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**Lab 04**  
  
Conditional  
  
statements in C

# LAB 04

## Learning Objectives

- Introduction to conditional statements
- If structure
- If –else structure
- If-else-if structure
- Switch statements

Conditional statements help you to make a decision based on certain conditions. These conditions are specified by a set of conditional statements having boolean expressions which are evaluated to a boolean value true or false.

### **If structure:**

The single if statement in C language is used to execute the code if a condition is true. It is also called one-way selection statement.

### **Syntax**

```
if (expression)
{
    //code to be executed
}
```

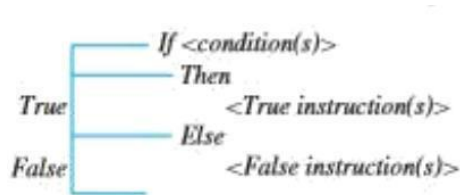
- If the expression is evaluated to nonzero (true) then if block statement(s) are executed.
- If the expression is evaluated to zero (false) then Control passes to the next statement following it.

### **Example**

```
#include<stdio.h>
#include<conio.h>
void main()
{
    int num=0;
    printf("enter the number");
    scanf("%d",&num);
    if(n%2==0)
    {
        printf("%d number in even",num);
    }
    getch();
}
```

## If else structure:

The decision logic structure uses the If/Then/Else instruction. It tells the computer that if a condition is true, then execute a set of instructions, or Else execute another set of instructions. The Else part is optional, as there is not always a set of instructions if the conditions are false.



The True instructions are processed when the resultant of the condition is True, and the False instructions are processed when the resultant of the condition is False. A condition can be one of four things:

- A logical expression, that is, an expression that uses logical operators (AND, OR, and NOT);
- An expression using relational operators (greater than, less than, greater than or equal to, less than or equal to, equal to, and not equal to);
- A variable of the logical data type (True or False);
- A combination of logical, relational, and mathematical operators.

Some examples of conditional expressions are as follows:

- $A < B$  (A and B are the same data type—either numeric, character, or string)
- $X + 5$  (X and Z are numeric data)
- $E < 5$  or  $F > 10$  (E and F are numeric data)

### Syntax

```
if(expression)
{
    //code to be executed
}
else
{
    //code to be executed
}
```

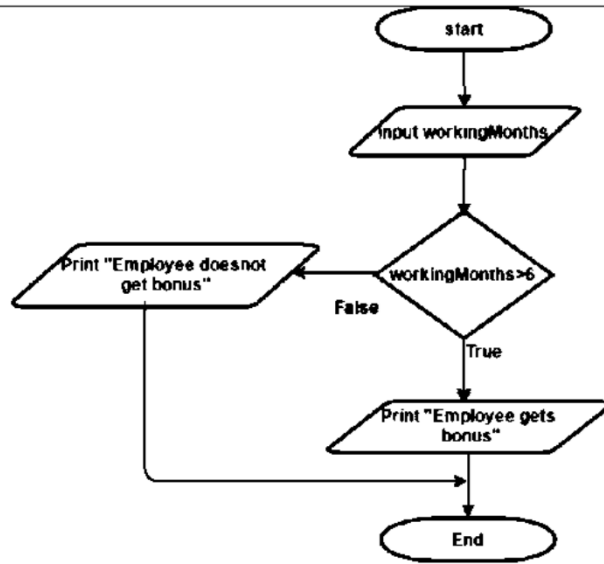
### PROBLEM

*A company gives a bonus at the end of each fiscal year. For an employee to get a bonus, the employee has been working at the company for more than six months.*

#### ALGORITHM

- 1) Start
- 2) Input working months
- 3) IF workingMonths > 6  
    then  
        Print "Employee gets bonus"  
    Else  
        Print "Employee doesn't get bonus"  
    END IF
- 4) End

#### FLOWCHART



#### C-IMPLEMENTATION

```
#include<stdio.h>

int main()
{
    int workingMonths;
    float earning;
    printf("Enter number of working months: ");
    scanf("%d", &workingMonths);

    if(workingMonths > 6)
    {
        printf("\nEmployee gets bonus.");
    }
    else
    {
        printf("\nEmployee doesnot get bonus.");
    }
}
```

## If else if structure:

Multiple conditions can be written by making several else-if clauses. Once a condition is true, control will never go to other else-if conditions. An else clause can be added after else if statements.

