

2023 Fall ECE 344: Operating Systems

Lecture 8

1.0.0

# Subprocess

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# We Want to Send and Receive Data From a Process

1. Create a new process that launches the command line argument
2. Send the string `Testing\n` to that process
3. Receive any data it writes to standard output

## A More Convenient API – `exec1p`

```
int exec1p(const char *file, const char *arg /* ..., (char *) NULL */);
```

Does not return on success, and -1 on failure (and sets `errno`)

`exec1p` will let you skip using string arrays (using C `varargs`),  
and it will also search for executables using the `PATH` environment variable

## Our Final APIs — dup and dup2

```
int dup(int oldfd);  
int dup2(int oldfd, int newfd);
```

Returns a new file descriptor on success, and -1 on failure (and sets errno)

Copies the file descriptor so oldfd and newfd refer to the same thing

For dup it'll return the lowest file descriptor

For dup2 it'll atomically close the newfd argument (if open),  
and then make newfd refer to the same thing

## Coding Example

Done live!

You can find the template in 08-subprocess in the materials repository

To compile it, run the following commands:

```
cd lectures/08-subprocess # if not already there
meson setup build
meson compile -C build
```

Run the program using: `build/subprocess <program>`

# Running with cat May Cause Problems

Run the program with the following arguments:

```
build/subprocess uname  
build/subprocess cat
```

You have to be careful with the file descriptors!

Why might cat not exit when using pipes?