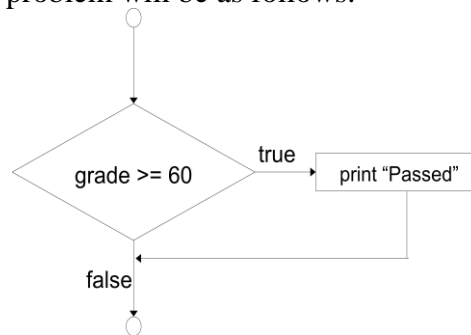


## Lab Manual

Course : CSE 105  
Credit Title : Structured Programming  
Instructor : Dr. Maheen Islam, Associate Professor, CSE Department

### Lab-3: Selection Statements *if*, *if-else*, *if-else-if*, Switch and Conditional operators

As discussed in the class, selection structures are used to choose among alternative courses of action: In this problem we want to check whether a student is passes or failed. According to the rule of EWU If the marks of a student is greater than or equal to 60 he/she “Passed”. Thus, the flowcharts of this problem will be as follows:



In C we can do this using a single *if*, which is shown below.

```
if(grade>=60)
    printf( "Passed\n" );
```

**Exercise 1:** Consider the following code

```
#include<stdio.h>
#include<math.h>

int main()
{
    int grade_number;
    printf("Enter grade number: ");

    scanf(" %d",&grade_number);

    if(grade_number>=60)
        printf("\nPassed\n");

    return 0;
}
```

- i. Fill the *printf* and *scanf* lines such that the output is as follows:

```

Enter The Number
70

Passed
Press any key to continue

```

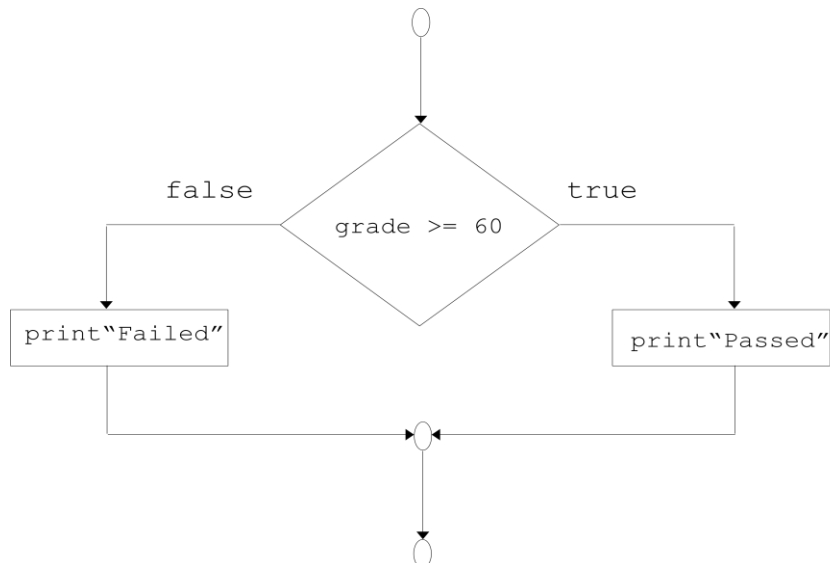
```

Enter The Number
59

Press any key to continue

```

- ii. As you see there is no output for the input 59 .This is because *if* statement is a single-entry/single-exit structure, i.e. our code will perform action for the true condition only.
- iii. Using an *else* concatenate with *if* we can easily covert the above code such it can perform an action (for example print failed) for the false condition too. In that case, it flow chart will be as follows



- iv. In the above code replace the *if parts* with the following code.

```

if(grade_number>=60)
printf("\nPassed\n");
else
printf("\nFailed\n");

```

- v. What is the output for the input **70** and **59** here?

