COMPUTER SYSTEMS AND PROGRAMMING

HOME ASSIGNMENT # 01

- **SUBMITTED BY:-**

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- **CLASS:-**

ME-15 (SECTION-C)

- **DUE DATE:-**

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LAB MANUAL # 01 (HOME ASSIGNMENT)

❑ Task # 01

Write a C++ program to calculate distance between two points. The values of Coordinates should be input by user

main.cpp

Run

```
//LAB HOME ASSIGNMENT # 01
// TASK # 01

#include <iostream>
using namespace std;

int main() {
    int x1, x2, y1, y2, distance;// DECLARING VARIABLES

    cout<<"enter x coordinate of firts point"<<endl;
    cin>>x1;//taking input from user
    cout<<"enter y coordinate of first point"<<endl;
    cin>>y1;// taking input from user
    cout<<"enter x coordinate of second point"<<endl;
    cin>>x2;//taking input from user
    cout<<"enter y coordinate of second point"<<endl;
    cin>>y2;//taking innput from user
    distance = (x2-x1)*(x2-x1)+(y2-y1)*(y2-y1);// formula to find
        the distance between two points
    cout<<"distance between two points is:"<<distance<<endl;
}
```

Output

Clear

```
/tmp/jAvrwACloh.o
enter x coordinate of firts point
16
enter y coordinate of first point
23
enter x coordinate of second point
14
enter y coordinate of second point
25
distance between two points is:8
```

❑ Task # 02

Write a code in C++ to take length from user in centimeter and convert it into meter and kilometer

main.cpp

Run

Output

Clear

```
1          // lab home assignment # 1
2           // task # 02
3
4   #include<iostream>
5   using namespace std;
6
7     int main(){
8       float cm, m, km;   // we are using float because answer can
            be in decimal points
9
10      std::cout<<"enter value in centimeters"<<endl;
11      cin>>cm;   //  taking input from user in the form of values
            in cm
12
13      m = cm/100;
14      km = m/1000;
15      std::cout<<"value in meters is:"<<m<<endl;
16      std::cout<<"value in kilometers is:"<<km<<endl;
17    }
18
```

```
/tmp/CjUIF5SEi.o
enter value in centimeters
234
value in meters is:2.34
value in kilometers is:0.00234
```

❑ Task # 03

Write a code in C++ that takes values of a and b from the user and displays result of polynomial a 2 + 2ab

main.cpp

Run

```
// lab home assignment # 01
//      task # 03

#include<iostream>
using namespace std;

int main (){
    int a, b, polynomial; // declaring variables

    std::cout<<"enter first variable"<<endl;
    cin>>a; // taking input from user
    std::cout<<"enter second variable"<<endl;
    cin>>b;  //taking input from user

    polynomial = (a*a)+2*a*b+(b*b) ; // initializing the
        variable
    std::cout<<"polynomial="<<polynomial<<endl; // displays
        answer on the monitor
}
```

Output

Clear

```
/tmp/CjUIF5SE1.o
enter first variable
15
enter second variable
23
polynomial=1444
```

❑ Task # 04

Write a program in C++ to convert temperature in Fahrenheit to Celsius.

main.cpp

Run

Output

Clear

```
1   // lab home assignment # 01
2   //     task # 04
3
4   #include<iostream>
5   using namespace std;
6
7   int main (){
8       float C, F; // declaring variables
9       std::cout<<"enter temprature in Fahrenheit"<<endl;
10      cin>>F; // taking input from user
11      C = (F-32)*0.55556; // initializing variable C
12      std::cout<<"Temprature in Celcius = "<<C<<endl; //displays
            answer on the monitor
13  }
```

```
/tmp/CjjUIF5SEi.o
enter temprature in Fahrenheit
151.45
Temprature in Celcius = 66.3616
```