### Syntax

```
if (expression1)
    statement 1;
else if (expression 2)
    statement 2;
    ...
else
    statement n;
```

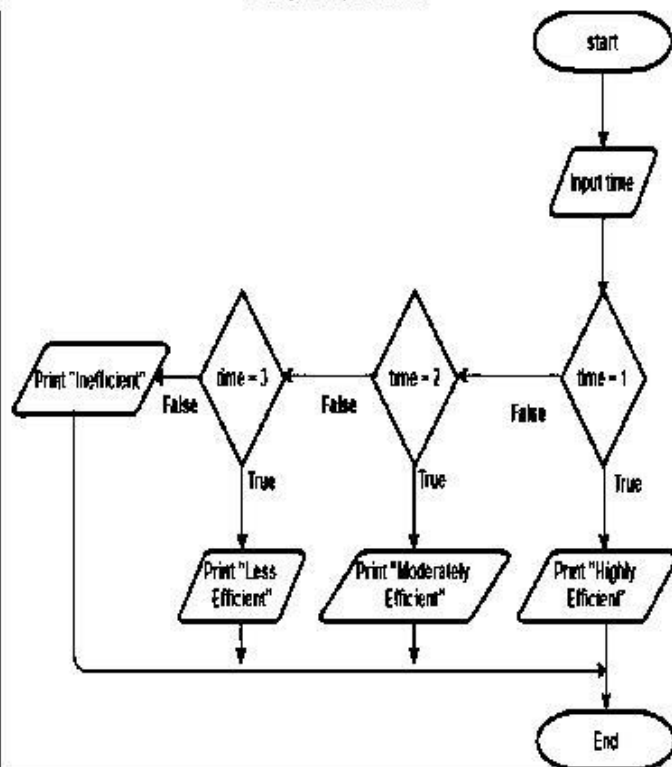
### PROBLEM

*In a company, worker efficiency is determined on the basis of the time required for a worker to complete a particular job. If the time taken by the worker is 1 hour, then the worker is said to be highly efficient. If the time required by the worker is 2 hours, then the worker is said to be moderately efficient. If the time taken is 3 hours, the worker is said to be less efficient and if the time taken by the worker is more than 3 hours, then the worker is said to be inefficient. Find the efficiency of the worker.*

### ALGORITHM

- 1) Start
- 2) Input time
- 3) IF time = 1  
    then  
        Print "Highly Efficient."  
    Else  
        If time = 2  
            Then  
                Print "Moderately Efficient."  
        Else  
            If time = 3  
                Then  
                    Print "Less Efficient."  
                else  
                    Print "Inefficient."  
    END IF
- 4) End

### FLOWCHART



## C-IMPLEMENTATION

---

```
#include<stdio.h>

int main()
{
    int time;
    printf("Enter the time(hours) taken by the worker to complete a particular job."); scanf("%d",&time);

    if(time == 1)
    {
        printf("Worker is highly efficient.");
    }

    else if(time == 2)
    {
        printf("Worker is moderately efficient.");
    }

    else if(time == 3)
    {
        printf("Worker is less efficient.");
    }

    else
    {
        printf("Worker is not efficient.");
    }

    return 0;
}
```

### Switch statements:

A series of decisions in which a variable or expression is tested separately for each of the constant integral values it may assume, and different actions are taken. This is called multiple selection. C provides the switch multiple-selection statement to handle such decision making.

The switch statement consists of a series of case labels, an optional default case and statements to execute for each case.

The switch statement is especially useful when the selection is based on the value of a single variable or of a simple expression (called the controlling expression). The value of this expression may be of type int or char, but not of type double.

## Syntax

```
switch ( controlling expression ) {  
  
    case 1 :  
  
        statements1 ;  
        break;  
    case 2 :  
  
        statements 2 ;  
        break;  
    .  
    .  
    .  
    case n :  
  
        statements n ;  
        break;  
    default:  
  
        statements d ;  
}
```

## INTERPRETATION:

- The controlling expression, an expression with a value of type int or type char, is evaluated and compared to each of the case labels in the label sets until a match is found. A label set is made of one or more labels of the form case followed by a constant value and a colon.
- When a match between the value of the controlling expression and a case label value is found, the statements following the case label are executed until a break statement is encountered. Then the rest of the switch statement is skipped.
- The statements following a case label may be one or more C statements, so it is not need to make multiple statements into a single compound statement using braces
- If no case label value matches the controlling expression, the entire switch statement body is skipped unless it contains a default label. If so, the statements following the default label are executed when no other case label value matches the controlling expression.

