Standard Streams and File Descriptors: Takeaways

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Syntax

- Redirecting stdout to `out` can also be obtained in two ways:
    - `cmd >out`
    - `cmd 1>out`
- Redirecting stdout and stderr to `out` and `err` respectively: `cmd >out 2>err`.
- Redirecting stdout and stderr to `all_output`: `cmd >all_output 2>&1`.
- Redirecting stdin from the shell to a file named `input_file`:
    - `cmd 0<input_file`
    - `cmd <input_file`
- Using `tr` to replace `x` with `3` (input implied): `tr x 3`

Concepts

- A **process** is a running instance of a command.
- **Standard streams** are certain communication channels through which processes communicate with the computer.
- There are three standard streams:
    - Standard input (stdin)
    - Standard output (stdout)
    - Standard error (stderr)
- Regular output uses stdout, where as error messages come through stderr
- The computer sees standard streams as non-negative integers called file descriptors:

File Descriptor	Stream	Full name
0	stdin	Standard input
1	stdout	Standard output
2	stderr	Standard error

- The order of redirection matters. The following two commands do different things:
    - `cmd 2>&1 >filename`
    - `cmd >filename 2>&1`
- Many commands take input not only from the filenames that are passed as arguments to them, but also from standard input.

Resources

- Redirections cheat sheet
- All about redirections

- A Detailed Introduction to I/O and I/O Redirection
- POSIX standards on redirection

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