- All the task performed above utilize the basic techniques of C++ programming. The first step in writing any program is specifying your directory which enables the computer to access the pre programmed functions.
- When we use a variable in a program, it must declared first and then initialized before running the program. Declaring a variable means assigning a data type to it and naming it using an identifier.
- There are four primary data types two of which are utilized in the tasks performed above. Int data type is responsible for storing digits (0-9). And generally it can store up to 4 byte of data. The second data type used is called float which is used to store decimal numbers and it can also store up to 4 bytes of data.
- After the variable has been declared it must be initialized. Initializing a variable means discussing its subject.

example *int x;* *(declaring a variable)*

x = 2+2 *(initializing the variable)*

LAB MANUAL # O2 (CLASS ASSIGNMENT)

❑ Task # 01

Write a program that determines if a person is eligible to vote based on their age (e.g., 18 years or older) using logical operator

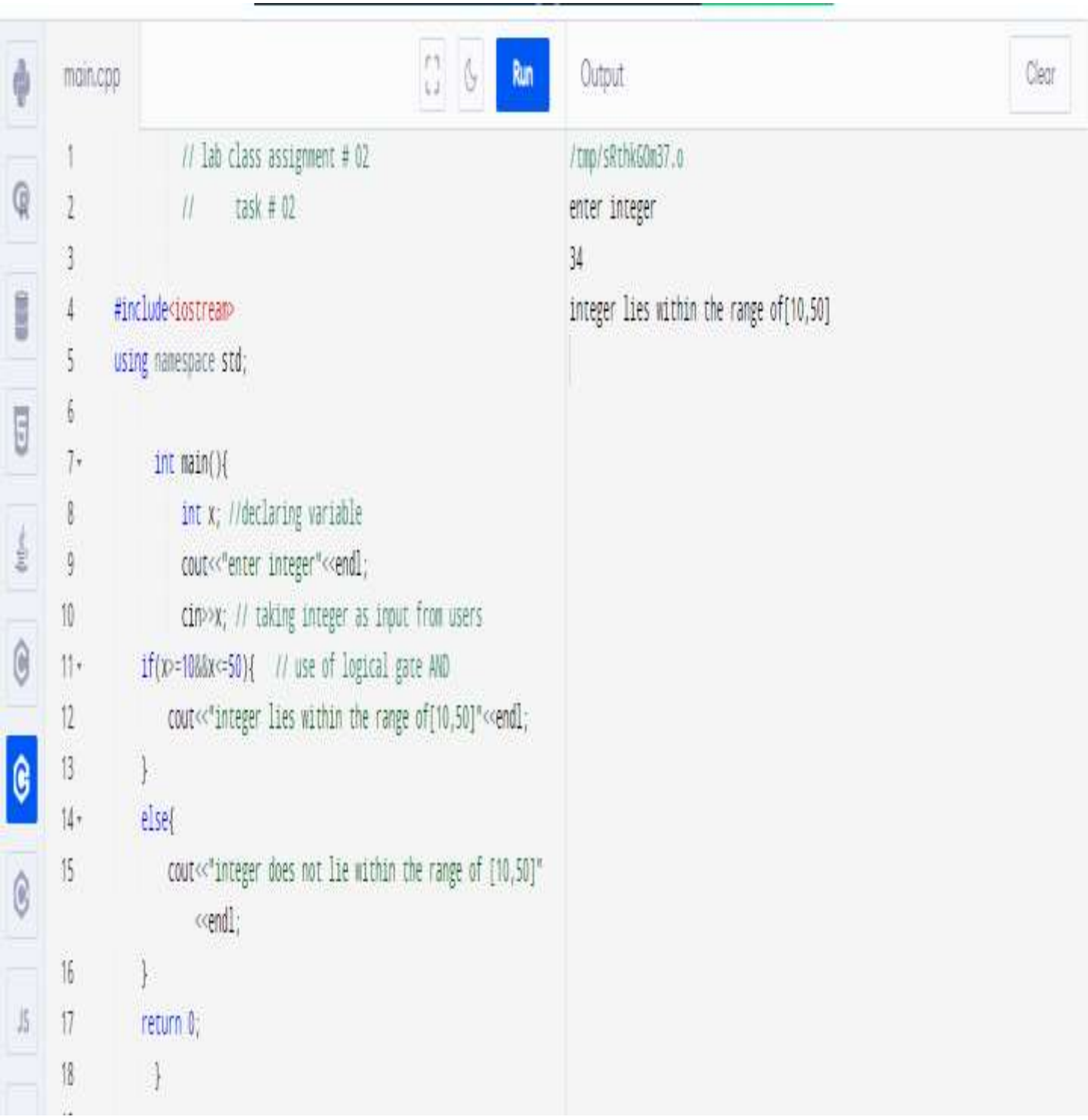
main.cpp | Run | Output | Clear

```
1   // lab class assignment # 02
2   //      task # 01
3
4   #include<iostream>
5   using namespace std;
6
7   int main(){
8       int x; // declaring the variable
9       cout<<"enter your age"<<endl;
10      cin>>x; // taking input from user
11  if (x>=18){
12          cout<<"person is eligible to vote"<<endl;
13      }
14      else{
15          cout<<"person is not old enough to vote"<<endl;
16      }
17      return 0;
18  }
19
```

```
/tmp/sRthkG0m37.o
enter your age
18
person is eligible to vote
```