In the *if* statement template, notice that statement is singular, not plural:

```

if(expression)
    Statement

```

To make an *if* statement control two or more statements, generally we use a compound statement. A compound statement has the form

```

{

```

```

Statement_1;
Statement_2;
...
Statement_n;
}

```

Placing braces around a group of statements forces the compiler to treat it as a single statement, i.e., for the following C code, all n statements will be executed if the expression is true.

```

if(expression)
{
    Statement_1;
    Statement_2;
    ...
    Statement_n;
}

```

**Exercise 2:** Consider the following flowchart, and Modify your code of exercise 1, such that it can comply outputs shown in right



Note: For this you should use separate **printf** for each text i.e., one **printf** for Sorry, one for Failed, one for Congratulations and another one for Passed .

**Exercise 3:** You are given two integer numbers. Find the quotient and remainder. When 2<sup>nd</sup> input is zero, you should print "Error!! Can't divide."

| Sample Input | Sample Output         |
|--------------|-----------------------|
| 17      5    | Q=3,    R=2           |
| 3        0   | Error!! Can't divide. |

**Exercise 4:** In this exercise you need to write a program that will take an integer input representing year and print whether this is a leap year or not leap year.

| Sample Input | Sample Output |
|--------------|---------------|
| 2000         | Leap Year     |
| 2003         | Not Leap Year |

**Exercise 5:** Write a C code that can check whether a number is odd or even. Your number should be input from the keyboard. If the number is odd your program should print “The number you entered is ODD” otherwise it should print “The number you entered is EVEN”. A number is odd *if the number mod 2 equals to zero*, otherwise it is an even number.

| Sample input                   | Sample Output                  |
|--------------------------------|--------------------------------|
| Please Enter your number : 11  | The number you entered is ODD  |
| Please Enter your number : 120 | The number you entered is EVEN |

**Exercise 6:** Given a score and the following grading scale write a program with *if-else-if* only to find the corresponding grade.

|        |   |
|--------|---|
| 90-100 | A |
| 80-89  | B |
| 70-79  | C |
| 60-69  | D |
| 0-59   | F |

Your program should have proper error checking. For example, if a user input a negative number or more than 100 it should print “Invalid input.”

| Sample input                  | Sample Output  |
|-------------------------------|----------------|
| Please Enter the number : 97  | Grade is A.    |
| Please Enter the number : 75  | Grade is C.    |
| Please Enter the number : 107 | Invalid input. |

**Exercise 7:** Suppose we have two tasks A and B, A takes Ah hours, Am minutes, and As seconds. On the other hand B takes Bh hours, Bm minutes, and Bs seconds. Write if-else statements to print out which task takes more time?

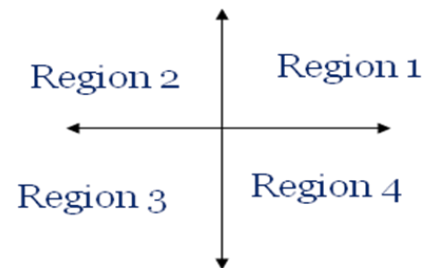
| Sample input   | Sample Output      |
|--|--------------------|
| Please Enter Ah = 10<br>Please Enter Am = 13<br>Please Enter As = 35<br>Please Enter Bh = 11<br>Please Enter Bm = 0<br>Please Enter Bs = 0 | B takes more time. |
| Please Enter Ah = 11<br>Please Enter Am = 12   | A takes more time. |

|   |  |
|---|--|
| Please Enter As = 13<br>Please Enter Bh = 8<br>Please Enter Bm = 35<br>Please Enter Bs = 37 |  |
|---|--|

**Exercise 8:** Write a program that reads 3 integer numbers a, b and c from user and computes minimum, median and maximum of the numbers

| Sample input   | Sample Output                |
|--|------------------------------|
| Please Enter a = 2<br>Please Enter b = 5<br>Please Enter c = 3 | Min = 2, Max = 5, Median = 3 |
| Please Enter a = 2<br>Please Enter b = 2<br>Please Enter c = 3 | Min = 2, Max = 3, Median = 2 |

**Exercise 9:** Write a program that reads a point (x, y) from user and prints its region



| Sample input             | Sample Output             |
|--------------------------|---------------------------|
| Please Enter x, y: 3 -1  | This point is in Region 4 |
| Please Enter x, y: -1 -5 | This point is in Region 3 |