Homework 2

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Task 1:

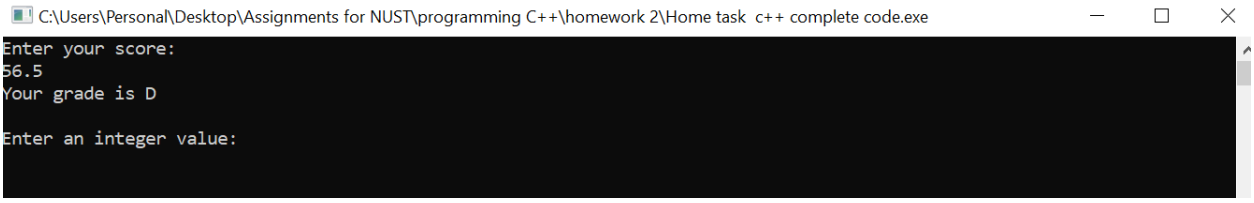
Create a program that takes student's scores as inputs and assigns a grade based on predefined criteria using logical operators.

```cpp
#include<iostream>
//<cctype> was include as without it the code was too complicated (refer to task 5 for a better explaination.
#include<cctype>
using namespace std;
int main ()
{
    //TASK 1

    //used float as i can now use grades in decimels.
    float grade;
    //simple promt to ask for the score.
    cout<<"Enter your score:"<<endl;
    cin>>grade;
    //using "if" and a chain of "else if" i was able to make a system of code that out puts the grades based on the score.


    if(grade>=90 && grade<100){cout<<"Your grade is A"<<endl;
    }
    else if(grade>=75 && grade<100){cout<<"Your grade is B"<<endl;
    }
    else if(grade>=60 && grade<100){cout<<"Your grade is C"<<endl;
    }
    else if(grade>=45 && grade<100){cout<<"Your grade is D"<<endl;
    }
    else if(grade>=0 && grade<100){cout<<"Your grade is F"<<endl;
    }
    // i added error detections which displays an error if input is beyond the range [0,100]
    else {cout<<"ERROR"<<endl;
    cout<<"INVALID SCORE"<<endl;}
    //added cout<<end; to create a gap between the task exicutes
    cout<<endl;
```

Explanation:

For this task I used a simple prompt that asked for the user input, then I made a system that checks if the input is within the range [0,100]. I then added an error prompt that appears only when an input is beyond the range.

This code when executed displays the grade of the individual whose score was inputted.



Task 2:

Write a program that takes integer as input and determines if it is both even and divisible by 5.

```
33      //TASK 2
34
35      int X;
36      //i wanted to use float however i found out that using float let to comlecated code that i have not been taught yet
37
38      cout<<"Enter an integer value:"<<endl;
39      cin>>X;
40      // using % the code is able to see if the remainder is zero when dividing with 2 and 5
41      //this chain of ifs and else ifs allows for an output for every type of input (all combinations are accounted for)
42      if (X % 2 == 0){
43          if (X % 5 == 0){cout<<"Your integer is both even and divisible by 5."<<endl;
44          }
45          else {cout<<"Your integer is even but no devisible by 5."<<endl;
46          }
47      }
48      else if (X % 5 == 0){cout<<"Your integer is not even but divisible by 5."<<endl;
49      }
50          else {cout<<"Your integer is not even and not divisible by 5."<<endl;
51          }
52
```

Explanation:

This code was fairly simple and uses a set of “ifs” that determine the output. After a value is inputted the code first checks if it is even or not, if it is then it checks if its divisible by 5.

