09 - Going Loopy - Part 2

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Outline

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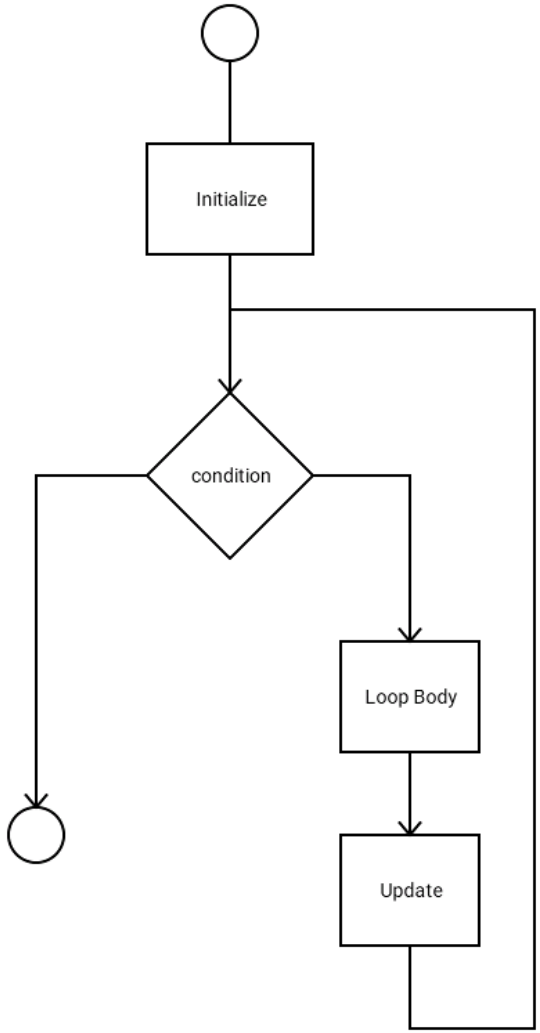
A Common Type of Loop



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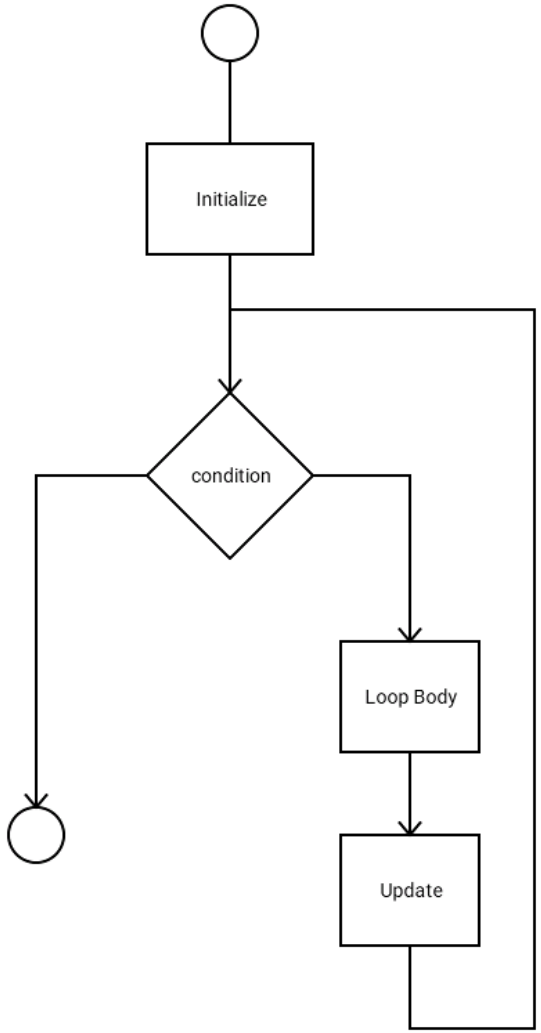

