Assignment :3

IT-603

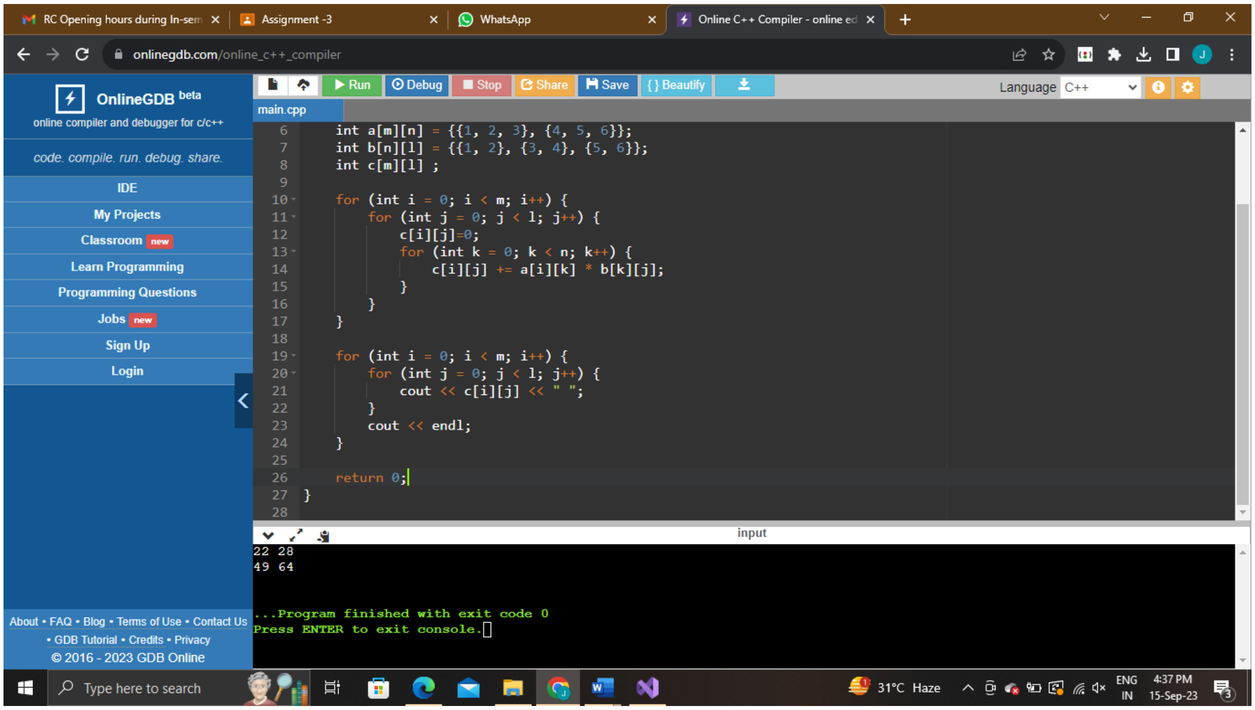
Name:- Rajpurohit Jeevan Bhawarlal

Student ID-202312090

1).

```
#include <bits/stdc++.h>
using namespace std;

int main() {
  int m = 2, n = 3, l = 2;
  int a[m][n] = {{1, 2, 3}, {4, 5, 6}};
  int b[n][l] = {{1, 2}, {3, 4}, {5, 6}};
  int c[m][l] ;

  for (int i = 0; i < m; i++) {
    for (int j = 0; j < l; j++) {
      c[i][j]=0;
      for (int k = 0; k < n; k++) {
        c[i][j] += a[i][k] * b[k][j];
      }
    }
  }
```

```
    for (int i = 0; i < m; i++) {
        for (int j = 0; j < l; j++) {
            cout << c[i][j] << " ";
        }
        cout << endl;
    }

    return 0;
}
```



