Session 4

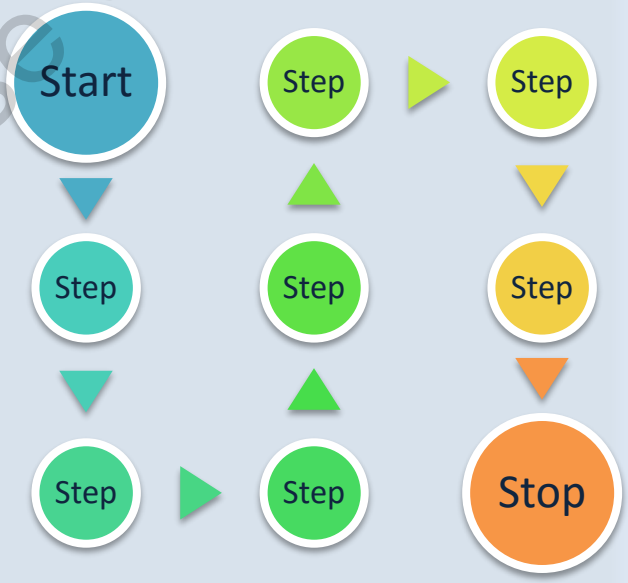
Selection Constructs

Objectives

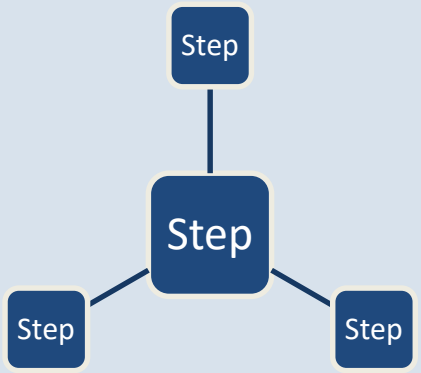
- Explain IF statement
- Explain IF…ELSE selection construct
- Explain multiple selection statements
- Explain nested IF…ELSE statements
- Explain case construct

Introduction

- A programmer may come across a condition in the program, where the path of execution can branch into two or more options.



- Such constructs are referred to as programming, selection, conditional, or branching constructs.



IF Statement 1-7

- The IF construct is a basic selection construct.
  - Consider an example where the customer is given a discount if purchases of over $100 are made.
  - Each time a customer is billed, a part of the code has to check to see if the bill amount exceeds $100.
  - If it does exceed the amount, then it must deduct 10% of the total amount, otherwise nothing must be deducted.

IF Statement 2-7

- The pseudocode for the scenario will be as follows:

```
IF customer purchases items worth more than $100
   Give 10% discount
```

IF Statement 3-7

- The general form of an IF statement or construct is as follows:

```
IF condition
    Statements } Body of the IF Construct
END IF
```

