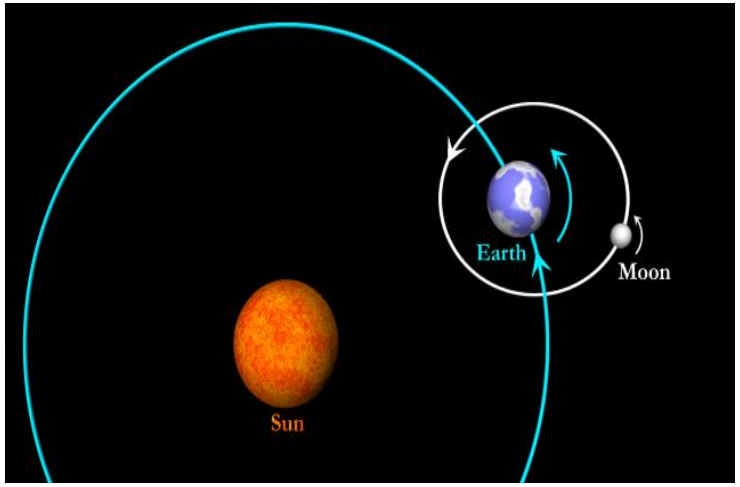
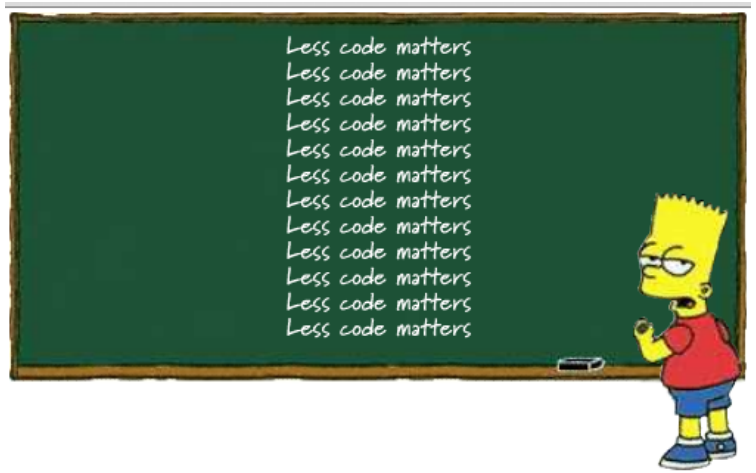
Loops

