Logically, every loop must have 4 parts:

- Loop initialization statement(s)
- Loop termination condition
- Loop body (the stuff that we want to repeat)
- Loop modification statement(s)

Programming languages do not usually force you to include these parts, so you must be careful to do it yourself. Otherwise your program will get wrong results.
For-loop Construct

• This \textit{for} statement

\begin{verbatim}
for (initialization ; condition ; incrementation)
{
  do this stuff
}
\end{verbatim}

• is equivalent to this \textit{while} statement

\begin{verbatim}
initialization;
while (condition)
{
  do this stuff
  incrementation
}
\end{verbatim}
#include <stdio.h>

int main()
{
    int Counter;       /* PRINT INTEGERS FROM 1 TO 10 */

    for (Counter = 1;       /* INITIALIZATION */
           Counter <= 10;     /* TERMINATION */
                           Counter++)    /* MODIFICATION */
    {
        printf("%3d", Counter);
    }
    printf("\n");

    return 0;
}
#include <stdio.h>

int main()
{
    int upperLimit;  /* read from terminal */
    int Counter;     /* print integers from 1 to upperLimit */

    printf("Please enter an integer value > ");
    scanf ("%d", &upperLimit);

    for (Counter = 1; Counter <= upperLimit; Counter++)
    {
        printf("%3d", Counter);
    }

    printf("\nFinished.\n");

    return 0;
}
#include <stdio.h>

int main()
{
    int lowerLimit;  /* read from terminal */
    int upperLimit;  /* read from terminal */
    int Counter;    /* print integers from 1 to upperLimit */

    printf("Please enter an integer value for lower limit > ");
    scanf("%d", &lowerLimit);

    printf("Please enter an integer value for upper limit > ");
    scanf("%d", &upperLimit);

    for (Counter = lowerLimit; Counter <= upperLimit; Counter++)
    {
        printf("%3d", Counter);
    }

    printf("\nFinished.\n");
    return 0;
}
NestedStructures.c
Count-controlled for-loop in which both limits are variable and only odd integers are displayed
Author: M. B. Feldman, The George Washington University
Last Modified: February 2006
```c
#include <stdio.h>

int main()
{
    int lowerLimit; /* read from terminal */
    int upperLimit; /* read from terminal */
    int Counter;    /* print integers from 1 to upperLimit */

    printf("Please enter an integer value for lower limit > ");
    scanf("%d", &lowerLimit);

    printf("Please enter an integer value for upper limit > ");
    scanf("%d", &upperLimit);

    for (Counter = lowerLimit; /* INITIALIZE */
         Counter <= upperLimit; /* TERMINATE */
         Counter++) /* MODIFY */
    {
        if ((Counter % 2) != 0) /* that is, if Counter is odd */
            printf("%3d", Counter);
    }
    printf("\nFinished.\n");

    return 0;
}
```
MultiplicationTable.c
Nested for-loop that displays a multiplication table
Author: M. B. Feldman, The George Washington University
Last Modified: February 2006
#include <stdio.h>
int main()
{
    int upperLimit; /* read from terminal */
    int row;       /* displays a row of the table */
    int column;    /* displays the column values in a given row */

    printf
       ("Please enter the limit of the multiplication (<= 20) > ");
    scanf ("%d", &upperLimit);

    /* outer loop does one row; inner does all columns in a row */
    for (row = 1; row <= upperLimit; row++)
    {
        for (column = 1; column <= upperLimit; column++)
        {
            printf ("%4d", row * column);
        }
        printf ("\n");
    }
    printf("\nFinished.\n");

    return 0;
}