

### Administrivia

Slide 1

- Reminder: Quiz 5 Friday. Likely topics are files and maybe strings.
- Some reading added for Monday's lecture. I'm still looking for a good tutorial on `make` that I can add, but I don't think it's critical that you understand this tool very well.
- Minor edits made to Homework 8, about use of the functions in my `alphabet` library and about where to get possibly-interesting input files.

### Functions as Parameters to Other Functions

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- There are situations in which it's useful to allow functions to use other functions as parameters.
- One example is sorting — the same algorithm applies to sorting anything for which there's a well-defined "less than" operator, so sorting `ints` is much like sorting `doubles`, which in turn is much like sorting strings (except that things get a little tricky there because they have varying lengths). So — maybe a general sort function, with one parameter that represents the "less than" operation to use?
- Another example is our numerical-integration program — we could use much the same code to perform numerical integration on different functions if we could somehow make the function to be integrated a parameter.

### Functions as Parameters to Other Functions, Continued

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- Some languages provide nice built-in support for this idea (“functions are first-class objects”). Examples go back to early “functional languages” and include several more-recent languages such as Scala, Python, and Java (though it’s a little clumsy in Java).
- C provides a way to get this effect, via “function pointers”.

### Function Pointers in C

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- The type of a function pointer includes information about the number and types of parameters, plus the return type.
- Example — last parameter to library function `qsort` (in its man page). Call this by providing, in your code, a function with declaration  

```
int my_compare(const void *, const void *);
```

and using `my_compare` as the last parameter to `qsort`.  
(Use this to finish sort program from earlier class.)
- (Also try revising numerical-integration program to use this?)

## Minute Essay

- None really — just sign in, unless questions?

Slide 5