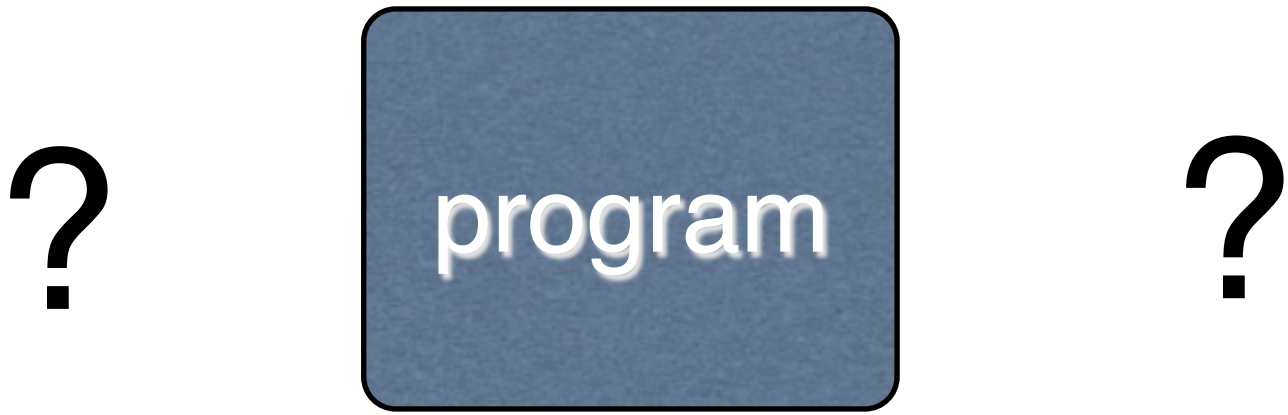
Unix Basics

ur Goal Tonight

ovide *fundamental concepts* and give you a
id understanding

hen we're done, there will still be *a lot* you
n't know.

What's a Program?



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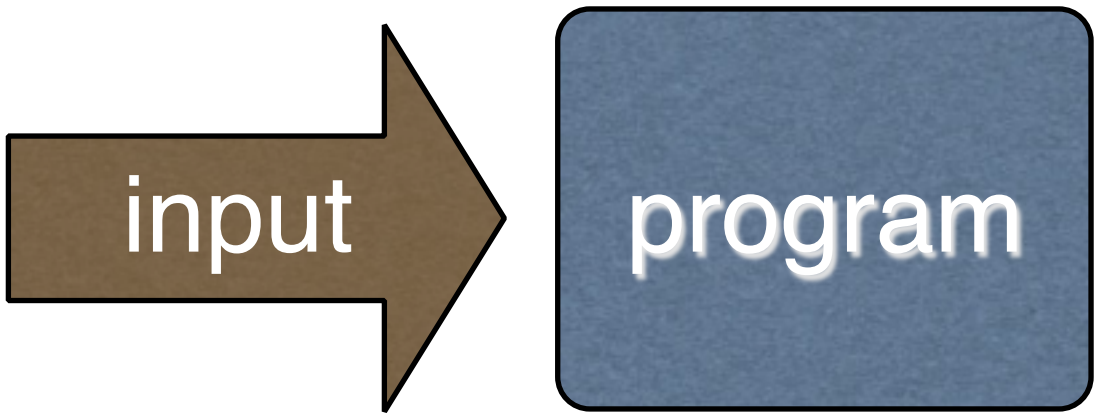

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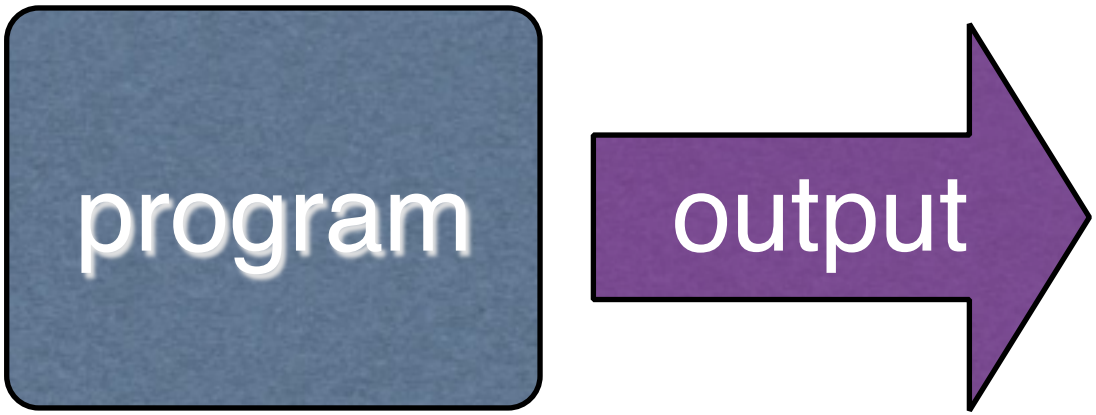

