

21-805-0206

Data Structure

Assignment

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August 2021

1 Program to generate Magic Square

1.1 C++ - Program

```
#include <iostream>
#include <iomanip>
using namespace std;

void magicMatrix(int n) {
    int magicMatrix[n][n];
    for (int i = 0; i < n; i++) {
        for (int j = 0; j < n; j++) {
            magicMatrix[i][j]=0;
        }
    }
    int i = n / 2;
    int j = n - 1;

    for (int num = 1; num <= n * n;) {
        if (i == -1 && j == n){
            j = n - 2;
            i = 0;
        } else {
            if (j == n){
                j = 0;
            }
            if (i < 0){
                i = n - 1;
            }
        }
        if (magicMatrix[i][j]){
            j = j - 2;
            i++;
            continue;
        } else {
            magicMatrix[i][j] = num++;
        }
        j++;
        i--;
    }

    cout<<"The Generated Magic Square is "<<endl;
    for (i = 0; i < n; i++) {
        for (j = 0; j < n; j++){
            cout<<setw(4)<<magicMatrix[i][j]<<" ";
        }
    }
}
```

```

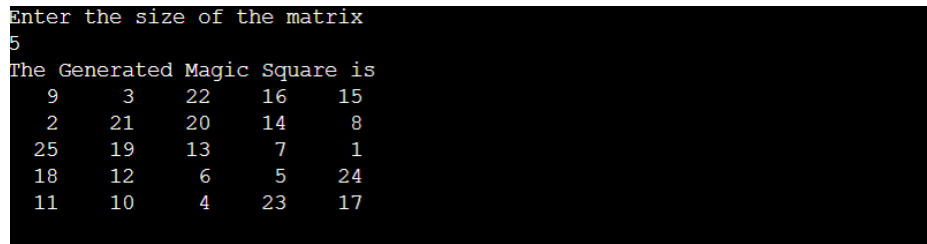
        cout<<endl;
    }
}

bool evenOrOdd(int n){
    if (n%2==0){
        return true;
    }
    return false;
}

int main() {
    int userSize;
    cout<<"Enter the size of the matrix"<<endl;
    cin>>userSize;
    if(evenOrOdd(userSize)){
        cout<<"Only possible for odd numbers"<<endl;
    } else {
        magicMatrix(userSize);
    }
    return 0;
}

```

1.2 Sample I/O




```

Enter the size of the matrix
5
The Generated Magic Square is
 9   3  22  16  15
 2  21  20  14   8
25  19  13   7   1
18  12   6   5  24
11  10   4  23  17

```

Figure 1: Output showing a magic square of size 5



```

Enter the size of the matrix
4
Only possible for odd numbers

```

Figure 2: Output showing an exception