02 - C++ Design and Thinking

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Maryville College

Outline

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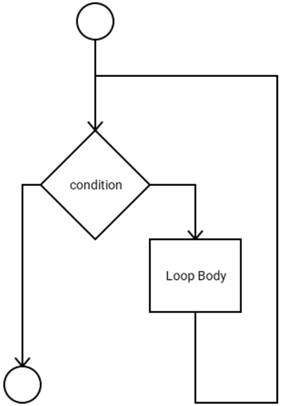
While Loop

While Loop Syntax

`while(` *condition* `)`
    statement/block



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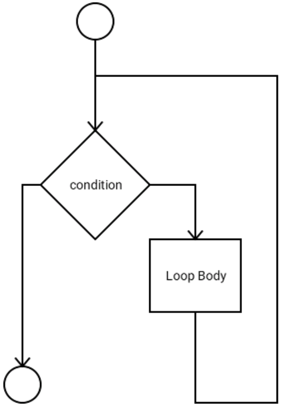

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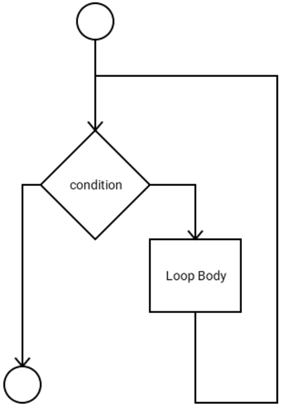

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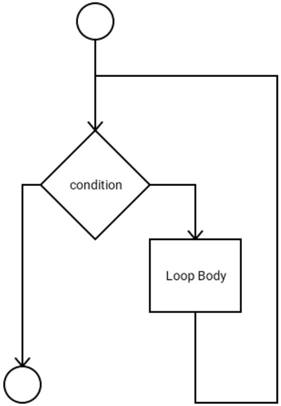

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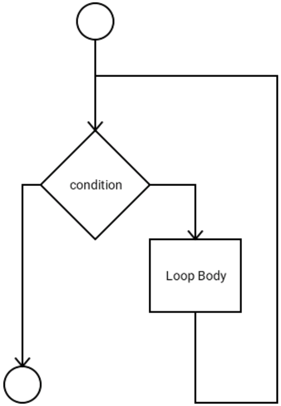
- After the loop body executes, the process begins again.
- How many times will the loop body execute?
    - Zero or more times!