❑ Task # 02

Write a program that takes an integer as input and checks if it falls within the range [10, 50]



❑ Task # 03

Write a C++ program to compare two integers and find the maximum value.

main.cpp

Run

Output

Clear

```
1        // lab class assignment # 02
2        //      task # 03
3
4   #include<iostream>
5   using namespace std;
6
7       int main(){
8           int x, y; //declaring variables
9       cout<<"enter firts integer"<<endl;
10      cin>>x; // taking input from users for firts integer
11      cout<<"enter second integer"<<endl;
12      cin>>y; //taking input from users for second integer
13
14      if(x>y){
15      cout<<"the maximum value is = "<<x<<endl;
16      }
17      else {
18          cout<<"the maximum value is = "<<y<<endl;
19      }
20      return 0;
21      }
```

```
/tmp/sRthkG0m37.o
enter firts integer
234
enter second integer
567
the maximum value is = 567
```

❑ Task # 04

Write a C++ program to calculate the average of three exam scores and determine if it's above a passing grade (e.g., average >= 60)

main.cpp

Run

Output

Clear

```
1   // lab class assignment # 02
2   //      task # 04
3   #include<iostream>
4   using namespace std;
5     int main(){
6     int x, y, z, average; //declaring variables
7   cout<<"enter firts exam score"<<endl;
8   cin>>x; // input firts score
9   cout<<"enter second exam score"<<endl;
10  cin>>y; //input second score
11  cout<<"enter third exam score"<<endl;
12  cin>>z; //input third score
13 average = (x+y+z)/3; //average=sum of all terms/no. of terms
14  cout<<"Average score = "<<average<<endl;//displays
      average on monitor
15 if(average>=60){ //using if else statements
16    cout<<"you have achieved a passing grade"<<endl;
17 }
18 else {
19    cout<<"you have not achieved a passing grade"<<endl;
20 }
21 return 0;  }
```

```
/tmp/sRthkGOm37.o
enter firts exam score
56
enter second exam score
45
enter third exam score
87
Average score = 62
you have achieved a passing grade
```

LAB MANUAL # 02 (HOME ASSIGNMENT)

❑ Task # 01

Create a program that takes a student's score as input and assigns a grade based on predefined criteria using logical operators (e.g., A, B, C, D, F).