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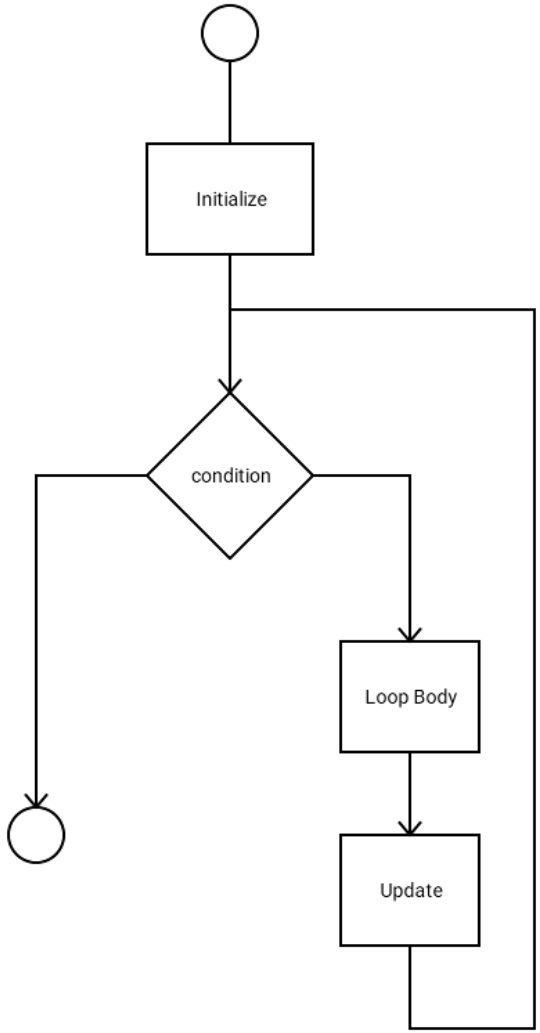

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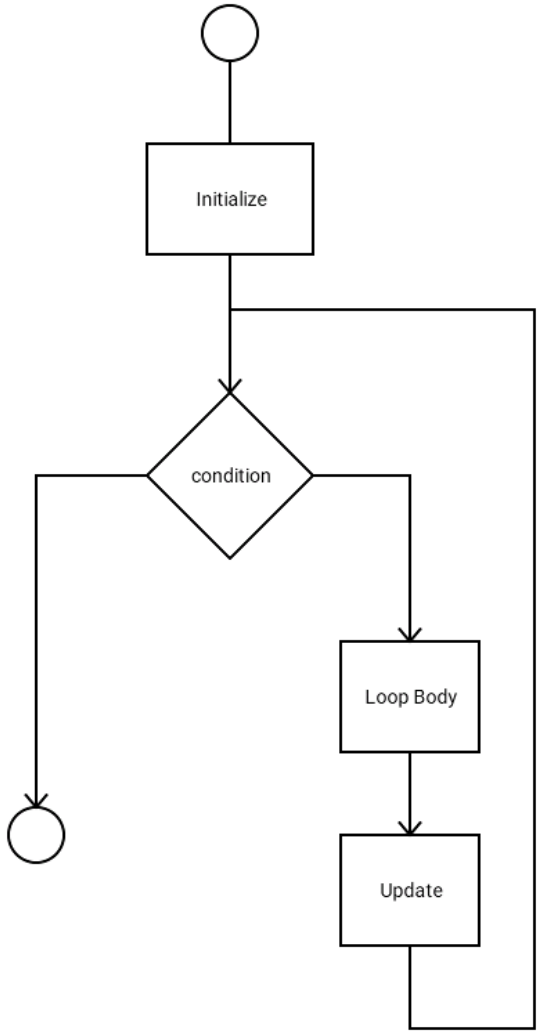

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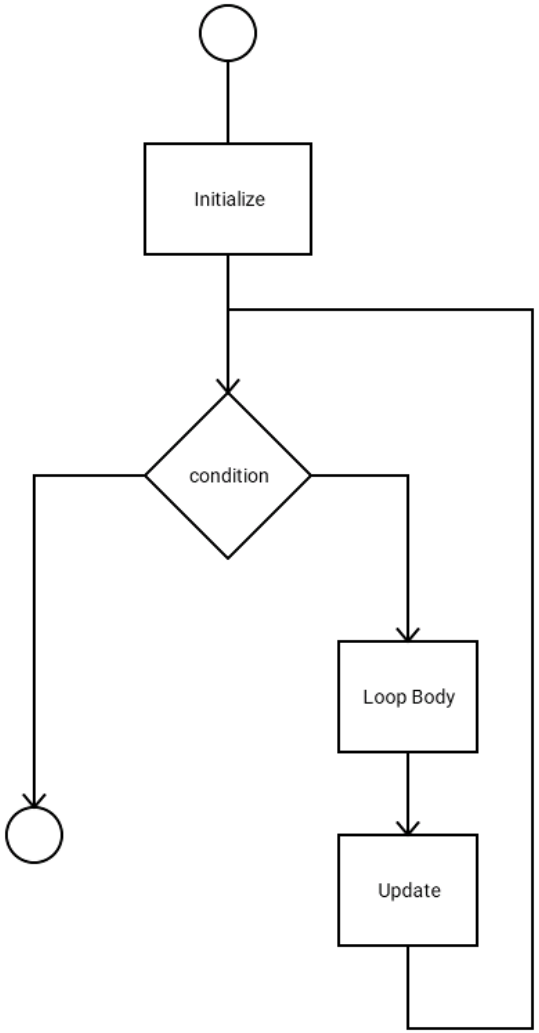

