



National University of Science and
technology
(NUST)

CS-114 - Fundamental of Programing

Lab Manual # 02

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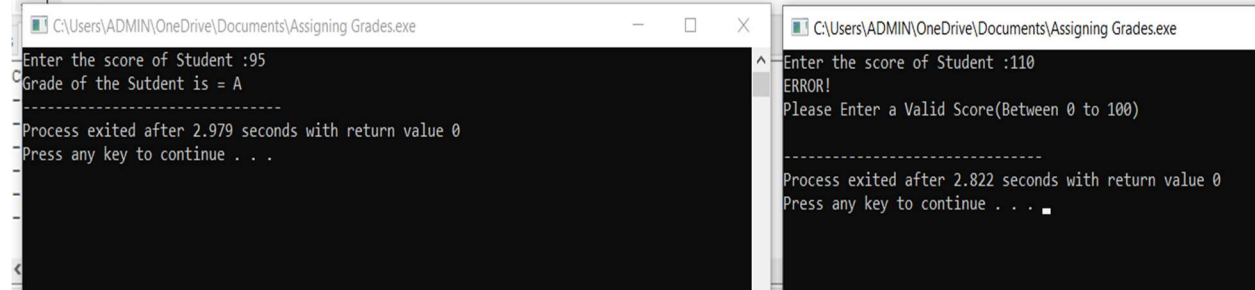
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TASK 1:

To create a program that takes a student's score as input and assigns a grade based on predefined criteria using logical operators.

```
1  #include <iostream>
2  using namespace std;
3  int main()
4  {
5      int score;
6      cout<<"Enter the score of Student :";
7      cin>>score; //taking the score as input
8      char grade;
9      if (score>= 90 && score<100){
10         grade = 'A'; //Assigning grade 'A' if score greater or equal to 90 and less than 100
11         cout<<"Grade of the Student is = "<<grade;
12     }
13     else if(score>= 75 && score<90){
14         grade = 'B'; //Assigning grade 'B' if score greater or equal to 75 and less than 90
15         cout<<"Grade of the Student is = "<<grade;
16     }
17     else if (score>= 60 && score<75){
18         grade = 'C'; //Assigning grade 'C' if score greater or equal to 60 and less than 75
19         cout<<"Grade of the Student is = "<<grade;
20     }
21     else if (score>= 45 && score<60){
22         grade = 'D'; //Assigning grade 'D' if score greater or equal to 45 and less than 60
23         cout<<"Grade of the Student is = "<<grade;
24     }
25     else if(score>= 0 && score<45){
26         grade = 'F'; //Assigning grade 'F' if score greater or equal to 0 and less than 45
27         cout<<"Grade of the Student is = "<<grade;
28     }
29     else {
30         cout<<"ERROR!"<<endl; //if the score values are not between 0 to 100 then there will be no result but an error
31         cout<<"Please Enter a Valid Score(Between 0 to 100)"<<endl;
32     }
33 }
```

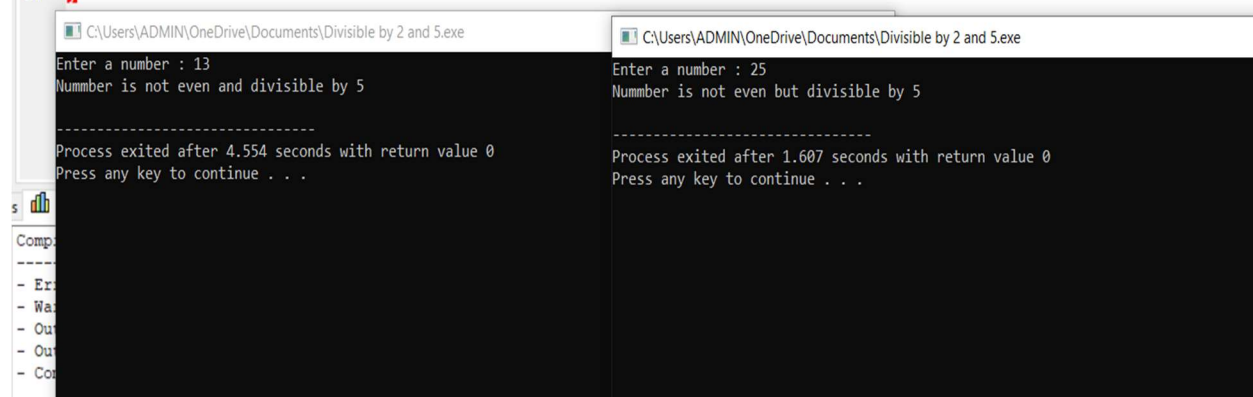


The image displays two screenshots of a C++ program's execution. The left screenshot shows the program running successfully for a valid score of 95, outputting 'Grade of the Student is = A'. The right screenshot shows the program running for an invalid score of 110, outputting an error message: 'ERROR! Please Enter a Valid Score(Between 0 to 100)'. Both screenshots show the program's title bar as 'C:\Users\ADMIN\OneDrive\Documents\Assigning Grades.exe' and indicate the process exited after a few seconds.

TASK 2:

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

```
1  #include <iostream>
2  using namespace std;
3  int main()
4  {
5      int a;
6      cout<<"Enter a number : ";
7      cin>>a; // Taking the integer as input fro user
8      if(a % 2 == 0 && a % 5 == 0) //using the if statement to check if the number is divisible by 2 and 5 and if it does then printing statement
9      {
10         cout<<"Number is both Even and divisible by 5"<<endl;
11     }
12     else if(a % 2 == 0 && a % 5 != 0) //using else if statement to check if number divisible by 2 and not divisible by 5
13     {
14         cout<<"Number is even and but not divisible by 5"<<endl; //then printing this this statement
15     }
16     else if(! a % 2 == 0 && a % 5 == 0) //using elseif to check if the number is divisible by 5 and not divisible by 2
17     {
18         cout<<"Number is not even but divisible by 5"<<endl; //Then printing this statement
19     }
20     else{
21         cout<<"Number is not even and divisible by 5"<<endl; //using 'else' statement to print this statement
22     }
23
24     return 0;
}
```



Enter a number : 13
Number is not even and divisible by 5

Process exited after 4.554 seconds with return value 0
Press any key to continue . . .

