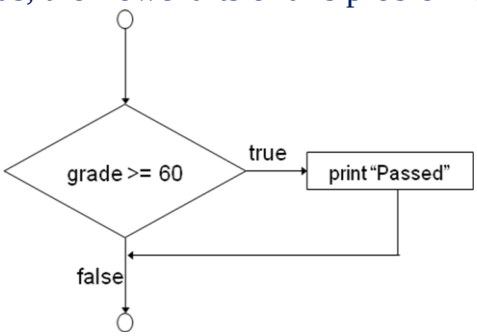
East West University
Department of Computer Science & Engineering
Plot No-A/2, Main Road, Jahurul Islam City, Aftabnagar, Dhaka-1219

Lab Manual

Course : CSE -105
Credit Title : Structured Programming
Instructor : Md.Shamsujjoha (MSJ)

Lab-3: Selection Statements ***if, if-else, if-else-if,*** Switch and Conditional operators **()?():()**

As discussed in the class, selection structure 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("                \n");

scanf("  ",&            );

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

return 0;
}
```

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

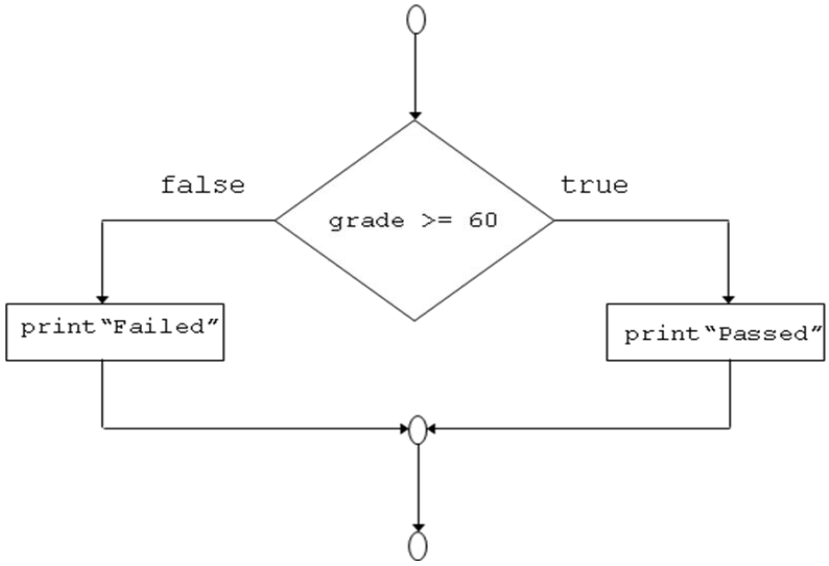
```
Enter The Number
70

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
```

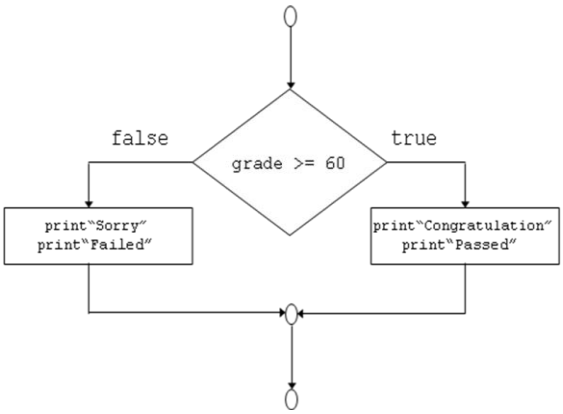
To make an ***if*** statement control two or more statements, generally we use a compound statement. A compound statement has the form

```
{
  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



Outputs

```
Enter The Number
70

Congatulation

Passed
Press any key to continue_
```

```
Enter The Number
50

Sorry

Failed
Press any key to continue_
```

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 .

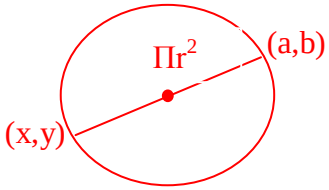
Exercise 3 : This is the repetition of Exercise 6 of our previous lab (lab-2). In that problem you were asked to find the quotient and remainder, all is given, two integer numbers which are actually input from keyboard. In that exercise there is no proper error checking, such as when 2nd input is zero, what are the results there? It's an error as we can't divide anything with zero. So, modify your previous code of exercise 6 such that it can check error properly. That is you should print "Error!! Can't divide." When the 2nd input is zero.