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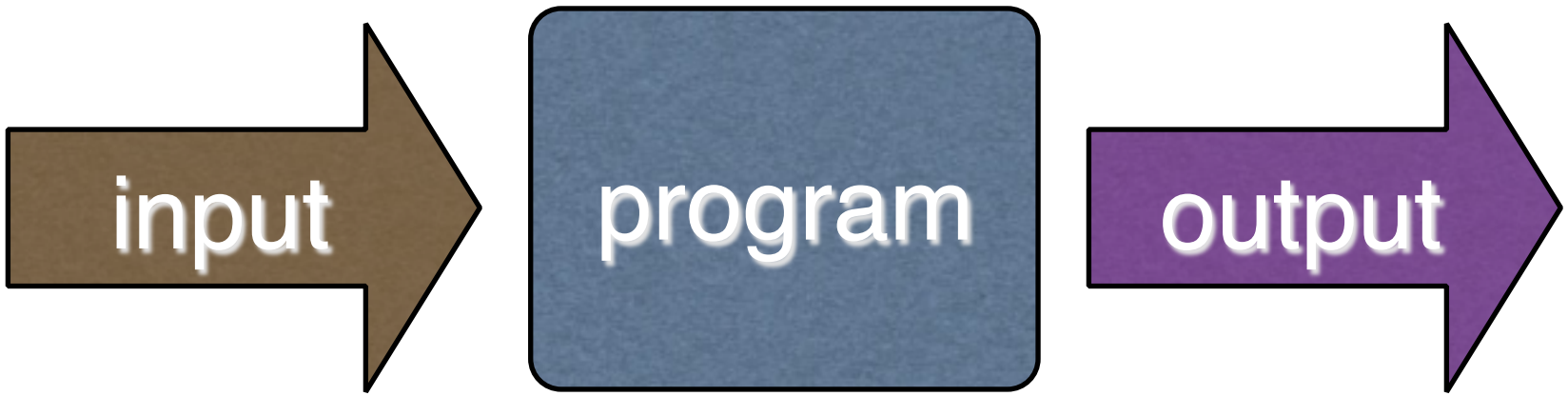

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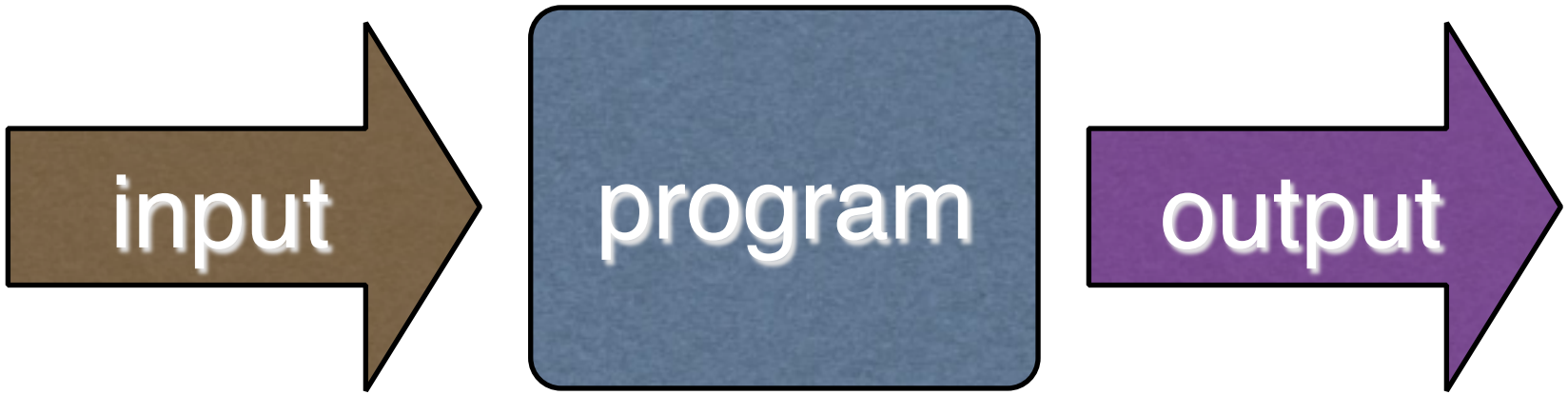