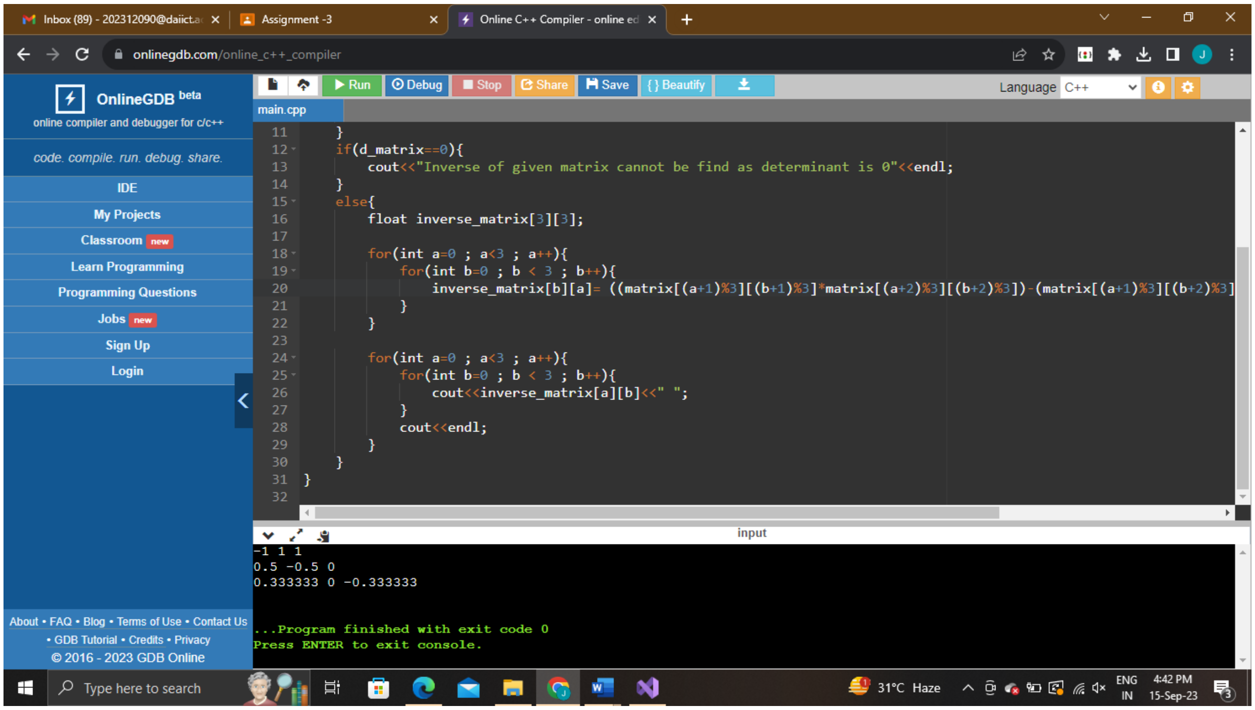
```
    int a[m][n] = {{1, 2, 3}, {4, 5, 6}};
    int b[n][l] = {{1, 2}, {3, 4}, {5, 6}};
    int c[m][l] ;

    for (int i = 0; i < m; i++) {
        for (int j = 0; j < l; j++) {
            c[i][j]=0;
            for (int k = 0; k < n; k++) {
                c[i][j] += a[i][k] * b[k][j];
            }
        }
    }

    for (int i = 0; i < m; i++) {
        for (int j = 0; j < l; j++) {
            cout << c[i][j] << " ";
        }
        cout << endl;
    }

    return 0;
}
```

```
22 28
49 64


...Program finished with exit code 0
Press ENTER to exit console.
```

2).

```
#include<bits/stdc++.h>

using namespace std;
```

```
int main(){
   float matrix[3][3]={{1,2,3},{1,0,3},{1,2,0}},mat[3][3];
   float d_matrix=0;

   for(int a=0,b=0 ; a<3 ; a++,b++){
      d_matrix+= matrix[0][a]*(matrix[1][(b+1)%3]*matrix[2][(b+2)%3]-
matrix[1][(b+2)%3]*matrix[2][(b+1)%3]);
   }
   if(d_matrix==0){
      cout<<"Inverse of given matrix cannot be find as determinant is 0"<<endl;
   }
   else{
      float inverse_matrix[3][3];

      for(int a=0 ; a<3 ; a++){
         for(int b=0 ; b < 3 ; b++){
            inverse_matrix[b][a]=
((matrix[(a+1)%3][(b+1)%3]*matrix[(a+2)%3][(b+2)%3])-
(matrix[(a+1)%3][(b+2)%3]*matrix[(a+2)%3][(b+1)%3]))/d_matrix;
         }
      }

      for(int a=0 ; a<3 ; a++){
         for(int b=0 ; b < 3 ; b++){
                cout<<inverse_matrix[a][b]<<" ";
            }
            cout<<endl;
        }
    }
}
```