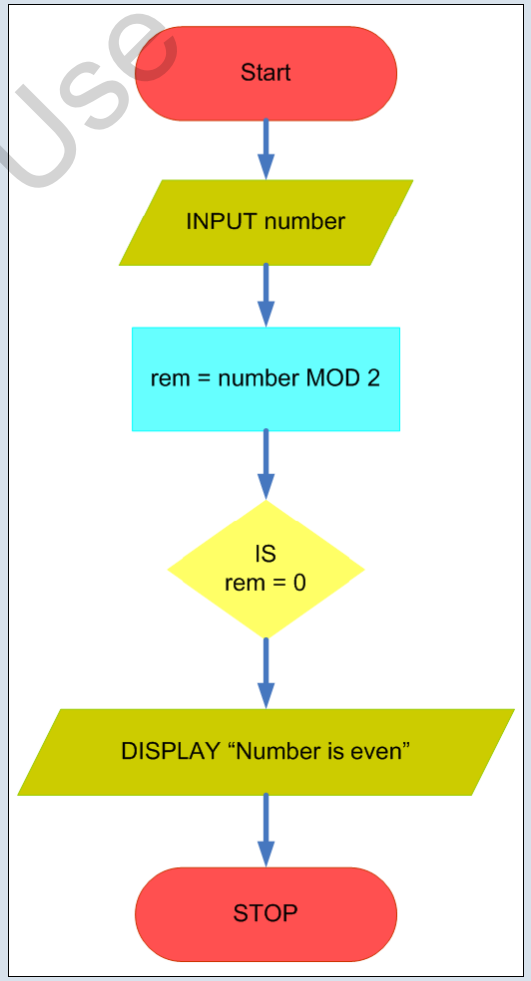
IF Statement 4-7

- The example uses the IF construct to find whether a number is even or not.

```
BEGIN
  INPUT number
  rem = number MOD 2
  IF rem=0
   Display "Number is even"
  END IF
END
```

IF Statement 5-7

- A flowchart for the pseudocode is shown in the figure.



IF Statement 6-7

- The syntax for the IF statement in C language is as follows:

```
if (condition)
  {
  Statements;
  }
```

IF Statement 7-7

- The example shows the pseudocode that would be written in C.

```
/* A C program using the IF construct */
#include <stdio.h>
void main ()
{
int number, rem;
printf ("Please enter a number: ");
scanf ("%d", &number);
rem=number%2;
if(rem==0)
   {
   printf("Even Number");
   }
}
```

IF…ELSE Statement 1-4

- The IF…ELSE statement enables a programmer to make a single comparison, and then execute the steps depending on whether the result of the comparison is true or false.

- The general form of the IF…ELSE statement is as follows:

```
IF condition
  Statement set1
ELSE
  Statement set2
END IF
```

IF…ELSE Statement 2-4

- The syntax for the IF…ELSE construct in C language is given as follows:

```
if(condition)
   {
   statement set1;
   }
else
   {
   statement set2;
   }
```