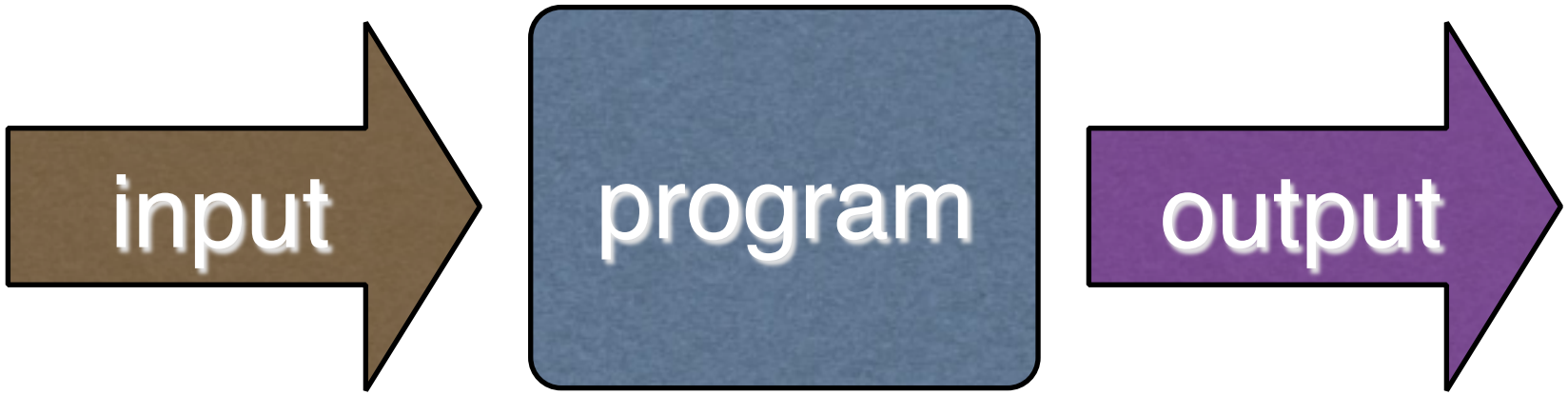
Something you can read from…

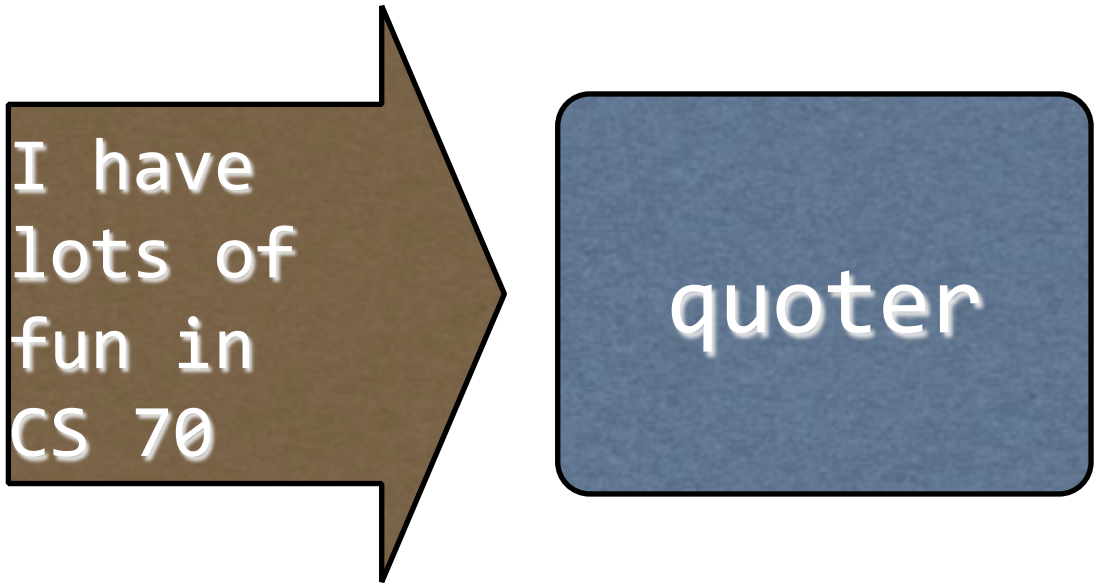
(e.g., contents of file, keyboard input, etc.)