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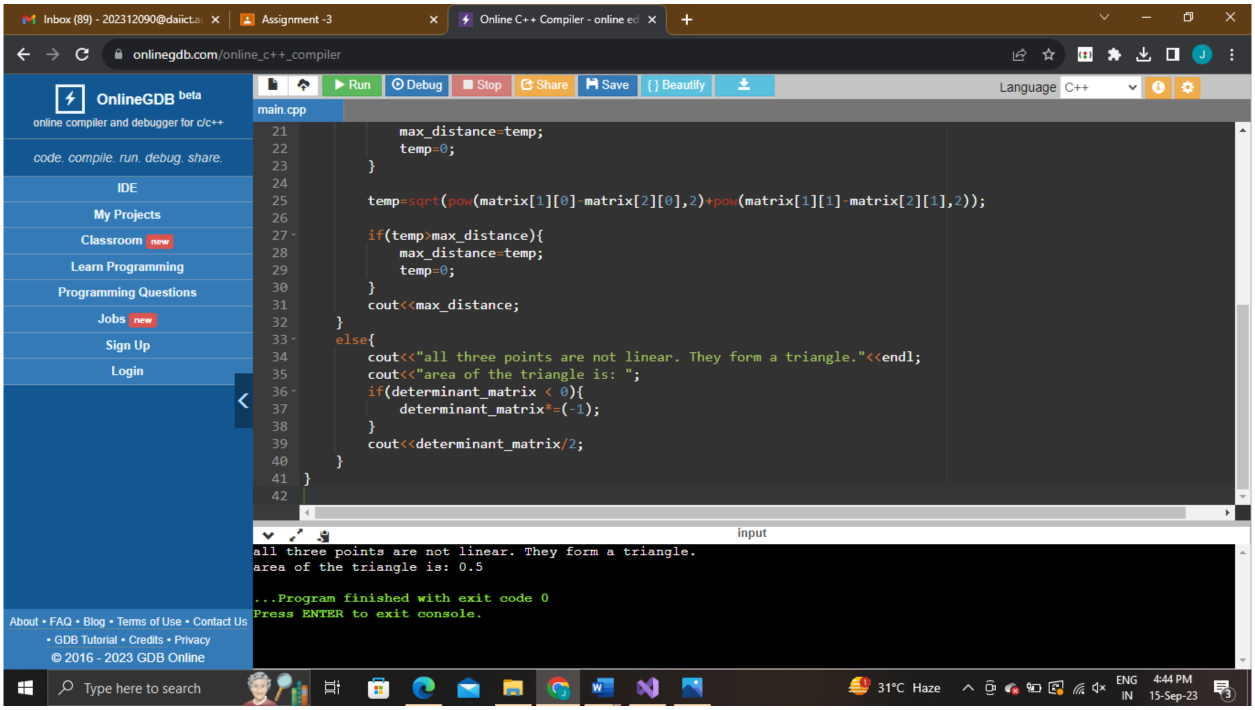
```
    }
    if(d_matrix==0){
        cout<<"Inverse of given matrix cannot be find as determinant is 0"<<endl;
    }
    else{
        float inverse_matrix[3][3];

        for(int a=0 ; a<3 ; a++){
            for(int b=0 ; b < 3 ; b++){
                inverse_matrix[b][a]= ((matrix[(a+1)%3][(b+1)%3]*matrix[(a+2)%3][(b+2)%3])-(matrix[(a+1)%3][(b+2)%3]
            }
        }

        for(int a=0 ; a<3 ; a++){
            for(int b=0 ; b < 3 ; b++){
                cout<<inverse_matrix[a][b]<<" ";
            }
            cout<<endl;
        }
    }
}
```

```
-1 1 1
0.5 -0.5 0
0.333333 0 -0.333333


...Program finished with exit code 0
Press ENTER to exit console.
```

