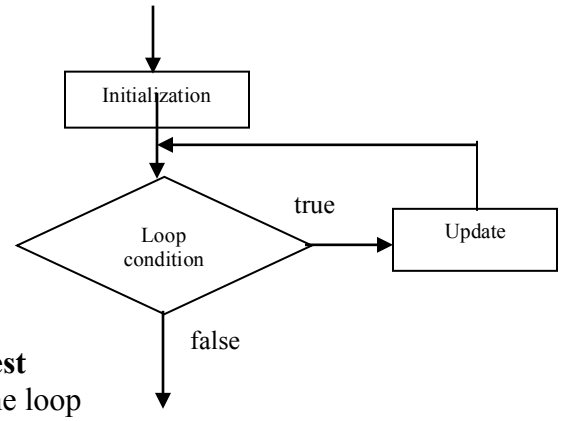
Repetition Statement
while loop (1)



Flow chart with a loop using **pretest**

- initialization step → to start the loop
- test loop condition → to determine whether to continue the loop processing
- updation within loop body → to update the condition so that, at some point, the loop condition will evaluate to false

basic syntax with *while* statement

```
while (condition)
    statement;          ← body of while statement
                          (Include condition updation statement)

while (condition)
{
    statement 1;
     ……                ← compound statement
    statement n;
 }
```

Example 1 : **counter controlled while loop**

```
counter = 0;    ← counter variable
sum = 0;

while (counter < 5)   ← condition based on the counter value
{
      cin >> inputData;
      sum = sum + inputData;

      counter = counter + 1;    ← update the counter
}
cout << "The average of these " << counter << " values is " << (float)sum/count
<< endl;
```

How many times will the body of the statement be executed?
How many times will the logical expression be evaluated?

Example 2: **event driven while loop**

```
sum = 0;
cin >> inputData;          ← initialization step

while (cin)                ← test (pre-test)
{
    sum = sum+inputData;
    cin >> inputData;      ← updation
}
```

1. body of while loop may be executed 0, 1, or more times depending on the input values. What if the input values are : 9, 4, 6, -3, ^d
2. because of the pretest, the loop may not be executed even once:
   what happens when the input value is : ^d

Example 3: **sentinel controlled while loop**

```
sum=0;
cin>> inputData;

while (inputData  != -1)      // -1 is sentinel value here
{       sum=sum + inputData;
        cin>>inputData;
}
```

- **Infinite loop:** When design loop structure, make sure that, at some point, the logical condition evaluates to false.
- **++, --, +=, -=, *=, /=, %= operators**

Practice question: Write a C++ program to
(1) plays the grandma's trunk game for 10 rounds
(2) compute the value of score, when score = 2*3+3*4+4*5… + 20*21
(3) Compute the area under the function $f(x) = x^5+3x^2-40$, in range [2, 15]
(4) read in a sequence of values from keyboard, count the number of positive, negative, and zeros in the sequence of values, the end of input values is signaled using ^d
(5) Reads in a sequence of values from the keyboard, find the largest and smallest values
(6) in the sequence, the end of input values is signaled using ^d.
(7) Continues to convert US dollar into Euro for as long as the user wants to perform more conversions.
(8) Find the number of even and odd digits in an integer entered from keyboard
(9) Find the number of values that is greater than its next value, given a sequence of values entered through keyboard
(10) Plot the frequency of students' test scores ([90-100], [80-90), …[0, 60))
(11) Read student names and account information from two separate data files, and generates handout files for individual students