Something you can write to…

(e.g., contents of file, display output, etc.)

What's a Program?





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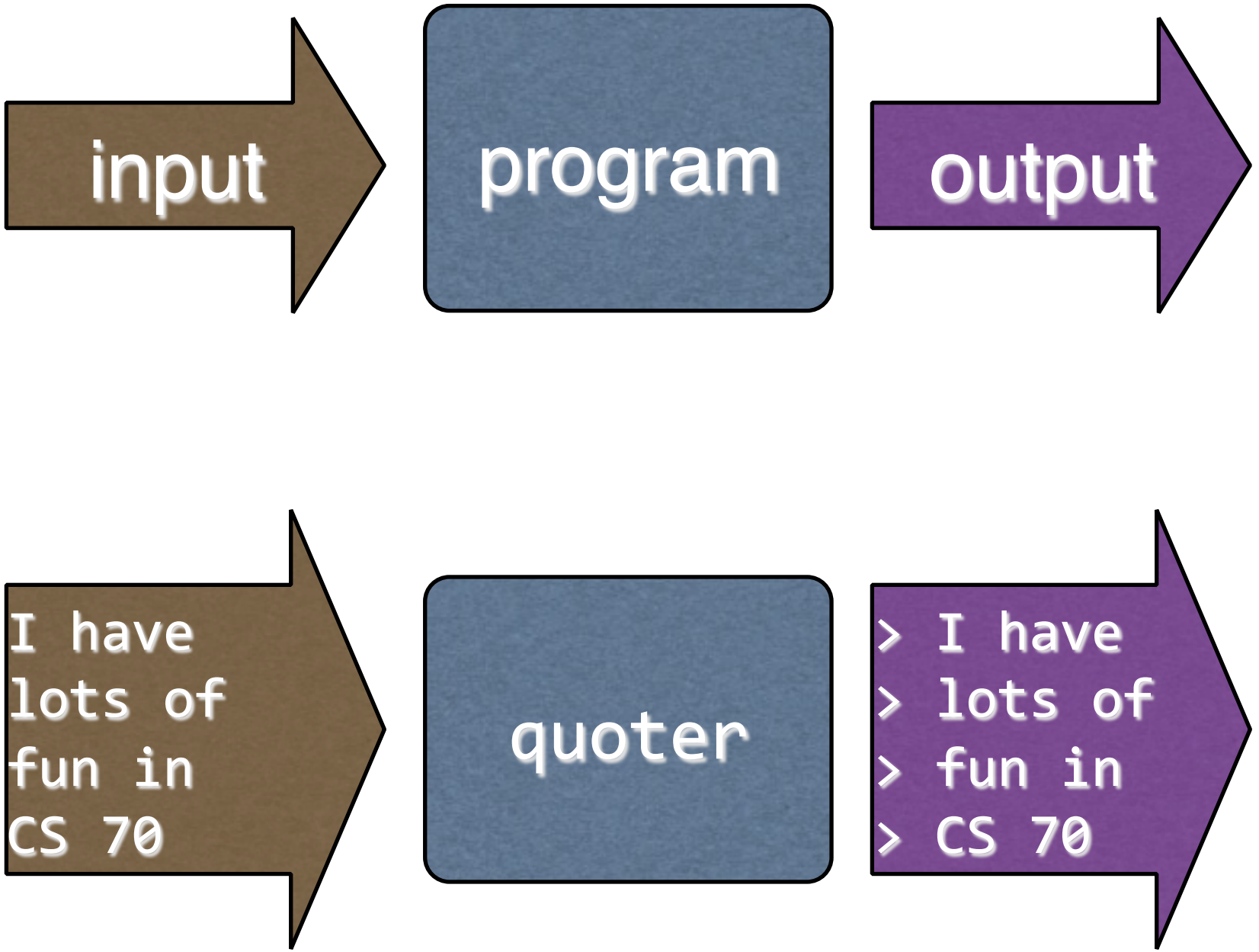