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.

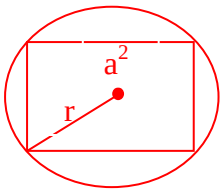
Sample Input	Sample Output
2000	Leap Year
2003	Not Leap Year

Exercise 5 : The line joining the points (a, b) and (x, y) which lie on the circumference of a circle is the diameter of the circle. Now, Write a program to computer the area of the circle. ***a, b, x*** and ***y*** are given as input. If the diameter of the circle is zero you should print "No circle !!! How I can calculate the area."



Sample Input	Sample Output
4 10 1 5	26.70
4 10 4 10	No circle !!! How I can calculate the area.

Exercise 6 : Write a C programme to compute the area of a circle, where the radius is the input from your keyboard. If the area of the circle is less than 100 square units then your programme should print "The Circle Is Too Small To Hold A Quadrate", otherwise it should print "Your Circle Is Big Enough To Hold A Quadrate & The Area of The Quadrate is ***X***". Here ***X*** is the actual area of the Quadrate.



Sample input	Sample Output
Please Enter The Radius : 5.5	The Circle Is Too Small To Hold A Quadrate
Please Enter The Radius : 6.75	Your Circle Is Big Enough To Hold A Quadrate & The Area of The Quadrate is 91.125000

Exercise 7 : In the lab we have worked with C's relational operators such as +,-,*,/,% and logical operators <, >, <=, >=, ==, != . Now 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 programme 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 8 : 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 programme 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.

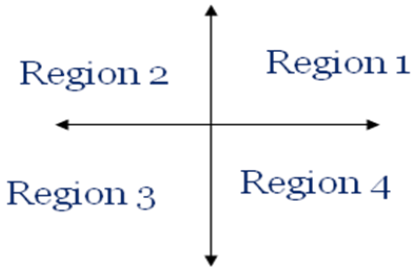
Exercise 9 : Suppose we have two tasks A and B, A takes Ah hours, Am minutes, and As seconds. On the other hand B takes Bh hours, Bm minutes, and Bs seconds. Write if-else statements to print out which task takes more time?

Sample input	Sample Output
Please Enter Ah = 10 Please Enter Am = 13 Please Enter As = 35 Please Enter Bh = 11 Please Enter Bm = 0 Please Enter Bs = 0	B takes more time.
Please Enter Ah = 11 Please Enter Am = 12 Please Enter As = 13 Please Enter Bh = 8 Please Enter Bm = 35 Please Enter Bs = 37	A takes more time.

Exercise 10 : 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 Please Enter b = 5 Please Enter c = 3	Min = 2, Max = 5, Median = 3
Please Enter a = 2 Please Enter b = 2 Please Enter c = 3	Min = 2, Max = 3, Median = 2

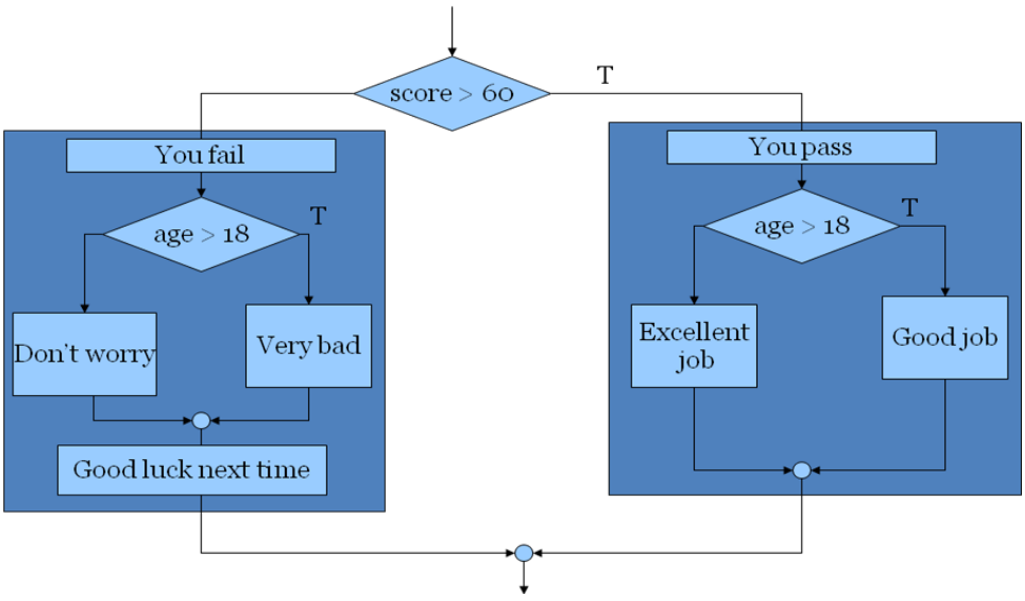
Exercise 11 : Write a program that reads a point (x, y) from user and prints its region