### Switch Case Statement As A Substitute For Long If Statements

EXAMPLE USING IF - ELSE	EXAMPLE USING SWITCH
<pre>#include &lt;stdio.h&gt;  int main () {     char grade = 'E';      if(grade == 'A')         printf("Superb!\n" );      else if(grade == 'B')         printf("Very good!\n" );      else if(grade == 'C')         printf("Good.\n" );      else if(grade == 'D')         printf("Passed.\n" );      else if(grade == 'F')         printf("Try again.\n" );      else         printf("Invalid grade.\n" );      printf("Your grade is %c.\n", grade );      return 0; }</pre>	<pre>#include &lt;stdio.h&gt;  int main () {     char grade = 'F';      switch(grade) {         case 'A' :             printf("Superb!\n" );             break;         case 'B' :             printf("Very good!\n" );             break;         case 'C' :             printf("Good\n" );             break;         case 'D' :             printf("Passed\n" );             break;         case 'F' :             printf("Try again\n" );             break;         default :             printf("Invalid grade\n" );     }      printf("Your grade is %c.\n", grade );      return 0; }</pre>



## **Lab Activity**

### **Question 01:**

Generate the following output:

SHOP OVER RS.3000 AND ENJOY 10% DISCOUNT
Enter the total number of items purchased by customer: 5
Number of T-shirts purchased: 2
Number of Formal Shirts purchased: 2
Number of Wrist watches purchased: 1
Total amount: Rs.3500
Customer provided: Rs.3500
Congratulations! You have purchased items of over Rs.3000, Enjoy the 10% discount on total.
Amount returned to customer: Rs.350

*For help: Unit price of T-shirt is Rs.500, Formal Shirt is Rs.1000 and Wrist Watch is Rs.500*

### **Question 02:**

Based on user input, check whether the given character is an alphabet, digit or special character.

### **Question 03:**

Write a program to determine fare. Rs 20 for a child, who is not more than 11 years old, for adult Rs 50 and Rs 30 for an aged person of at least 65 years' old.

### **Question 04:**

Fix the errors:

```
a. void main() {  
    int x=40; y=30; z=80;  
    if(x<y<z)  
        {printf("\n Hello world");}  
    else  
        {printf("\nGood by");  
    }
```

```

b. void main ()
    {
        double a; int x;
        if(a>=0&& x=1)
            printf("OK all right");
        else if(a!=0|| x >=3)
            printf("wrong answer")
    }

```

**Question 05:** Input two numbers and determine whether the numbers are equal or not, if numbers are not equal then determine which one is greater and which one is less.

```

Enter first number: 32
Enter second number: 54
Given numbers are not equal
Second number is greater than first

```

**Question 06:**

Using IF or Switch statement, write a program that displays the following menu for the food items available to take order from the customer:

- B= Burger (Rs. 200)
- F= French Fries (Rs. 50)
- P= Pizza (Rs. 500)
- S= Sandwiches (Rs. 150)

The costumer can order any combination of available food. The program first asks to enter the no of types of snacks i.e. 2, 3 or 4 then it asks to enter the choice i.e. B for Burger and then for quantity. The program should finally display the total charges for the order.

```

ABC Restaurant Online Order Placement
WELCOME!

Please select from the following Menu
B= Burger
F= French Fries
P= Pizza
S= Sandwiches
How many types of snacks you need to order: 2
Enter first Snack you want to order: B
Please provide quantity: 2
Enter second Snack you want to order: P
Please provide quantity: 3
-----
You have ordered!
2 Burger (s) value 400 PKR
3 pizza (s) value 1500 PKR
Total: 1900 PKR
Thank you for your order... have a nice day.

```

**Question 07:**

The body mass index (BMI) is the ratio of the weight of a person (in kilograms) to the square of the height (in meters). Write a program that takes two inputs, weight and height, computes the BMI, and prints the corresponding BMI category:

$$BMI = \frac{weight(lb) \times 703}{(height(in))^2}$$

- Starvation: less than 15
- Underweight: less than 18.5
- Ideal: greater than or equal to 18.5 but less than 25
- Overweight: greater than or equal to 25 but less than 30
- Morbidly Obese: greater than or equal to 40

**Question 08:**

Write a program to input your age and your sister's age and then display who is older of the two.

```
Enter Your Age: 21
```

```
Enter Your Sister's Age: 19
```

```
You are older of the two
```

**Question 09:**

Write a program for simple calculator with Switch-Statements.