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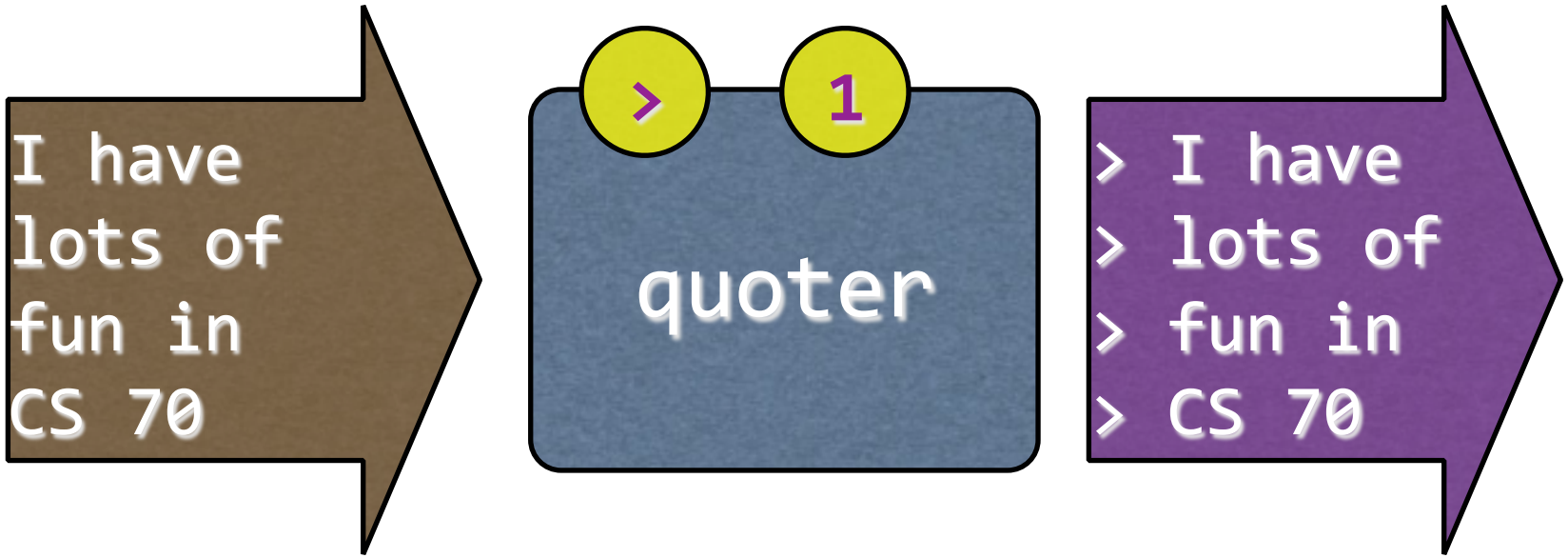

