

Administrivia

- Homework 4 still “coming soon”.

Slide 1

I/O in C — Recap

- `getchar` and `putchar` read/write one character at a time.
- `scanf` and `printf` read/write other data types (converting from/to printable form).
- Some environments allow reading/writing files via “I/O redirection”. But that’s somewhat restrictive . . .

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Streams

Slide 3

- C's notion of file I/O is based on the notion of a *stream* — a sequence of characters/bytes. Streams can be *text* (characters arranged into lines separated by something platform-dependent) or *binary* (any kind of bytes). UNIX/Linux doesn't make a distinction, but some other operating systems do.
- An input stream is a sequence of characters/bytes coming into your program (think of characters being typed at the console).
- An output stream is a sequence of characters/bytes produced by your program (think of characters being printed to the screen, including special characters such as the one for going to the next line).

Streams in C

Slide 4

- In C, streams are represented by the type `FILE *` — i.e., a pointer to a `FILE`, which is something defined in `stdio.h`.
- A few streams are predefined — `stdin` for standard input, `stdout` for standard output, `stderr` for standard error (also output, but distinct from `stdout` so you can separate normal output from error messages if you want to).
- To create other streams ...

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Creating Streams in C

- To create a stream connected with a file — `fopen`.
- Parameters, from its man page:
 - First parameter is the name of the file, as a C string.
 - Second parameter is how we want to access the file – read or write, overwrite or append — plus a `b` for binary files, also a string.
 - Return value is a `FILE *` — a somewhat mysterious thing, but one we can pass to other functions. If `NULL`, the open did not succeed. (Can you think of reasons this might happen?)

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Working With Streams in C

- To read from an input stream — `fscanf`, almost identical to `scanf`. To write to an output stream — `fprintf`, almost identical to `printf`. `fgetc` and `fputc` may also be useful.
- When done with a stream, `fclose` to tidy up. (Particularly important for output files, which otherwise may not be completely written out.)

Reading Text Strings

Slide 7

- Getting text-string input is surprisingly tricky. `scanf` (or `fscanf`) seems like an obvious choice, but:
 - it can't read a string that includes blanks, and
 - it has no nice way to limit the number of characters read to the size of the array being read into.
- Getting a whole line is probably better. `gets ()` is an obvious/simple choice for reading from standard input, but it also has no way to limit how much is read. `fgets ()` is better. (Look at its man page.)
(Also notice `puts ()` — simple way to write out a text string.)

Minute Essay

Slide 8

- None — sign in.