CSE 1201 "Structured Programming Language"

Decision Making and Branching

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C Statements (C)

- In the most general sense, a statement is a part of your program that can be executed.
- An expression is a statement.

```
a=a+1;
a--;
```

- A function call is also a statement.

```
printf("%d",a);
```

- Other statements ……
- C is a free form language, so you may type the statements in any style you feel comfortable:

```
a=
a+
1;a--;                    // line breaks can be anywhere
```

Conditional Statement

- A conditional statement allows us to control whether a program segment is executed or not.
- Two constructs
  - `if` statement
    - `if`
    - `if-else`
    - `if-else-if`
  - `switch` statement

Example

```
if (it is sunny){
        go to beach;
        swim;
}
 go to library;
```

```
// no matter what happens, you
// will go to library
```

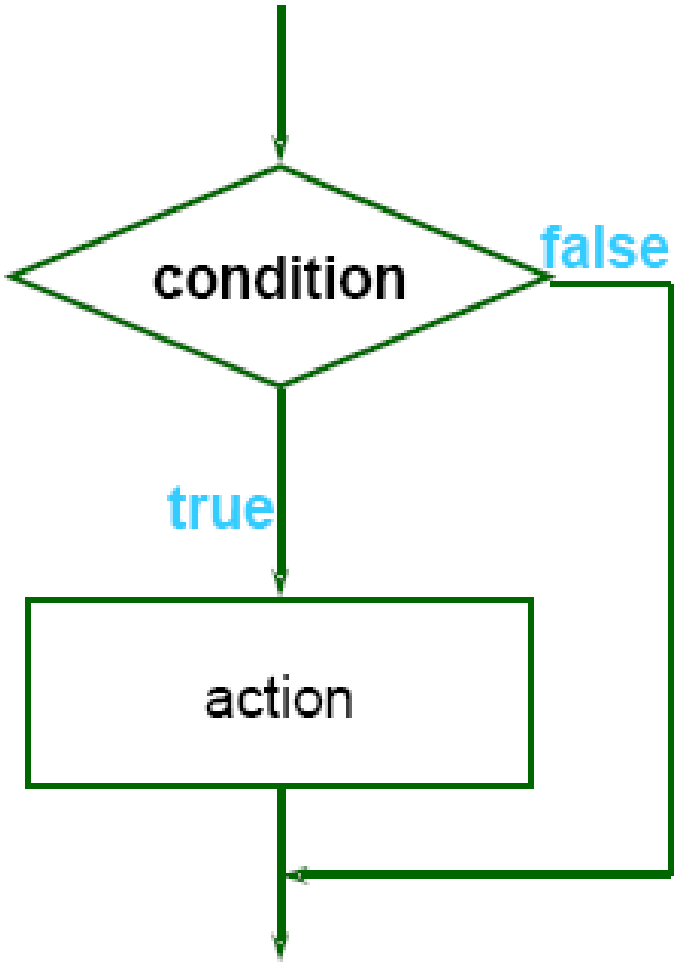
The Basic if Statement

- Syntax

```
if(condition)
    action
```

- if the condition is true then execute the action.

- action is either a single statement or a group of statements within braces.



Choice (if)

- You can put multiple action statements into braces

```
if (class is over){
    <turn off computer>
    <leave classroom>
    <go to somewhere>
}
```

- The program in Fig.5.3 reads four values a, b, c, and d from the terminal and evaluates the ratio of (a+b) to (c-d) and prints the result, if c-d is not equal to zero.

- The program given in Fig.5.3 has been run for two sets of data to see that the paths function properly. The result of the first run is printed as

Ratio = -3.181818

ILLUSTRATION OF **if** *STATEMENT*

Program

```
main()
{
   int a, b, c, d;
   float ratio;

   printf("Enter four integer values\n");
   scanf("%d %d %d %d", &a, &b, &c, &d);

   if (c-d  != 0)  /* Execute statement block */
   {
      ratio = (float)(a+b)/(float)(c-d);
      printf("Ratio = %f\n", ratio);
   }
}
```

Output

```
Enter four integer values
12  23  34  45
Ratio = -3.181818

Enter four integer values
12  23  34  34
```

Fig. 5.3 *Illustration of simple* ***if*** *statement*

Example 5.2

The program in Fig.5.4 counts the number of boys whose weight is less than 50 kgs and height is greater than 170 cm.