Enter a number : 25
Number is not even but divisible by 5

Process exited after 1.607 seconds with return value 0
Press any key to continue . . .

TASK 3:

Write a C++ program that determines if user provided year is a leap year or not.

```
1  #include <iostream>
2  using namespace std;
3  int main()
4  {
5      int year;
6      cout<<"Enter the Year : ";
7      cin>>year; //taking 'year' as input from user
8      if( year % 4==0){//using if logic to check if provided year is divisible by '4'
9          cout<<"It is a Leap Year"<<endl;//if year is divisible by 4 then printed this
10     }
11     else{//if the year is not divisible by 4 then
12         cout<<"It is not a leap year"<<endl;//printed this statement
13     }
14     return 0;
15 }
```

Left Terminal Window (C:\Users\ADMIN\OneDrive\Documents\Leap Year.exe):

```
Enter the Year : 2023
It is not a leap year

-----
Process exited after 2.629 seconds with return value 0
Press any key to continue . . .
```

Right Terminal Window (C:\Users\ADMIN\OneDrive\Documents\Leap Year.exe):

```
Enter the Year : 2020
It is a Leap Year

-----
Process exited after 4.141 seconds with return value 0
Press any key to continue . . .
```

TASK 4:

Write a C++ program that determines if a student is eligible for a Scholarship based upon GPA and attendance.

```
1  #include <iostream>
2  using namespace std;
3  int main()
4  {
5      float GPA;
6      int a;
7      cout<<"Enter Student's GPA : ";
8      cin>>GPA; //Taking 'GPA' as input from user
9      cout<<"Enter Student's Attendance(in percentage) :";
10     cin>>a; //Taking 'attendance' as input from user
11     if (GPA >= 3.5 && a >=80){
12         cout<<"Student is Eligible for Scholarship"<<endl; // using and logic to check if GPA is above 3.5 and attendance is above 80%
13     }
14     else if(GPA>4.0 || a>100){ //using if statement and or logic to draw out invalid values
15         cout<<"ERROR!"<<endl;
16         cout<<"Invalid values"<<endl;
17         cout<<"Please enter GPA from 0-4 "<<endl;
18         cout<<"and Attendance from 0-100 percent"<<endl;
19     }
20     else if (!GPA>= 3.5 && a>=80){ // checking if GPA is Less than 3.5
21         cout<<"Student is not Eligible for Scholarship due to low GPA "<<endl;
22     }
23     else{ //Checking if attendance is Lower than 80%
24         cout<<"Student is not Eligible for Scholarship due to low attendance"<<endl;
25     }
26     return 0;
}
```

```
C:\Users\ADMIN\OneDrive\Documents\Attendance.exe
Enter Student's GPA : 3.5
Enter Student's Attendance(in percentage) :80
Student is Eligible for Scholarship

-----
Process exited after 4.772 seconds with return value 0
Press any key to continue . . .
```

```
C:\Users\ADMIN\OneDrive\Documents\Attendance.exe
Enter Student's GPA : 4.0
Enter Student's Attendance(in percentage) :70
Student is not Eligible for Scholarship due to low attendance

-----
Process exited after 13.95 seconds with return value 0
Press any key to continue . . .
```

TASK 5:

Write a program that checks if a given character is a vowel or a Consonant using logical operators.

```
1  #include <iostream>
2  using namespace std;
3  int main()
4  {
5      char al; // determining al by char
6      cout<<"Enter a character :"; //taking alphabet as input from user
7      cin>>al;
8      if (al == 'a' || al == 'e' || al == 'i' || al == 'o' || al == 'u' || al == 'A' || al == 'E' || al == 'I' || al == 'O' || al == 'U') { //using or Logic to check if al resembles a,e,i,,o,u
9          cout<<"The Chracter is a Vowel"<<endl;
10     }
11     else if ((al >= 'a' && al <= 'z') &&! (al == 'a' || al == 'e' || al == 'i' || al == 'o' || al == 'u' || al == 'A' || al == 'E' || al == 'I' || al == 'O' || al == 'U')) {
12         cout<<"The Character is a Consonant"<<endl; // declaring limit from a to z and using 'not' to sxclude vowels
13     }
14     else if ((al >= 'A' && al <= 'Z') &&! (al == 'a' || al == 'e' || al == 'i' || al == 'o' || al == 'u' || al == 'A' || al == 'E' || al == 'I' || al == 'O' || al == 'U')) {
15         cout<<"The Character is a Consonant"<<endl; //again declaring Limit from A to Z and using 'or', 'and' and 'not' logic to exclude vowels
16     }
17     else { cout<<"Error!"<<endl; // incase of input other than 'a to z' or 'A to Z' error is displayed
18         cout<<"Enter a Valid Character"<<endl;
19     }
20
21     return 0;
22 }
```

C:\Users\ADMIN\OneDrive\Documents\Consonants and vowels L-2.exe

Enter a character :A
The Chracter is a Vowel

Process exited after 4.154 seconds with return value 0
Press any key to continue . . .

C:\Users\ADMIN\OneDrive\Documents\Consonants and vowels L-2.exe

Enter a character :b
The Character is a Consonant

Process exited after 3.015 seconds with return value 0
Press any key to continue . . .