main.cpp

Run

Output

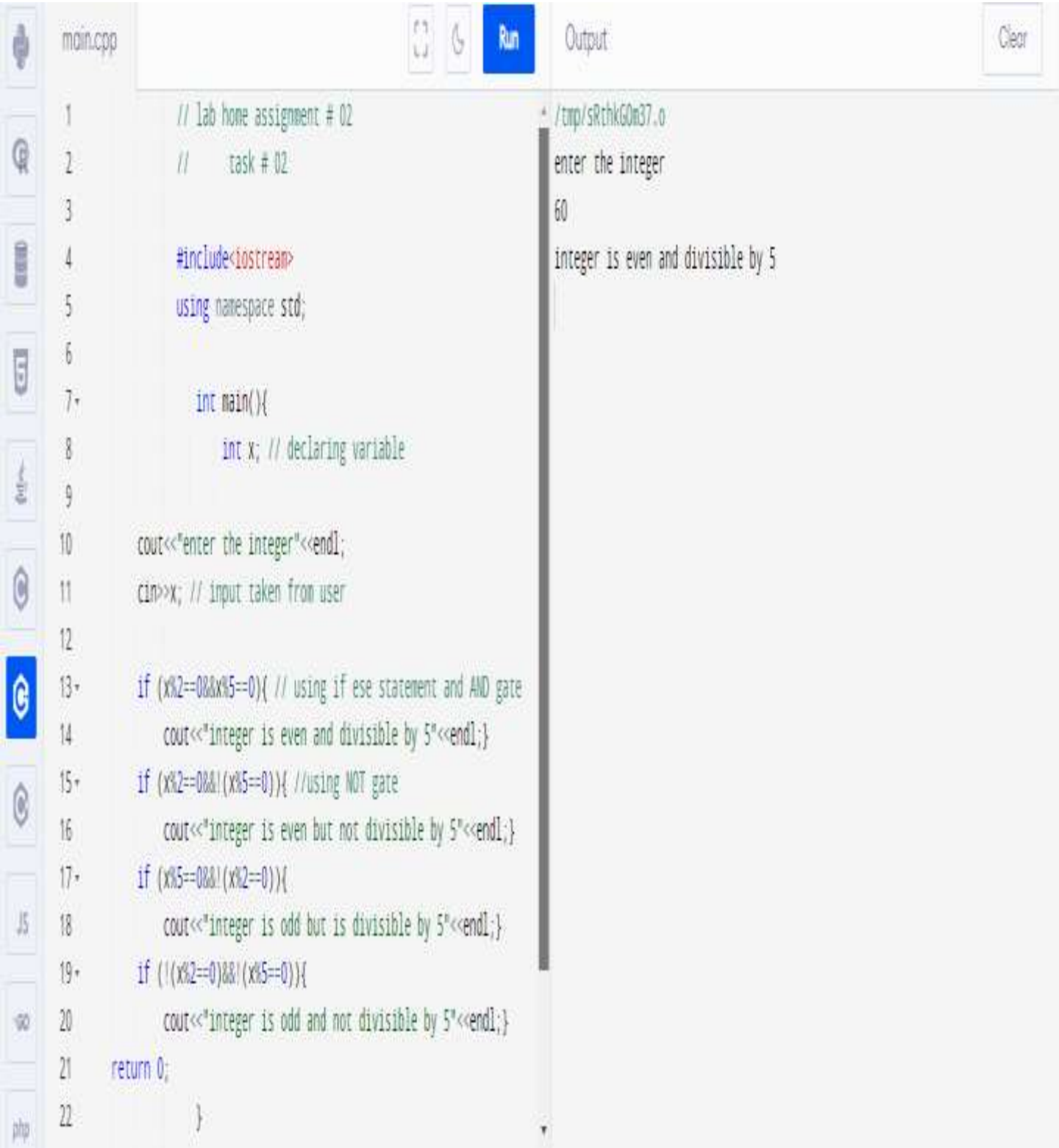
Clear

```
1   // lab home assignment # 02
2   //      task # 01
3
4   #include<iostream>
5   using namespace std;
6
7     int main(){
8       int x; // declaring variable
9   cout<<"enter your score"<<endl;
10  cin>>x; // input scores
11  if (x>=90&&x<=100){ //use of if else statement and AND gate
12     cout<<"YOUR GRADE IS A"<<endl;}
13  if (x>=75&&x<=89){
14      cout<<"YOUR GRADE IS B"<<endl;}
15  if (x>=60&&x<=74){
16       cout<<"YOUR GRADE IS C"<<endl;}
17  if (x>=45&&x<=59){
18       cout<<"YOUR GRADE IS D"<<endl;}
19  if (x>=0&&x<=44){
20       cout<<"YOUR GRADE IS F"<<endl;}
21  return 0;
22      }
```

```
/tmp/sRthkGOm37.o
enter your score
86
YOUR GRADE IS B
```