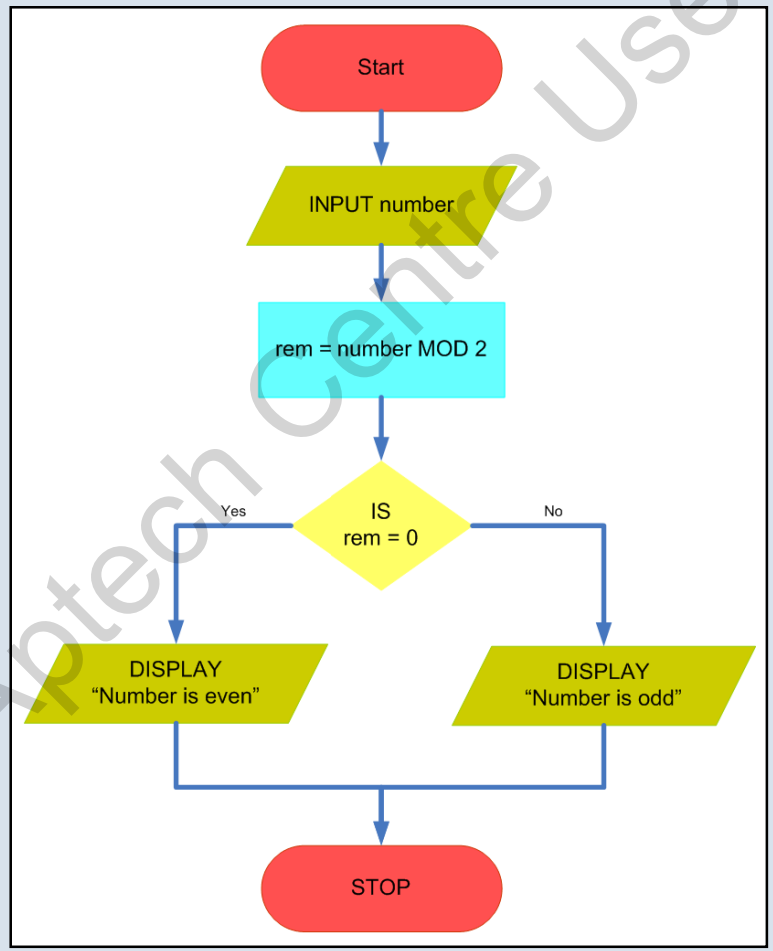
IF…ELSE Statement 3-4

- A more efficient code for the even number using the IF…ELSE statement is shown in the following example.

```
BEGIN
INPUT number
rem=number MOD 2
IF rem=0
   DISPLAY "Even Number"
ELSE
   DISPLAY "Odd Number"
END IF
END
```

IF…ELSE Statement 4-4

- The flowchart for the pseudocode is shown:



Multiple Selection Statements 1-3

- The AND statement can be used in conjunction with the IF statement for more than one condition.
- To classify a supplier as a Most Valuable Supplier (MVS), the organization must check that the supplier has been with them for the last 10 years.
- And has done a total business of more than $500000.
- These two conditions must be satisfied to consider a supplier as a MVS.

Multiple Selection Statements 2-3

- The example shows the pseudocode for this scenario.

```
BEGIN
INPUT YearsWithUs
INPUT BizDone
IF YearsWithUs >= 10 AND BizDone >= 500000
  DISPLAY "Classified as an MVS"
ELSE
  DISPLAY "A little more effort required"
END IF
END
```

Multiple Selection Statements 3-3

- The example shows the pseudocode that would be written in C.

```
/* C snippet depicting the AND operator in IF */
if(YearsWithUs >= 10 && BizDone >= 500000)
   {
   printf("Classified as an MVS");
   }
else
   {
   printf("A little more effort required");
   }
```

Nested IF…ELSE Statements 1-3

- Another way to combine two conditions without using the AND operator, is by using nested IF...ELSE statements.

- A nested IF is an IF statement written inside another IF statement.

