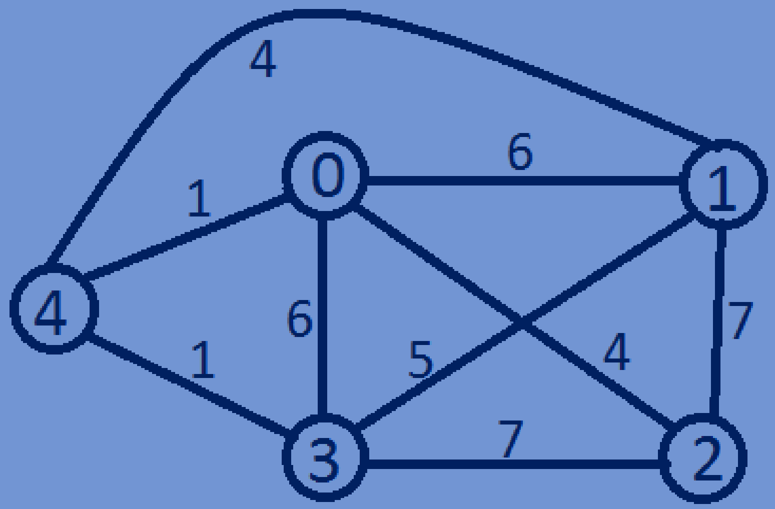


```c
                int temp=rand()%8;
                *(array + i * n + j) =temp;
            }
        }
    }
    return array;
}
void printAdjacencyMatrix(graph *array,int n){
    for (int i = 0; i < n; i++) {
        for (int j = 0; j < n; j++) {
            printf("%d  ", *(array + i*n + j));
        }
        printf("\n");
    }
}
int main(){
    int n=5;
    graph *array;
    array=buildWUndirectedGraph(n);
    printAdjacencyMatrix(array,n);
    array=buildWDirectedGraph(n);printf("\n");
    printAdjacencyMatrix(array,n);
```

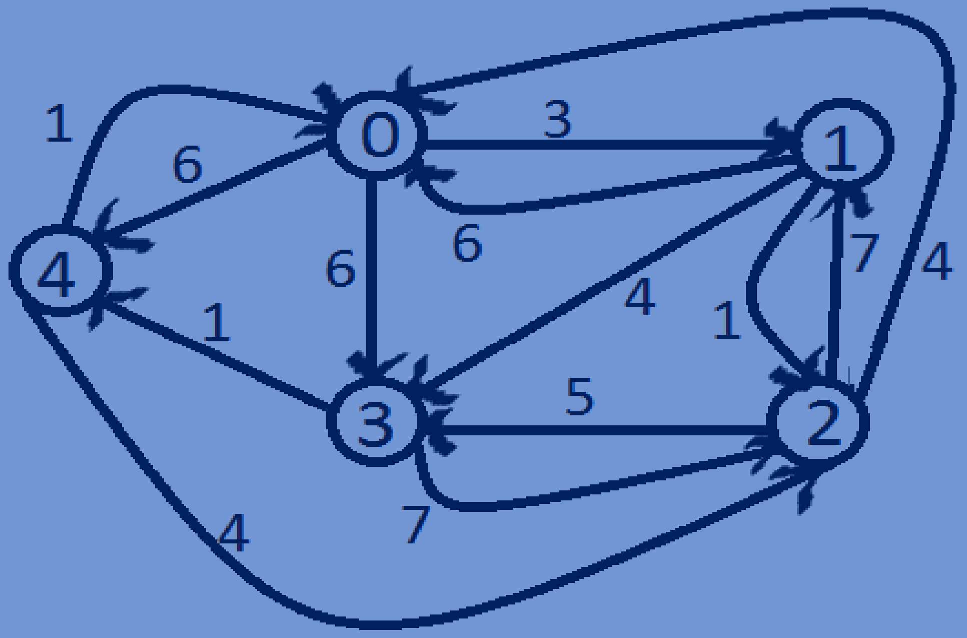
```
    return 0;
}
```

Output:

```
0 6 4 6 1
6 0 7 5 4
4 7 0 7 0
6 5 7 0 1
1 4 0 1 0
```



```
0 3 0 6 6
6 0 1 4 0
4 7 0 5 0
0 0 7 0 1
1 0 4 0 0
```


1
0
3
1
6
6
4
6
7
4
4
1
1
3
5
2
4
7