



# Basic Loops

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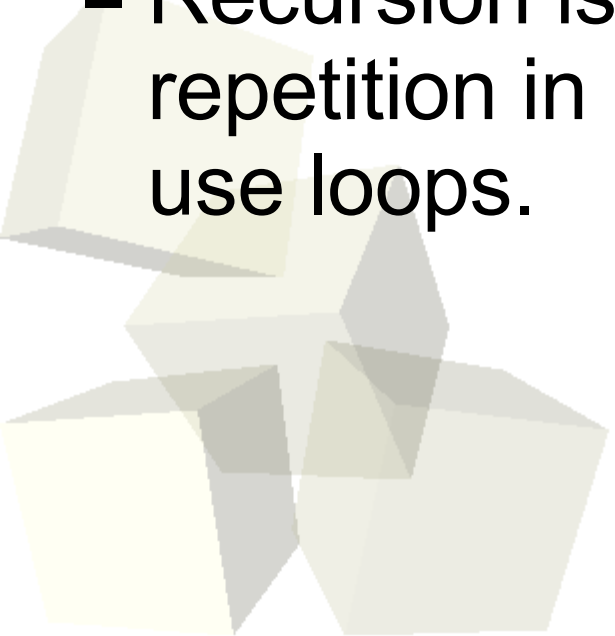
# Opening Discussion

- What did we talk about last class?
- Do you have any questions about the assignment?
- Do you have any questions about the reading?





- Last time we decided that we wrote a little calculator and we ran into a problem when we wanted the calculator to do more than one calculation.
- We got around this by having a function call itself. This is called recursion and we'll spend more time on it in the future.
- Recursion is not the normal way of getting plain repetition in C. The more standard method is to use loops.





# Loops in General

- There are three general types of loops that occur in programming languages.
  - ◆ Pre-test loops
  - ◆ Post-test loops
  - ◆ Counting loops
- Loops also have something of a general structure that includes four elements
  - ◆ Initialize
  - ◆ Condition
  - ◆ Loop body
  - ◆ Iterate
- The order and nature of these elements can vary. Forgetting one typically means that you have made a mistake.



- What are the different loops that you have in the C language? What type is each one? When would you want to use each one?





# Adding Loops to Code

- Let's change our calculator so it uses a loop for repetition instead of recursion.
- We could even write code that can “parse” prefix math expressions.
- If we add a bit of logic to our ray tracing code we could make it do something interesting, like “drawing” our sphere.





# Repetition through Recursion

- As we saw last class, we can do repetition by having a function call itself. This is called recursion.
- Recursion is an incredibly powerful tool. In C you don't normally use recursion when a loop would suffice, but there are many problems where recursion can easily do things that can't be done with loops without throwing in a lot of extra complexities.
- The critical key for any recursion, is that there has to be a chance for the function to not call itself.



- Write a function that will sum and return the numbers read from standard input until a value of zero is read.
- Remember to turn in assignment #2 by midnight tonight.
- Quiz #3 will be at the beginning of next class.