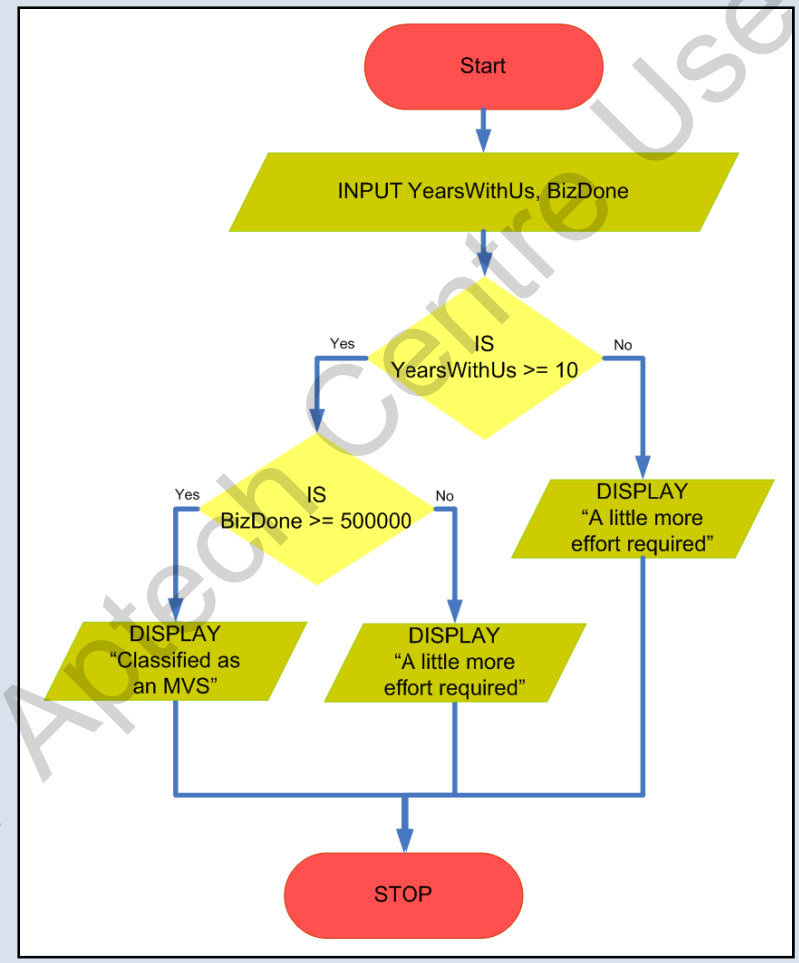
Nested IF…ELSE Statements 2-3

- Consider the earlier example to recognize the MVS status of a supplier rewritten using nested IF.

```
BEGIN
INPUT YearsWithUS
INPUT BizDone
IF YearsWithUs >= 10
   IF BizDone >= 500000
      DISPLAY "Classified as an MVS"
   ELSE
      DISPLAY "A little more effort required"
   END IF
ELSE
   DISPLAY "A little more effort required"
END IF
END
```

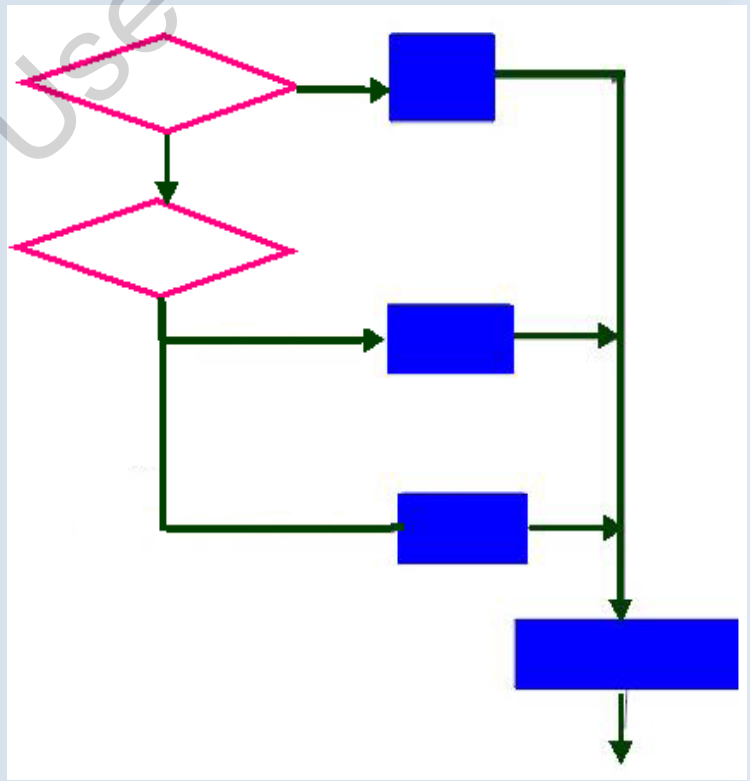
Nested IF…ELSE Statements 3-3

- The flowchart for the pseudocode is shown in the figure.



Case Conditions 1-2

- The DO CASE…END CASE construct is used when a variable is to be successively compared against different values.
- The DO CASE is known as ‘Switch Case’ in C.



Case Conditions 2-2

- The syntax in C will be as follows:

```
switch (expression)
{
   case const-expr:
      statement set;
      break;
   case const-expr:
      statement set;
      break;
   default
      statement set;
}
```

Summary

- Conditions in a program where the path of execution may branch into two or more options are referred to as programming, selection, conditional, or branching constructs.
- The basic selection construct is an IF construct.
- The IF…ELSE construct enables the programmer to make a single comparison and then, execute some steps, based on the outcome.
- The AND statement can be used in conjunction with the IF statement when more than one condition is to be checked.
- A nested IF is an IF statement inside another IF statement.
- The DO CASE construct is used when a variable is to be successively compared against different values.
- The break statement breaks out of the switch case construct and continues execution at the instruction following the construct.