3).

```
#include<bits/stdc++.h>


using namespace std;


int main(){
    float matrix[3][3]={{1,1,1},{0,0,1},{0,1,1}};
    float d_matrix=0;
    for(int a=0,b=0 ; a<3 ; a++,b++){
        d_matrix+= matrix[0][a]*(matrix[1][(b+1)%3]*matrix[2][(b+2)%3]-
matrix[1][(b+2)%3]*matrix[2][(b+1)%3]);
    }
    if(d_matrix==0){
        cout<<"all three points are linear"<<endl;
        cout<<"Max distance between 2 points is: ";
        float max_distance=0;
        max_distance=sqrt(pow(matrix[0][0]-matrix[1][0],2)+pow(matrix[0][1]-
matrix[1][1],2));

        float temp=0;
        temp=sqrt(pow(matrix[0][0]-matrix[2][0],2)+pow(matrix[0][1]-
matrix[2][1],2));

        if(temp>max_distance){
            max_distance=temp;
            temp=0;
        }

        temp=sqrt(pow(matrix[1][0]-matrix[2][0],2)+pow(matrix[1][1]-
matrix[2][1],2));

        if(temp>max_distance){
            max_distance=temp;
            temp=0;
        }
        cout<<max_distance;
    }
    else{
        cout<<"all three points are not linear. They form a triangle."<<endl;
        cout<<"area of the triangle is: ";
        if(d_matrix < 0){
            d_matrix*=(-1);
        }
        cout<<d_matrix/2;
    }
}
```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```
            max_distance=temp;
            temp=0;
        }

        temp=sqrt(pow(matrix[1][0]-matrix[2][0],2)+pow(matrix[1][1]-matrix[2][1],2));

        if(temp>max_distance){
            max_distance=temp;
            temp=0;
        }
        cout<<max_distance;
    }
    else{
        cout<<"all three points are not linear. They form a triangle."<<endl;
        cout<<"area of the triangle is: ";
        if(determinant_matrix < 0){
            determinant_matrix*=(-1);
        }
        cout<<determinant_matrix/2;
    }
}
```

```
all three points are not linear. They form a triangle.
area of the triangle is: 0.5

...Program finished with exit code 0
Press ENTER to exit console.
```

4).