The program has to test two conditions, one for weight and another for height. This is done using the compound relation

```
if (weight < 50 && height > 170)
```

This would have been equivalently done using two **if** statements as follows:

```
if  (weight < 50)
   if  (height > 170)
      count = count +1;
```

If the value of **weight** is less than 50, then the following statement is executed, which in turn is another **if** statement. This **if** statement tests **height** and if the **height** is greater than 170, then the **count** is incremented by 1.

```
main()
{
   int count, i;
   float weight, height;
   count = 0;
   printf("Enter weight and height for 10
  boys\n");

   for (i =1; i <= 10; i++)
   {
     scanf("%f %f", &weight, &height);
     if (weight < 50 && height > 170)
        count = count + 1;
   }
   printf("Number of boys with weight < 50
  kgs\n");
   printf("and height > 170 cm = %d\n", count);
}
```

Output

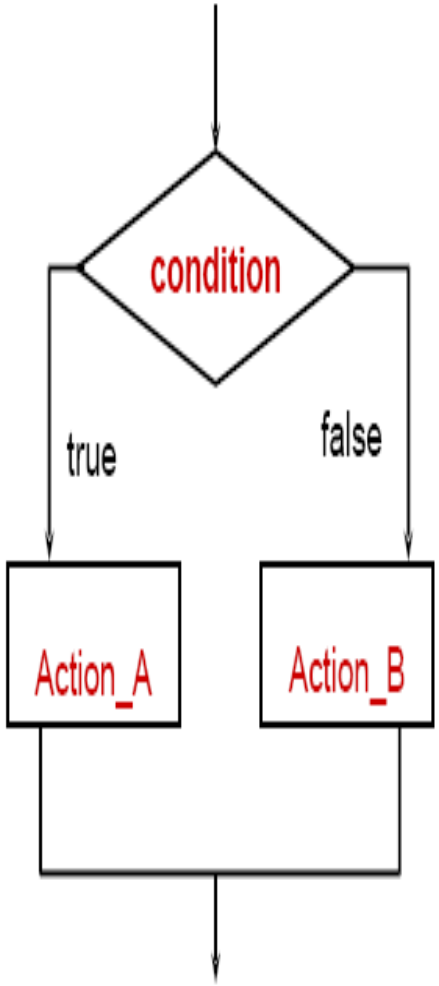
```
Enter weight and height for 10 boys
45  176.5
55  174.2
47  168.0
49  170.7
54  169.0
53  170.5
49  167.0
48  175.0
47  167
51  170
Number of boys with weight < 50 kgs
and height > 170 cm = 3
```


Fig. 5.4 Use of ***if*** *for counting*

The if-else Statement

Syntax

```
if (condition)
        Action_A
else
        Action_B
```



Example:

```
if(value == 0)
        printf("value is 0");
else
        printf("value is not 0");
```

Example

```
if (it is sunny){
        go to beach;
        swim;
}
else {
        take umbrella;
        go to school;
        study;
}
```

Example: find the larger one

```
int value1;
int value2;
int larger;
printf("Enter two integers: ");
scanf("%d%d",&value1,&value2);
if(value1 > value2)
   larger = value1;
else
   larger = value2;
printf("Larger of inputs is: %d.\n",larger);
```

Example 5.4
The program in Fig. 5.8 selects and prints the largest of the three numbers using nested if....else statements.

```
main()
{
   float A, B, C;

   printf("Enter three values\n");
   scanf("%f %f %f", &A, &B, &C);

   printf("\nLargest value is  ");

   if (A>B)
     {
       if (A>C)
         printf("%f\n", A);
       else
         printf("%f\n", C);
     }
   else
     {
       if (C>B)
         printf("%f\n", C);
      else
         printf("%f\n", B);
     }
}
```

Fig 5.8 Selecting the largest of three numbers

Output

```
Enter three values
23445  67379  88843

Largest value is  88843.000000
```