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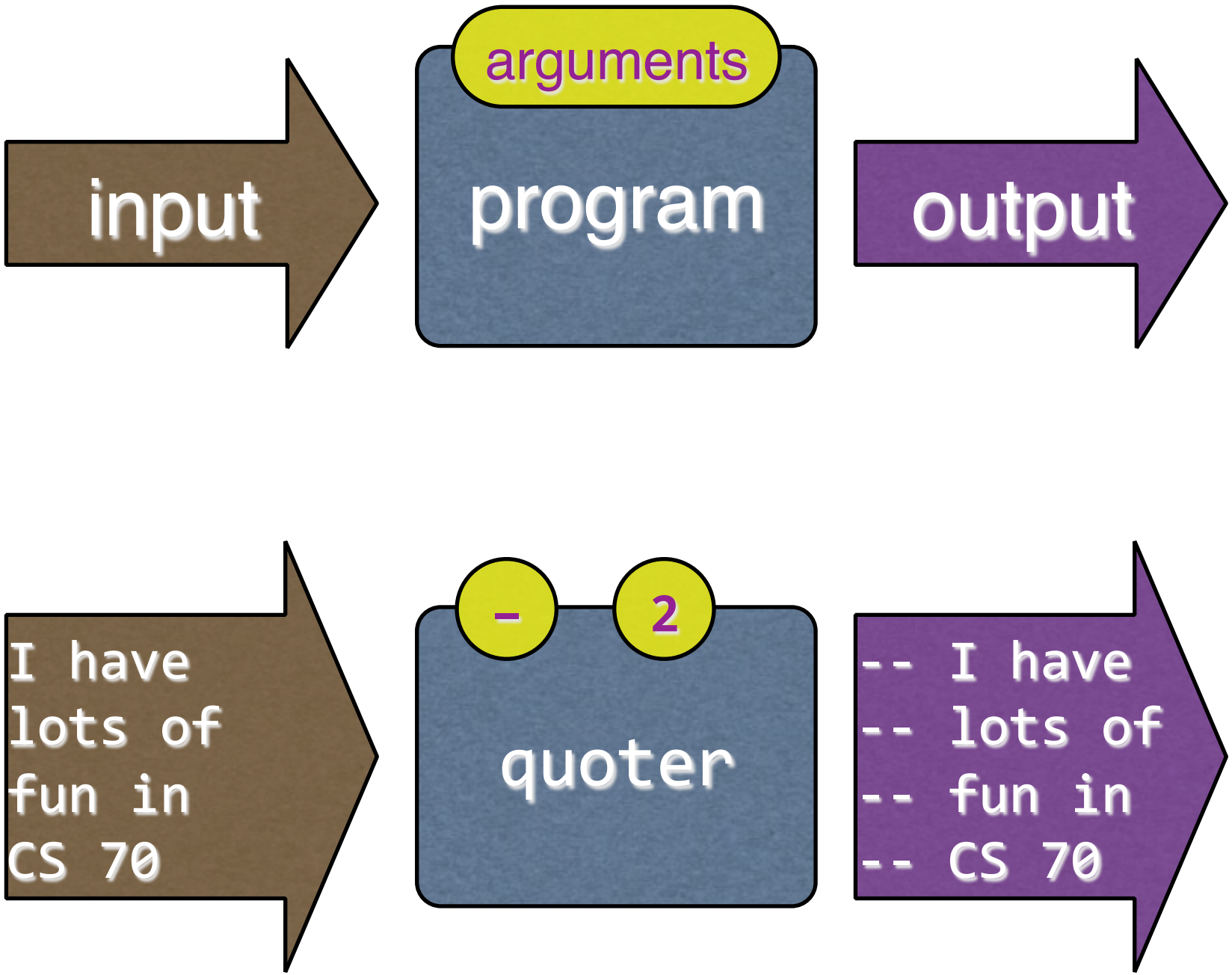

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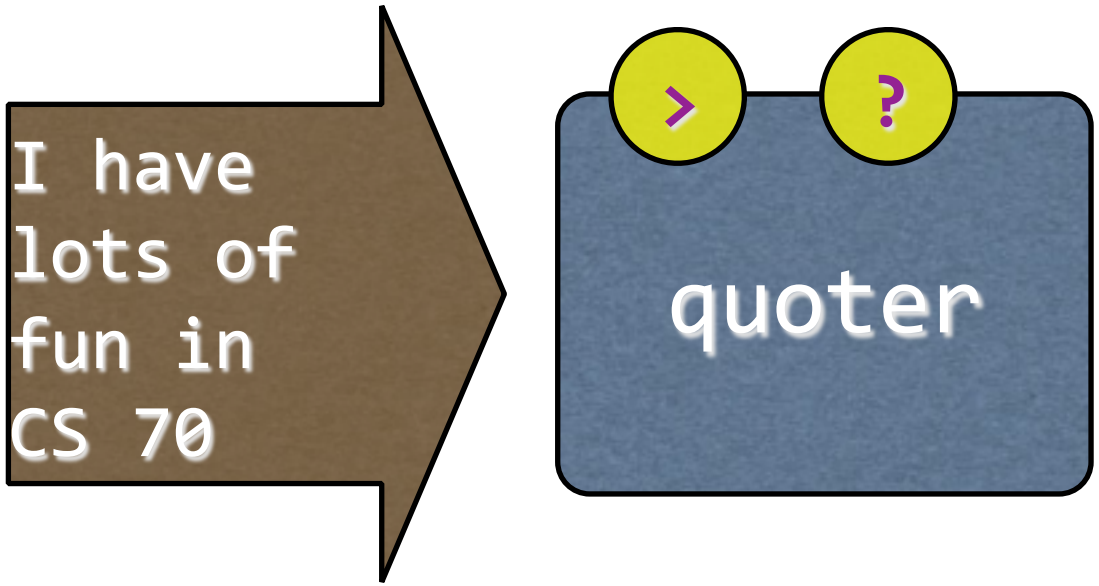