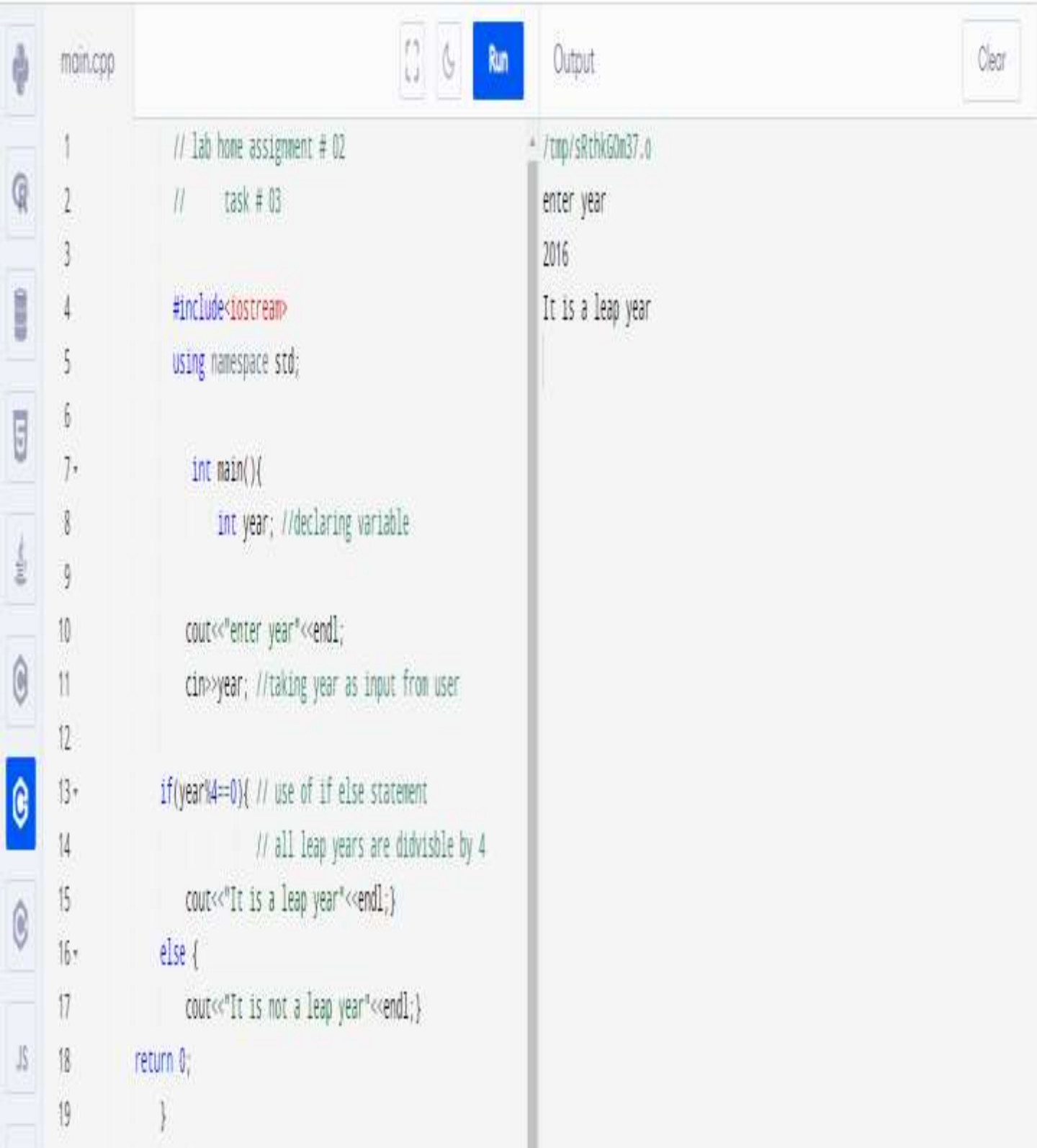
❑ Task # 02

Write a program that takes an integer as input and determines if it is both even and divisib



❑ Task # 03

Create a C++ program that checks if a user-provided year is a leap year.



❑ Task # 04

Create a C++ program that determines if a student is eligible for a scholarship based on their GPA (must have GPA >= 3.5) and attendance (must have attended at least 80% of classes).

main.cpp

Run

Output

Clear

```
1         // lab home assignment # 02
2         //      task # 04
3
4     #include<iostream>
5     using namespace std;
6
7         int main(){
8           float GPA, attendance; //using float because GPA is
                in points
9         cout<<"enter your GPA"<<endl;
10        cin>>GPA; //input GPA
11
12        cout<<"enter your attendance in %"<<endl;
13        cin>>attendance; //input attendane
14
15      if(GPA>=3.5&&attendance>=80){ // use of AND gate
16            cout<<"you are eligible for scholarship"<<endl;}
17        else {
18            cout<<"you do not meet the eligibilty criteria for
                scholarship"<<endl;}
19    return 0;
20        }
```

```
/tmp/sRthkGOm37.o
enter your GPA
3.8
enter your attendance in %
95
you are eligible for scholarship
```

Establishing secure connection...

❑ Task # 05

Write a program that checks if a given character is a vowel (a, e, i, o, u) or a consonant using

main.cpp

Run

Output

Clear

```
1          // lab home assignment # 02
2          //      task # 05
3
4   #include<iostream>
5   using namespace std;
6
7          int main(){
8             char character; // char datatype is used to store
                 characters
9       cout<<"enter character"<<endl;