```
#include<bits/stdc++.h>
```

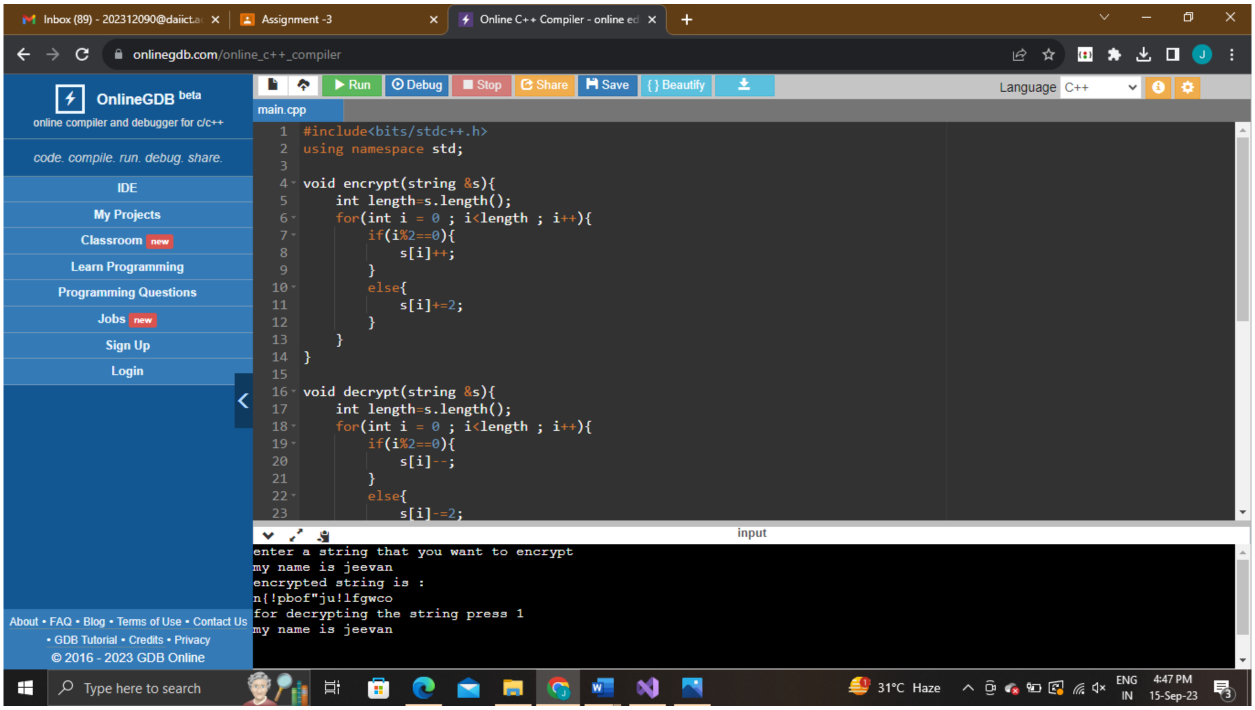
```
}

using namespace std;

void encrypt(string &s){
    int length=s.length();
    for(int i = 0 ; i<length ; i++){
        if(i%2==0){
            s[i]++;
        }
        else{
            s[i]+=2;
        }
    }
}

void decrypt(string &s){
    int length=s.length();
    for(int i = 0 ; i<length ; i++){
        if(i%2==0){
            s[i]--;
        }
        else{
            s[i]-=2;
        }
    }
```

}



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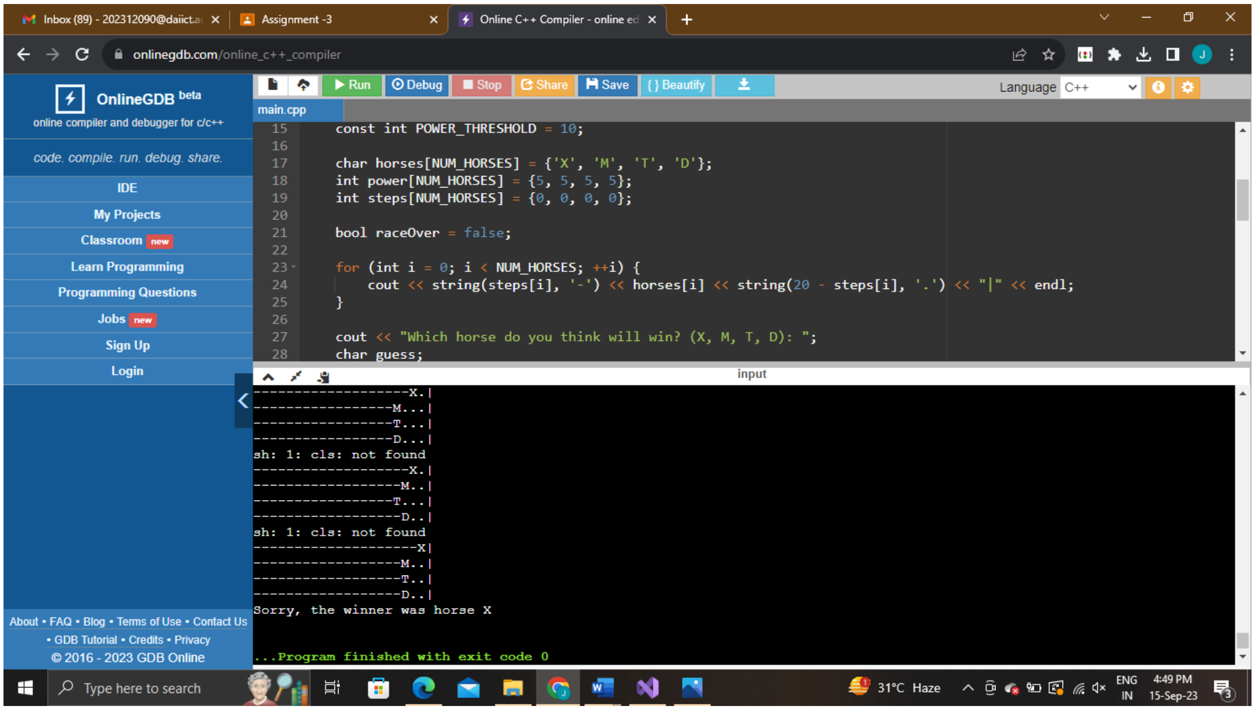
```cpp
#include<bits/stdc++.h>
using namespace std;