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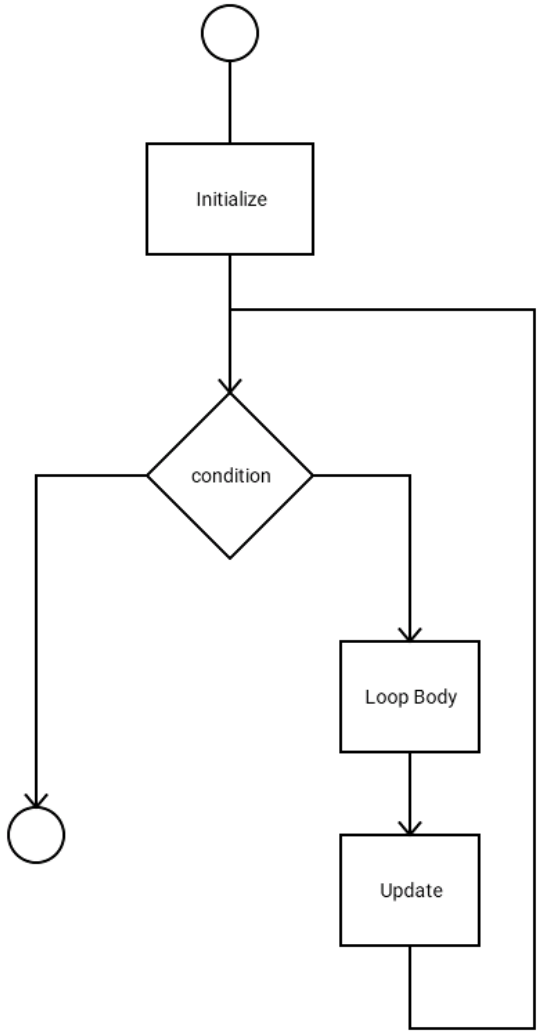

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- Take, for example, the main function of `examples/09-Loopy/count.cpp`.

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int main()
{
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        //display the number
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- Note that when you do this, the variable is **only** available in the `for` loop.

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  - You are building a menu interface.
  - You need to go through a loop at least one time.

Converting a `while` Loop to a For Loop

```
int num;

//initialize
num = 0;

//count to 10
while(num <= 10) {
    //display the number
    cout << num << endl;

    //increment
    num++;
}
```

```
//count to 10
for(int num=0; num <= 10; num++) {
    //display the number
    cout << num << endl;
}
```

Lab Activity: Convert to For Loops

1. Create the directory `labs/week6`
2. Copy the following files from `labs/week4` to `labs/week6`.
   - `count2.cpp`
   - `fahrenheit.cpp`
3. Convert the loops in these programs to `for` loops.
4. Compile and test your programs.

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- Fixing this is pretty easy, just remove the extra update!

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- Consider the following sample run:

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What should I count to? 1.0
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- Play around with this a bit. Does it always work?
- No! This is because of the imprecision in `double` calculations and comparison!

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- Calculate the double within the loop.
- This is often done using the comma operator to do two calculations in the update:

```
line++, start += increment
```

Lab Activity: Repair `double-count.cpp`

1. Copy `examples/09-Loopy/double-count.cpp` to `labs/week6`.
2. Repair the loop by changing it to this:

```
//Go through each row
double start=0.0;
for(int line=0; line < lines;  line++, start += increment) {
    //find max for this row
    double row_max = start + 3.0 * lines * increment;

    if(row_max <= max) {
        //print all the columns
        double num=start;
        for(int col=0; col<4; col++, num+=lines * increment){
            cout << num << "\t";
        }
        cout << endl;
    }
}
```

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- Off by one errors are also a common mistake!
- Be careful about < vs <=, and be sure to select the correct one!