Lecture 11.1

Topics

1. `while` Loop/Statement

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1. `while` Loop/Statement

There are 2 groups of loops known as

- Pre-test group; and
- Post-test group

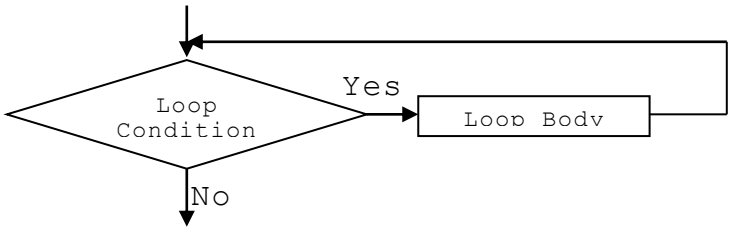
The `for` and `while` loops are in the pre-test group; and the `do-while` loop is in the post-test group.

The `for` and `while` loops are interchangeable – Let's look at the `while` loop next.

1.1 `while` Loop Structures

General looping structures are depicted in **Figures 1&2** below.

Looking at the flowchart for a loop, there is at least one conditional block and other processing blocks. A loop must end or exit through the result of this conditional block. There are several different structures of loop.



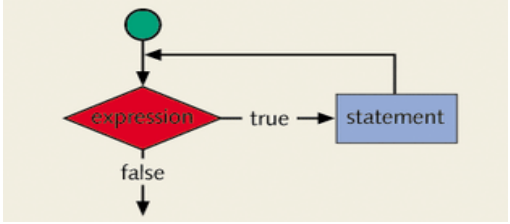
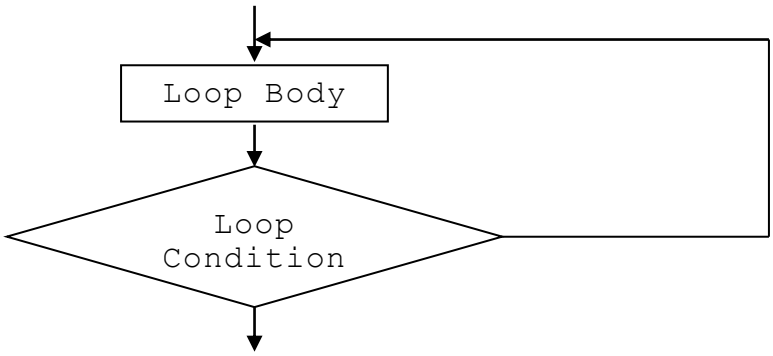


Figure 1 A general flowchart depicts a loop



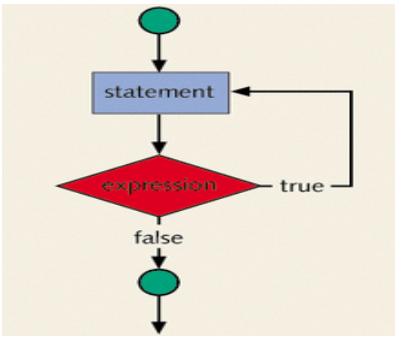


Figure 2 Loop with body executed **at least once**

Again, each loop can be thought of a process where three main steps are preformed after initializing (one may also want to include an **initialization step** as part of a loop structure):

(1) Testing/Conditioning,
(2) Loop Body, and
(3) Update

In general, they are described as below.

*A. Loops that may **not** have body executed at all:*

Loop #1

```
/*Initial Condition*/
while (loopCondition) {
  /*Loop Body*/

  /*Update*/
}
```

Loop #2

```
/*Initial Condition*/
while (loopCondition) {
  /*Update*/

  /*Loop Body*/
}
```

Loop #3

```
for (initialization; testExpression; update) {
  /*Loop Body*/
}
```

B. Loops that must be executed ***at least once*** ***`do-while`*** ***loop****:*

Loop #1

```
/*Initial Condition*/
do {
  /*Loop Body*/

  /*Update*/
} while (loopCondition);
```

Loop #2

```
/*Initial Condition*/
do {
  /*Update*/

  /*Loop Body*/
} while (loopCondition);
```

1.2 Example – `while` loop

Example

```
/**
 * Program Name: cis6L1111.c
 * Discussion:   while-Loop
 */
#include <stdio.h>

/*Function prototype*/
void printDaySwitch(int);

int main() {
  int iSelection;

  printf("\nEnter an integer from 0 through 6 "
         "or any other to quit: ");
  scanf("%d", &iSelection);

  while (iSelection >= 0 && iSelection <= 6) {
    printDaySwitch(iSelection);
```

```
    printf("\nEnter an integer from 0 through 6 "
           "or any other to quit: ");
    scanf("%d", &iSelection);
  }

  printf("\n");

  return 0;
}

/**
 * Function Name: printDaySwitch()
 * Description:   Displaying day of the week
 * Pre:           Selected day
 * Post:          None
 */
void printDaySwitch(int iDay) {
  switch (iDay) {
    case 0:
      printf("\nIt is Sunday!");
      break;
    case 1:
      printf("\nIt is Monday!");
      break;
    case 2:
      printf("\nIt is Tuesday!");
      break;
    case 3:
      printf("\nIt is Wednesday!");
      break;
    case 4:
      printf("\nIt is Thursday!");
      break;
    case 5:
      printf("\nIt is Friday!");
      break;
    case 6:
      printf("\nIt is Saturday!");
      break;
    default:
      printf("\nIt is an INVALID selection!");
  }

  return;
}
```

OUTPUT

```
Enter an integer from 0 through 6 or any other to quit: 1

It is Monday!
Enter an integer from 0 through 6 or any other to quit: 2

It is Tuesday!
```

```
Enter an integer from 0 through 6 or any other to quit: 0

It is Sunday!
Enter an integer from 0 through 6 or any other to quit: 3

It is Wednesday!
Enter an integer from 0 through 6 or any other to quit: 4

It is Thursday!
Enter an integer from 0 through 6 or any other to quit: 6

It is Saturday!
Enter an integer from 0 through 6 or any other to quit: 5

It is Friday!
Enter an integer from 0 through 6 or any other to quit: 7
```