10      cin>>character; // taking input form  user
11
12  if(character=='a'|| character=='e'||character=='i'||character
       =='o'||character=='u'){ //use of OR gate
13      cout<<"This charater is a vowel"<<endl;} //displays on
           monitor
14  else { // if 'if' statement is not true computer runs else
       statement
15             cout<<"This character is a consonant"<<endl;
16         }
17  return 0;
18         }
```

```
/tmp/sRthkGOm37.o
enter character
h
This character is a consonant
```

- All the tasks performed above utilize logic gates and IF-ELSE statements. The IF-ELSE statements are used when certain conditions need to be applied to run the program. The IF statement is the primary statement which can exist independently, however, an ELSE statement cannot exist without an IF statement.

- The computer reads the IF statement first and check if the statement is true, if it is true than the computer run the program mentioned in the IF statement. However, if the IF statement is false the computer moves on to the ELSE statement and executes it.
- A program can have more than one IF statements and no ELSE statement

- There are three basic types of logic gates :- AND gate (&&), OR gate (||), and NOT gate (!), all of which are used in the tasks performed above.

- The AND gate is considered to be true only if both statements are true. This means that the computer performs the task only if both of the given conditions are fulfilled. On the other hand OR gate is true when only one of the given statements is true. This implies that even if one of the given conditions is true, the computer will execute the program. The NOT gate simply negates the given statement.