void encrypt(string &s){
    int length=s.length();
    for(int i = 0 ; i<length ; i++){
        if(i%2==0){
            s[i]++;
        }
        else{
            s[i]+=2;
        }
    }
}

void decrypt(string &s){
    int length=s.length();
    for(int i = 0 ; i<length ; i++){
        if(i%2==0){
            s[i]--;
        }
        else{
            s[i]-=2;
```

```
enter a string that you want to encrypt
my name is jeevan
encrypted string is :
n{!pbof"ju!lfgwco
for decrypting the string press 1
my name is jeevan
```

5).

```cpp
#include <iostream>

#include <cstdlib>

#include <ctime>

using namespace std;


int getRandom(int min, int max) {

    return min + (rand() % (max - min + 1));

}


int main() {

    srand(time(0));
    const int NUM_HORSES = 4;
    const int POWER_INCREMENT = 5;
    const int POWER_THRESHOLD = 10;

    char horses[NUM_HORSES] = {'X', 'M', 'T', 'D'};
    int power[NUM_HORSES] = {5, 5, 5, 5};
    int steps[NUM_HORSES] = {0, 0, 0, 0};

    bool raceOver = false;

    for (int i = 0; i < NUM_HORSES; ++i) {
        cout << string(steps[i], '-') << horses[i] << string(20 - steps[i], '.') << "|" << endl;
    }

    cout << "Which horse do you think will win? (X, M, T, D): ";
    char guess;
    cin >> guess;

    while (!raceOver) {
        for (int i = 0; i < NUM_HORSES; ++i) {
            power[i] += getRandom(1, 5);

            if (power[i] >= POWER_THRESHOLD * (steps[i] + 1)) {
                steps[i]++;
            }

            if (steps[i] >= 20) {
                raceOver = true;
            }
        }

        system("cls");

        for (int i = 0; i < NUM_HORSES; ++i) {
            cout << string(steps[i], '-') << horses[i] << string(20 - steps[i], '.') << "|" << endl;
        }

        if (raceOver) {
            int winnerIndex = 0;
            for (int i = 1; i < NUM_HORSES; ++i) {
                if (steps[i] > steps[winnerIndex]) {
                    winnerIndex = i;
                }
            }

            if (guess == horses[winnerIndex]) {
                cout << "Congratulations! You guessed the winner!" << endl;
            } else {
                cout << "Sorry, the winner was horse " << horses[winnerIndex] << endl;
            }
        }
    }

    return 0;
}
```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```
    const int POWER_THRESHOLD = 10;

    char horses[NUM_HORSES] = {'X', 'M', 'T', 'D'};
    int power[NUM_HORSES] = {5, 5, 5, 5};
    int steps[NUM_HORSES] = {0, 0, 0, 0};

    bool raceOver = false;

    for (int i = 0; i < NUM_HORSES; ++i) {
        cout << string(steps[i], '-') << horses[i] << string(20 - steps[i], '.') << "|" << endl;
    }

    cout << "Which horse do you think will win? (X, M, T, D): ";
    char guess;
```

```
-------------------X.|
-----------------M...|
-----------------T...|
-----------------D...|
sh: 1: cls: not found
-------------------X.|
------------------M..|
-----------------T...|
------------------D..|
sh: 1: cls: not found
--------------------X|
------------------M..|
------------------T..|
------------------D..|
Sorry, the winner was horse X


...Program finished with exit code 0
```

```
int main(){
    cout<<"enter a string that you want to encrypt"<<endl;
    string s;
    getline(cin,s);
    encrypt(s);
    cout<<"encrypted string is :"<<endl;
    cout<<s<<endl;

    cout<<"for decrypting the string press 1 "<<endl;
    int a;
    cin>>a;
    if(a==1){
        decrypt(s);

        cout<<s;
    }
    return 1;
}
```