Assignment - 6
Multimedia Lab

Name – Shishu **Registration No- 2020CA089**

Ques - Implementation of JPEG image compression using Discrete Cosine Transform.

Code:

```
// CPP program to perform discrete cosine transform
#include <bits/stdc++.h>
using namespace std;
#define pi 3.142857
const int m = 8, n = 8;

// Function to find discrete cosine transform and print it
int dctTransform(int matrix[][n])
{
	int i, j, k, l;

	// dct will store the discrete cosine transform
	float dct[m][n];

	float ci, cj, dct1, sum;

	for (i = 0; i < m; i++) {
		for (j = 0; j < n; j++) {

			// ci and cj depends on frequency as well as
			// number of row and columns of specified matrix
			if (i == 0)
				ci = 1 / sqrt(m);
			else
				ci = sqrt(2) / sqrt(m);
			if (j == 0)
				cj = 1 / sqrt(n);
			else
				cj = sqrt(2) / sqrt(n);

			// sum will temporarily store the sum of
```

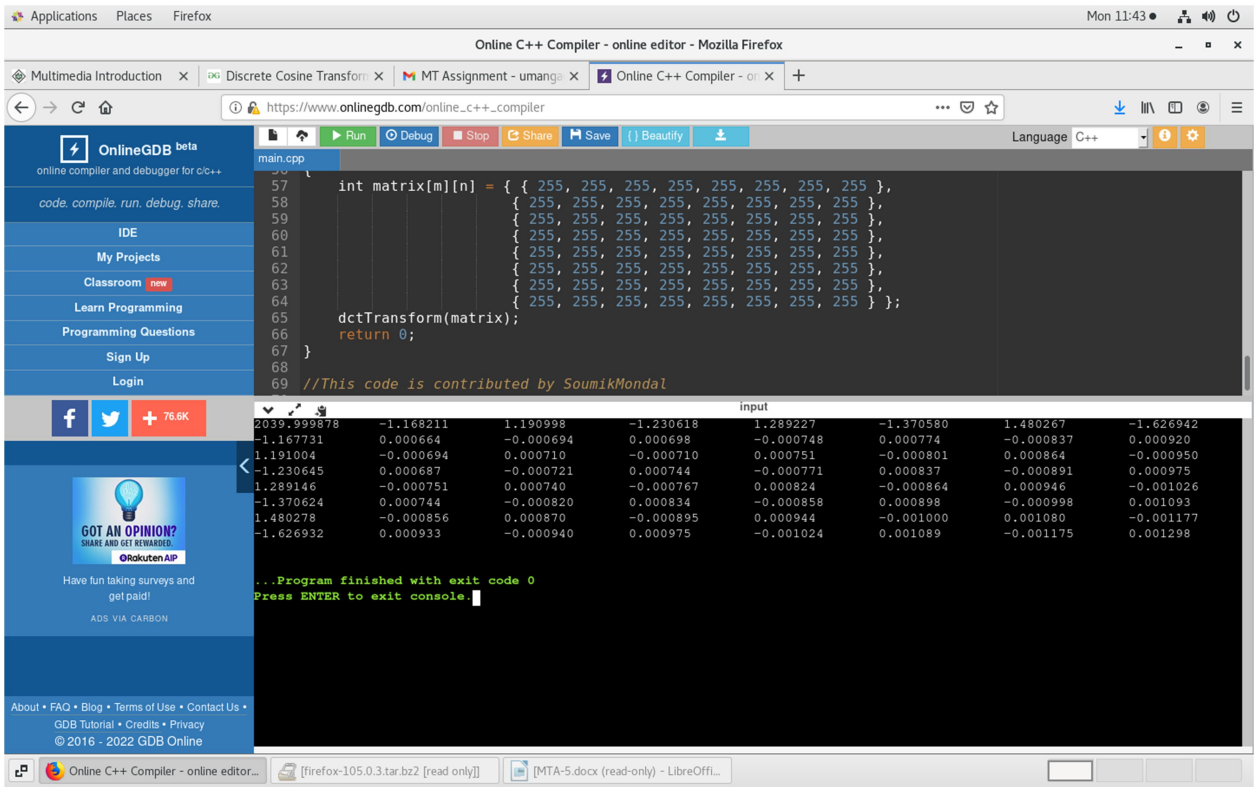
```
                        // cosine signals
                        sum = 0;
                        for (k = 0; k < m; k++) {
                                for (l = 0; l < n; l++) {
                                        dct1 = matrix[k][l] *
                                                cos((2 * k + 1) * i * pi / (2 * m)) *
                                                cos((2 * l + 1) * j * pi / (2 * n));
                                        sum = sum + dct1;
                                }
                        }
                        dct[i][j] = ci * cj * sum;
                }
        }

        for (i = 0; i < m; i++) {
                for (j = 0; j < n; j++) {
                        printf("%f\t", dct[i][j]);
                }
                printf("\n");
        }
}

// Driver code
int main()
{
        int matrix[m][n] = { { 255, 255, 255, 255, 255, 255, 255, 255 },
                                                { 255, 255, 255, 255, 255, 255, 255, 255 },
                                                { 255, 255, 255, 255, 255, 255, 255, 255 },
                                                { 255, 255, 255, 255, 255, 255, 255, 255 },
                                                { 255, 255, 255, 255, 255, 255, 255, 255 },
                                                { 255, 255, 255, 255, 255, 255, 255, 255 },
                                                { 255, 255, 255, 255, 255, 255, 255, 255 } };
        dctTransform(matrix);
        return 0;
}

//This code is contributed by SoumikMondal
```

Output: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{ } Beautify
Language C++
main.cpp
int matrix[m][n] = { { 255, 255, 255, 255, 255, 255, 255, 255 },
{ 255, 255, 255, 255, 255, 255, 255, 255 },
{ 255, 255, 255, 255, 255, 255, 255, 255 },
{ 255, 255, 255, 255, 255, 255, 255, 255 },
{ 255, 255, 255, 255, 255, 255, 255, 255 },
{ 255, 255, 255, 255, 255, 255, 255, 255 },
{ 255, 255, 255, 255, 255, 255, 255, 255 } };
dctTransform(matrix);
return 0;
}
//This code is contributed by SoumikMondal
input
2039.999878 -1.168211 1.190998 -1.230618 1.289227 -1.370580 1.480267 -1.626942
-1.167731 0.000664 -0.000694 0.000698 -0.000748 0.000774 -0.000837 0.000920
1.191004 -0.000694 0.000710 -0.000710 0.000751 -0.000801 0.000864 -0.000950
-1.230645 0.000687 -0.000721 0.000744 -0.000771 0.000837 -0.000891 0.000975
1.289146 -0.000751 0.000740 -0.000767 0.000824 -0.000864 0.000946 -0.001026
-1.370624 0.000744 -0.000820 0.000834 -0.000858 0.000898 -0.000998 0.001093
1.480278 -0.000856 0.000870 -0.000895 0.000944 -0.001000 0.001080 -0.001177
-1.626932 0.000933 -0.000940 0.000975 -0.001024 0.001089 -0.001175 0.001298
...Program finished with exit code 0
Press ENTER to exit console.
Online C++ Compiler - online editor...
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