Depending on the combinations an output will be displayed.

```
Enter an integer value:
55
Your integer is not even but divisible by 5.
Enter a year:
```

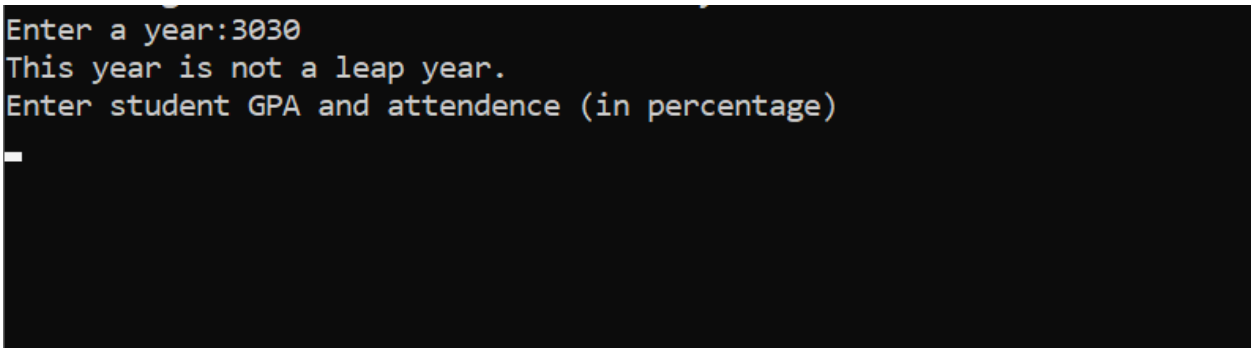
Task 3:

C++ code that checks if a given year is a leap year or not.

```
52
53      //TASK 3
54
55      int year;
56      //used int as years are most often then not displayed as whole numbers
57
58      cout<<"Enter a year:";
59      cin>>year;
60      //this line below checks if the year us divisible by 4 and is not divisible by 100 (hence the !=)
61      //it also uses the OR function to check if the year is instead divisible by 400
62      if ((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0)) {cout<<"This year is a leap year."<<endl;
63      }
64      else {cout<<"This year is not a leap year."<<endl;
65      }
```

Explanation:

This code is utilizing the OR function to determine if an inputted year fulfills any of the conditions.

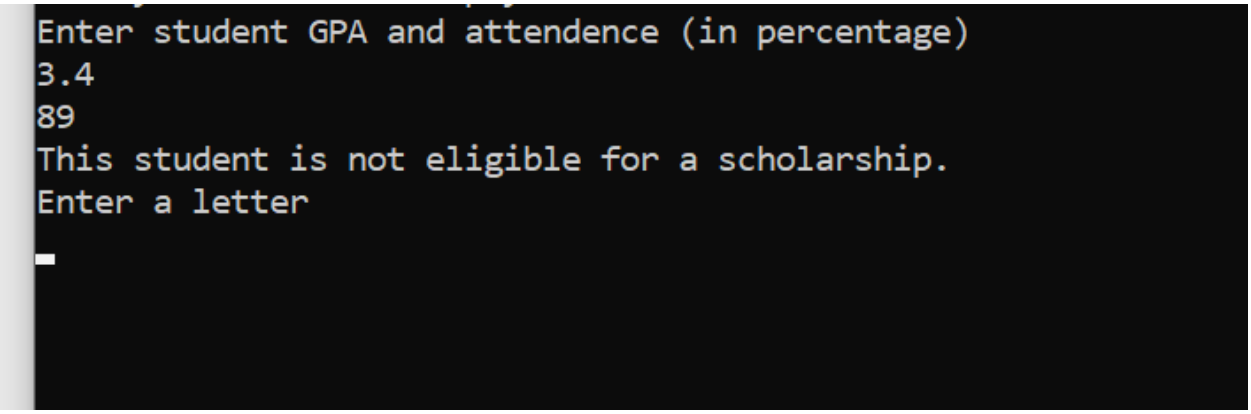


Task 4:

Create a program that determines if a student is eligible for a scholarship depending on their GPA and attendance.