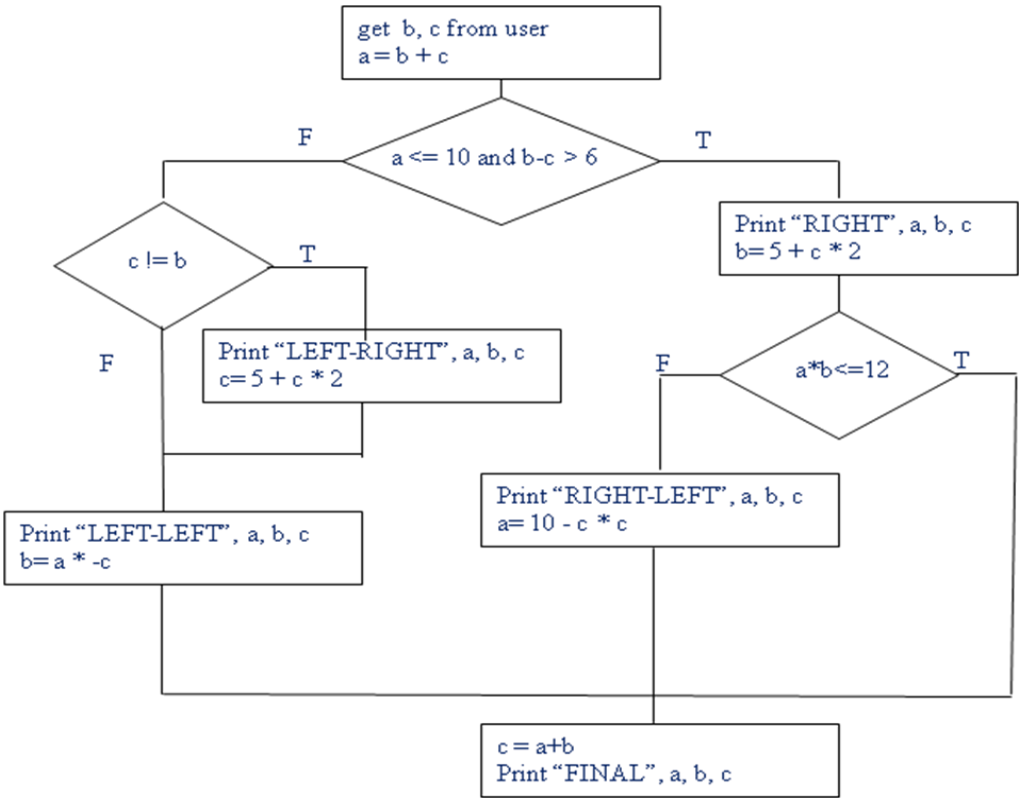


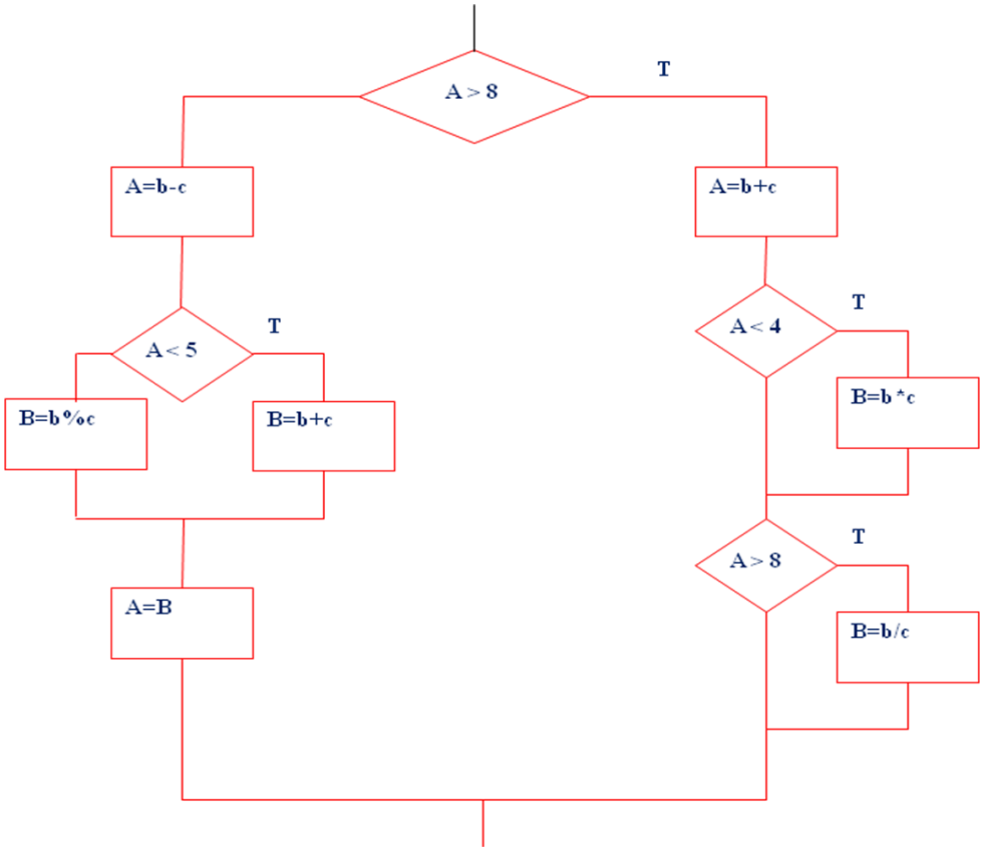
Sample input	Sample Output
Please Enter x, y: 3 -1	This point is in Region 4
Please Enter x, y: -1 -5	This point is in Region 3

Home Works :

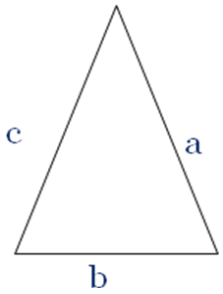
1. Write three C programme that adapt with following three flowchart respectively




get b, c from user
a = b + c
a <= 10 and b-c > 6
F
T
c != b
T
F
Print "LEFT-RIGHT", a, b, c
c= 5 + c * 2
Print "LEFT-LEFT", a, b, c
b= a * -c
Print "RIGHT", a, b, c
b= 5 + c * 2
a*b<=12
F
T
Print "RIGHT-LEFT", a, b, c
a= 10 - c * c
c = a+b
Print "FINAL", a, b, c


A > 8
T
A=b-c
A=b+c
A < 5
T
A < 4
T
B=b%c
B=b+c
B=b*c
A=B
A > 8
T
B=b/c

2. In this programme you have to check if you can make a triangle using a, b, c. Where a, b, c are the inputs form your keyboard. If you can't make a triangle your programme should "Print no triangle is possible" otherwise it should print the area of that triangle. For this problem you should know the basic law of the triangle.



3. Write a program that reads double *N* and computes the cost, where the cost function is as follows.

