More loops
Ch 3.3-3.4
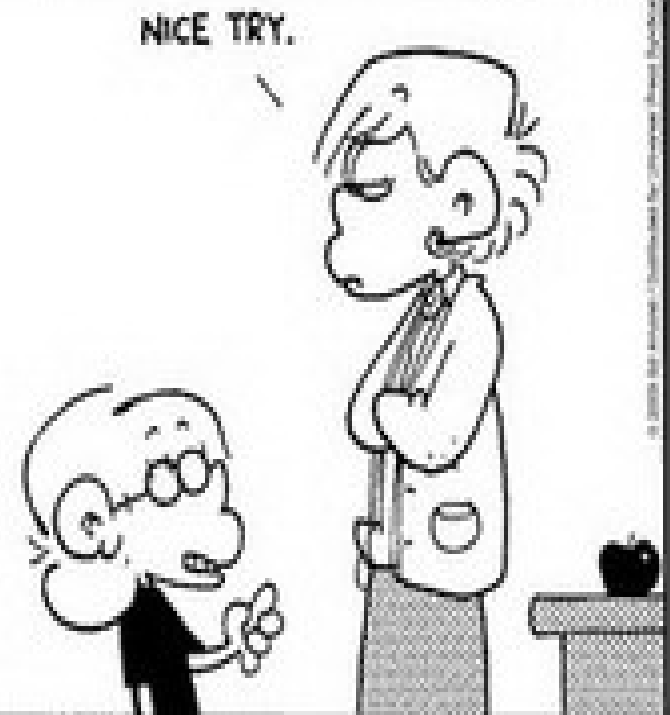
Review: Loops

We put a loop around code that we want to run more than once

If we have an easy sequence (0, 1, 2, ... 10) of values we want to go over, <u>for loop</u> is nice

Otherwise, the <u>while loop</u> is a bit more general and is typically more useful if we are asking the user to control the loop

Review: Loops

Write a program that asks the user to input a value, then show the sum from 1 to that value in the following format:

```
Find the sum from 1 to what
value?    5
```

```
1+2+3+4+5 = 15
```

(See: sumToN.cpp)

Nested for loop

Now modify the code so it shows all sums less than or equal to the entered values, as such:

```
Find the sum from 1 to what
value?    4
1 = 1
1+2 = 3
1+2+3 = 6
1+2+3+4 = 10
```
(See: sumAllToN.cpp)

Nested for loop

Like <u>nested if</u> statements, we can also make <u>nested loops</u> (which can cause headaches)

It might help to think of each loop as an added dimensions:

    1 loop = 1 dimension (line/ruler)
    2 loops = 2 dimensions (plane/square/area)
    3 loops = 3 dimensions (volume/cube)

    ...

(See: nestedLoop.cpp)

Nested for loop

Ask the user for a size of matrix, then show the identity matrix for that dimension:

```
What size?  4
1 0 0 0
0 1 0 0
0 0 1 0
0 0 0 1
```
(See: identityMatrix.cpp)

Overview

Peripheral

file I/O

op. overload

recursion   pointers

Advanced

dynamic memory

Very
Useful

scope

string

functions

classes

loop

types

if/else

ops

arrays

Essentials