Do..While Loop

While Loop Syntax

```
do
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while( condition );
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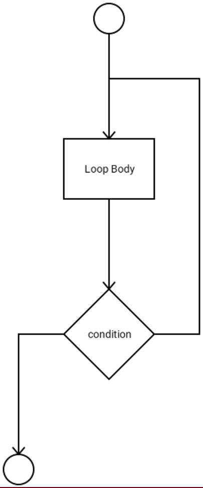

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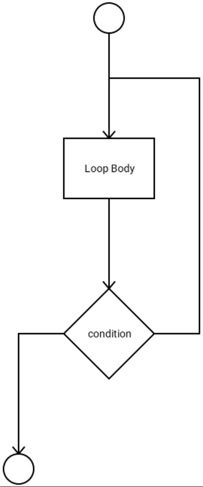

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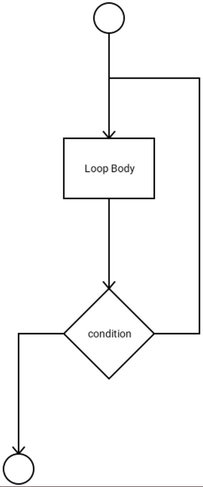

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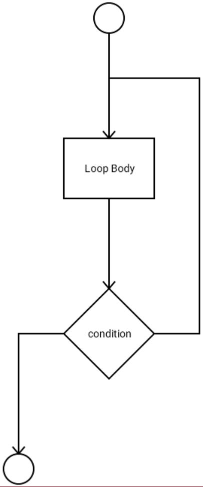

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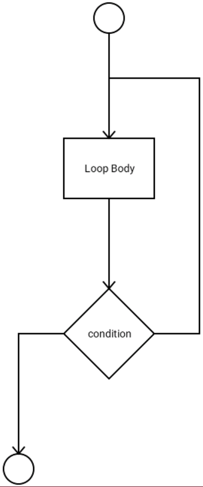
- Commonly used with input



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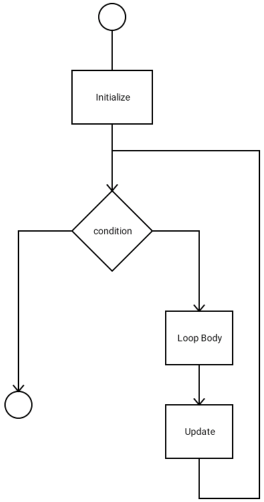

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The For Loop

`for(` *initialize*; *condition*; *update*`)` `{`
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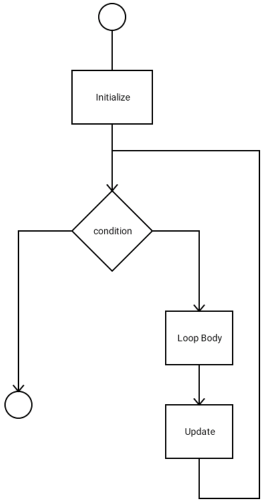

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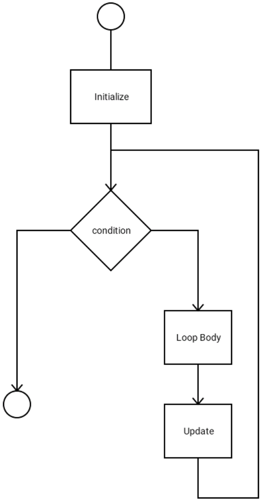
Example: Count to 10

```
for(num=0; num <= 10; num++)
{
    cout << num << endl;
}
```



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The Problem

- Thus far, all known software is written by humans.

Human[1]
Temporal range: 0.35–0 Ma

Middle Pleistocene – Recent

An adult human male (left) and female (right) from the Akha tribe in Northern Thailand.

Conservation status

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- This is insufficient for almost all useful programming tasks.

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name	The identifier which names the function.
parameters	The local variables which receive the arguments of the function.

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- This is a sort of “contract” between you and the compiler.
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- Change the first few lines of `roman.cpp` so it reads as follows:

```
#include <iostream>

using namespace std;

//function prototypes
void print_roman_numeral(int value);
```

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  - Type Definitions

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Makefile – Explicit Recipes

```
sodasim: sodasim.o soda-machine.o
    g++ -o sodasim sodasim.o soda-machine.o

sodasim.o: sodasim.cpp soda-machine.h
soda-machine.o: soda-machine.cpp soda-machine.h
```

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- There are several pre-defined variables, the two most commonly used ones are:
  - `$@` – The name of the target
  - `$^` – The list of all ingredients
- We could simplify the sodasim `Makefile` like so:

```
sodasim: sodasim.o soda-machine.o
    g++ -o $@ $^

sodasim.o: sodasim.cpp soda-machine.h
soda-machine.o: soda-machine.cpp soda-machine.h
```

Example Makefile – Address Book

```
TARGETS=stock

#application builds
all: $(TARGETS)
stock: iofun.o main.o stock.o transaction.o portfolio.o
        g++ -o $@ $^

#object files
iofun.o: iofun.h iofun.cpp
main.o: main.cpp iofun.h stock.h transaction.h portfolio.h
stock.o: stock.h stock.cpp
transction.o: transaction.cpp transaction.h
portfolio.o: portfolio.cpp portfolio.h


#delete all binaries
clean:
        rm -f *.o $(TARGETS)
```

Outline

Programming Project 5.9

Programming Project 5.9 from Big C++

Write a program that, given a month and year, prints a calendar, such as

```
      June 2016
Su Mo Tu We Th Fr Sa
          1  2  3  4
 5  6  7  8  9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30
```

Make a helper function to print the header and a helper function to print each row.