$$\cos t = \begin{cases} \$100 & \text{if } N \le \$50 \\ \$10 + 2\% \text{ of } N & \text{if } 50 < N \le 100 \\ \$15 + 0.1\% \text{ of } N & \text{if } 100 < N < 1000 \\ \$300 & \text{Otherwise} \end{cases}$$

4. In exercise 8 you have already compute the grade with *if-else-if* . Now solve the same problem with switch statements, *i.e*, no *if-else-if*.

5. Solve the problem 4 (Ex.8) with ternary conditional operators i.e., ()**?**():()

Reminder: Next week no student will be allowed to enter into the lab without completion of the above home tasks. Submission of the home tasks can be either Hard Copy (Hand Written or, printed) or Soft Copy (Source Code). We also *vigorously* opposed to the academic dishonesties, as it seriously detracts from the education of honest students. In the completion of your home works, it is impermissible to discuss a general method of solution with other students, or to make use of online resources. In case of any problem, inconsistency and errors in coding knock your Instructors/teachers. We are here to help you and to remove your confusions.

Thanks

Maheen Islam, Dr. Taskeed Jabid and Md. Shamsujjoha
Faculty members, Department of Computer Science & Engineering, East West University
Email: maheen@ewubd.edu, tasked@ewubd.edu and dishacse@yahoo.com