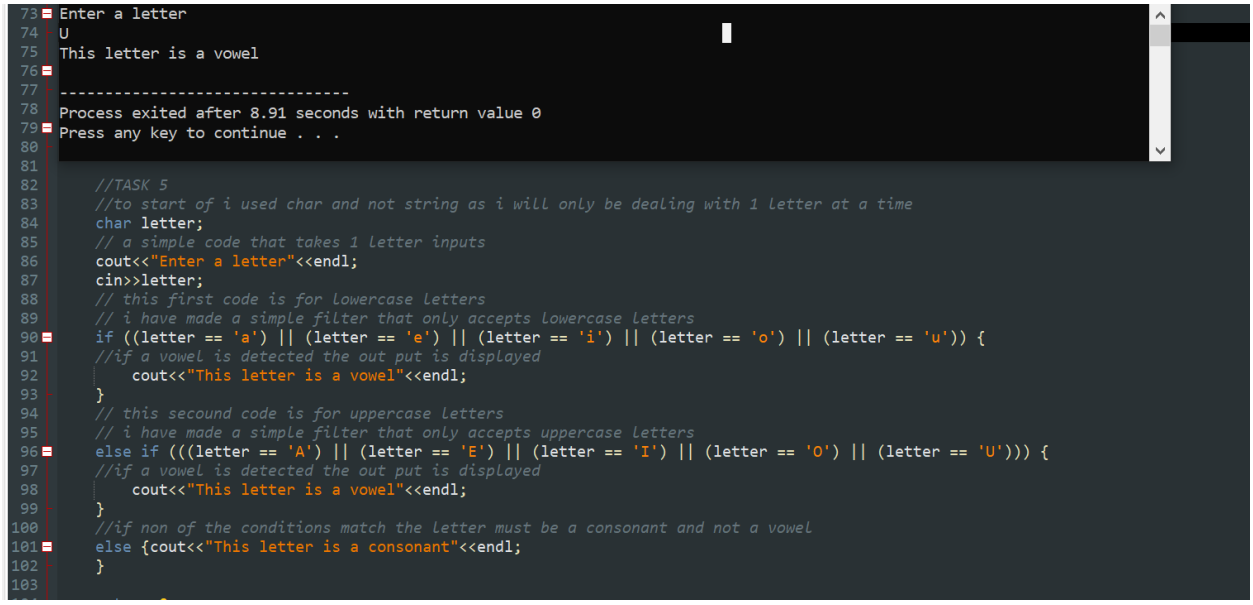
```
//TASK 4

float GPA, ATT;
//using float i can input decimal values for gpa and attendence

cout<<"Enter student GPA and attendence (in percentage)"<<endl;
cin>>GPA>>ATT;
//again making use of the OR function to make a multi conditional "if" this line also serves the perpouse of being the limit (error) detection
if ((GPA > 4) || (GPA < 0) || (ATT < 0) || (ATT > 100)){cout<<"ERROR INPUTS ARE INVALID"<<endl;
}
//these condtions determine the output for the code
else if (GPA >= 3.5 && ATT >= 80) {cout<<"This student is eligible for a scholarship."<<endl;
}

else {cout<<"This student is not eligible for a scholarship."<<endl;
}
```

This code uses multiple OR functions to create a multi conditional functions. In this case the GPA has a limit of [0,4] and the attendance has [0,100]. After checking that the inputs are correct the code determines the output.



Task 5:

Write a program that checks if a given character is a vowel or a consonant.



```
Enter a letter
U
This letter is a vowel

--------------------------------
Process exited after 8.91 seconds with return value 0
Press any key to continue . . .
```

```
    //TASK 5
    //to start of i used char and not string as i will only be dealing with 1 letter at a time
    char letter;
    // a simple code that takes 1 letter inputs
    cout<<"Enter a letter"<<endl;
    cin>>letter;
    // this first code is for lowercase letters
    // i have made a simple filter that only accepts lowercase letters
    if ((letter == 'a') || (letter == 'e') || (letter == 'i') || (letter == 'o') || (letter == 'u')) {
    //if a vowel is detected the out put is displayed
        cout<<"This letter is a vowel"<<endl;
    }
    // this secound code is for uppercase letters
    // i have made a simple filter that only accepts uppercase letters
    else if (((letter == 'A') || (letter == 'E') || (letter == 'I') || (letter == 'O') || (letter == 'U'))) {
    //if a vowel is detected the out put is displayed
        cout<<"This letter is a vowel"<<endl;
    }
    //if non of the conditions match the letter must be a consonant and not a vowel
    else {cout<<"This letter is a consonant"<<endl;
    }
```

This code is divided into 2 parts, the first detects only lowercase vowels while the second part detects only uppercase vowels. If neither lines of code detect a vowel then the input letter must be a consonant (not a vowel).