HK Rana


Earth
Moon
Sun


Less code matters
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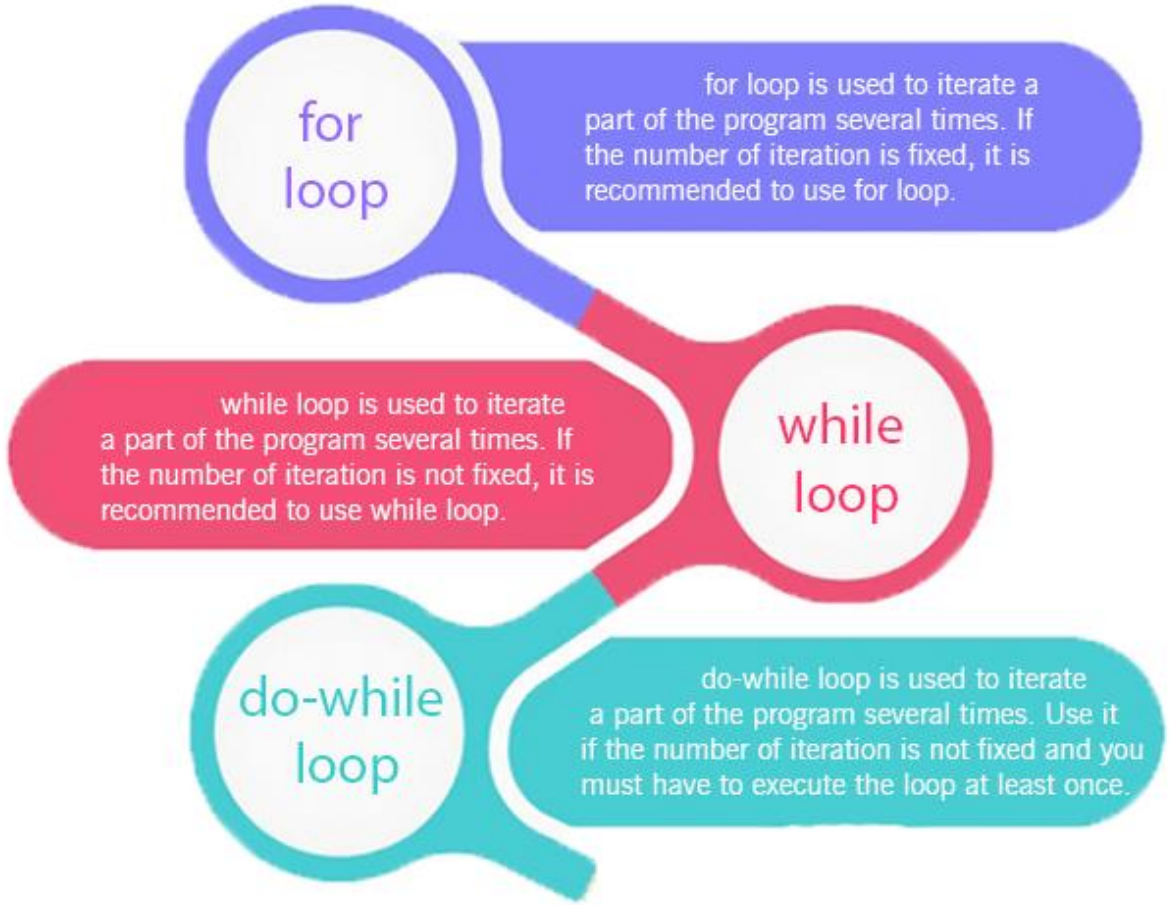
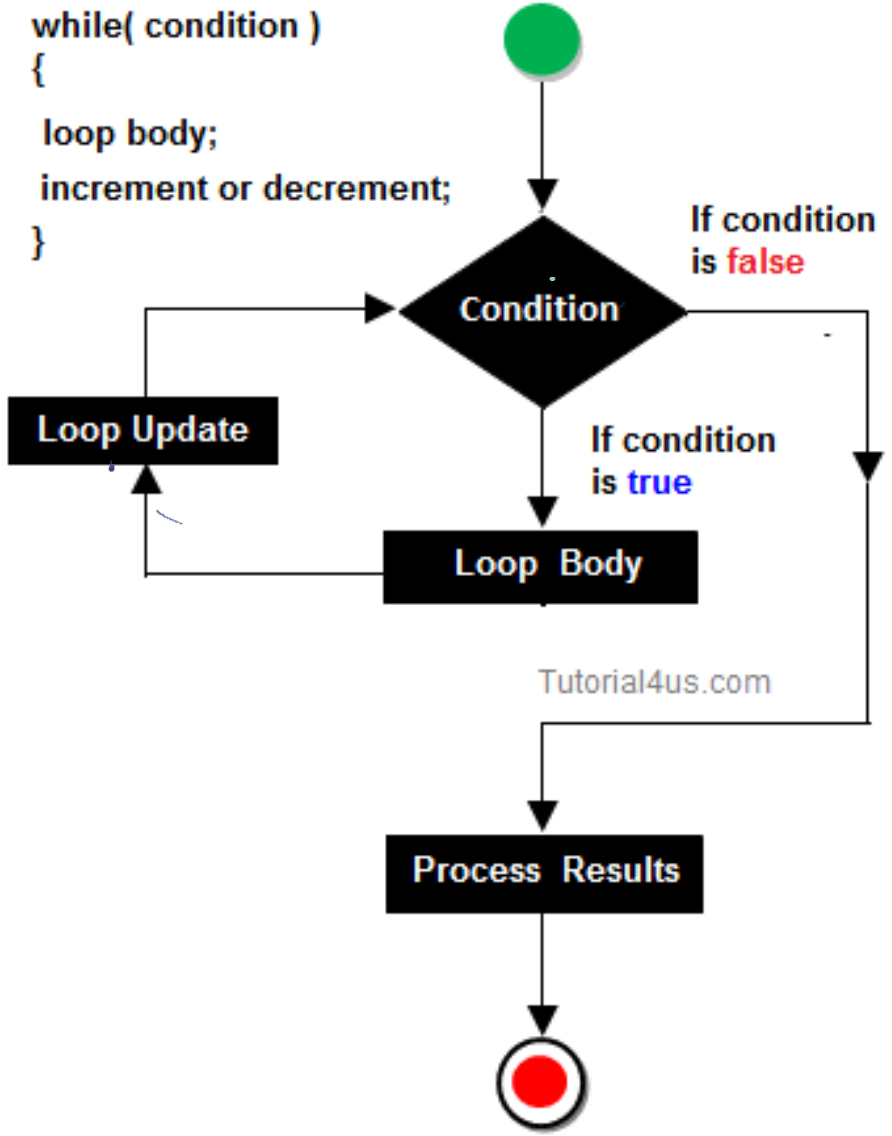
Why Looping??

Various Loops



Flow Chart of Loops:

for vs while vs do-while



PROGRAM Printing a Table of Squares

Let's write a program that prints a table of squares. The program will first prompt the user to enter a number *n*. It will then print *n* lines of output, with each line containing a number between 1 and *n* together with its square:

```
This program prints a table of squares.
Enter number of entries in table: 5
          1         1
          2         4
          3         9
          4        16
          5        25
```

PROGRAM **Summing a Series of Numbers**

As a second example of the `while` statement, let's write a program that sums a series of integers entered by the user. Here's what the user will see:

Infinite Loop

PROGRAM Calculating the Number of Digits in an Integer

Although the `while` statement appears in C programs much more often than the `do` statement, the latter is handy for loops that must execute at least once. To illustrate this point, let's write a program that calculates the number of digits in an integer entered by the user:

```
Enter a nonnegative integer: 60
The number has 2 digit(s).
```

for statement Idioms & Comma Separators

- *Counting up from* 0 *to* n–1*:*

idiom
```
for (i = 0; i < n; i++) …
```

- *Counting up from* 1 *to* n*:*

idiom
```
for (i = 1; i <= n; i++) …
```

- *Counting down from* n–1 *to* 0*:*

idiom
```
for (i = n - 1; i >= 0; i--) …
```

- *Counting down from* n *to* 1*:*

idiom
```
for (i = n; i > 0; i--) …
```

Nested Loop

Exiting from a loop

THE BREAK STATEMENT

THE CONTINUE STATEMENT

THE GOTO STATEMENT

PROGRAM

Balancing a Checkbook

Many simple interactive programs are menu-based: they present the user with a list of commands to choose from. Once the user has selected a command, the program performs the desired action, then prompts the user for another command. This process continues until the user selects an "exit" or "quit" command.