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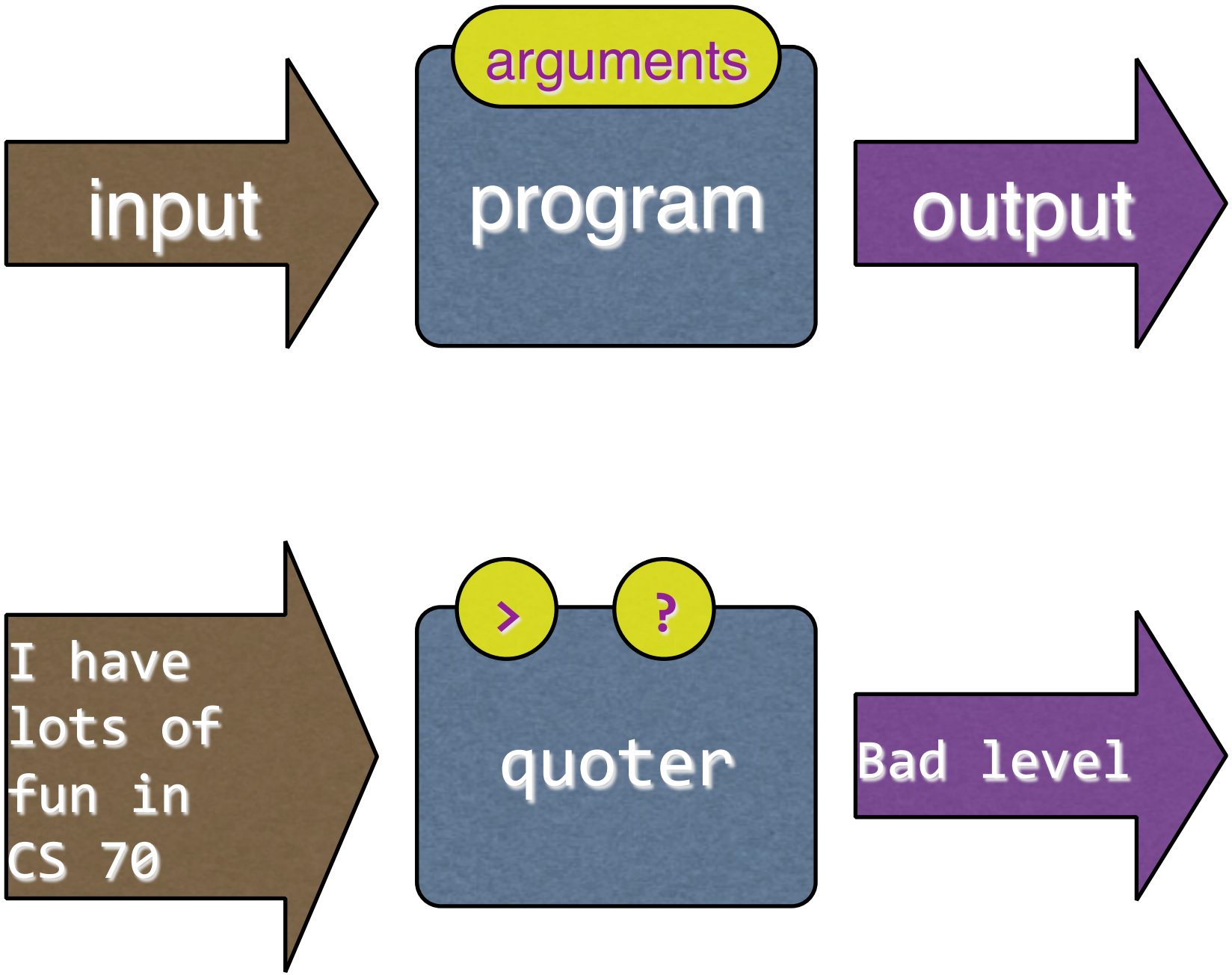

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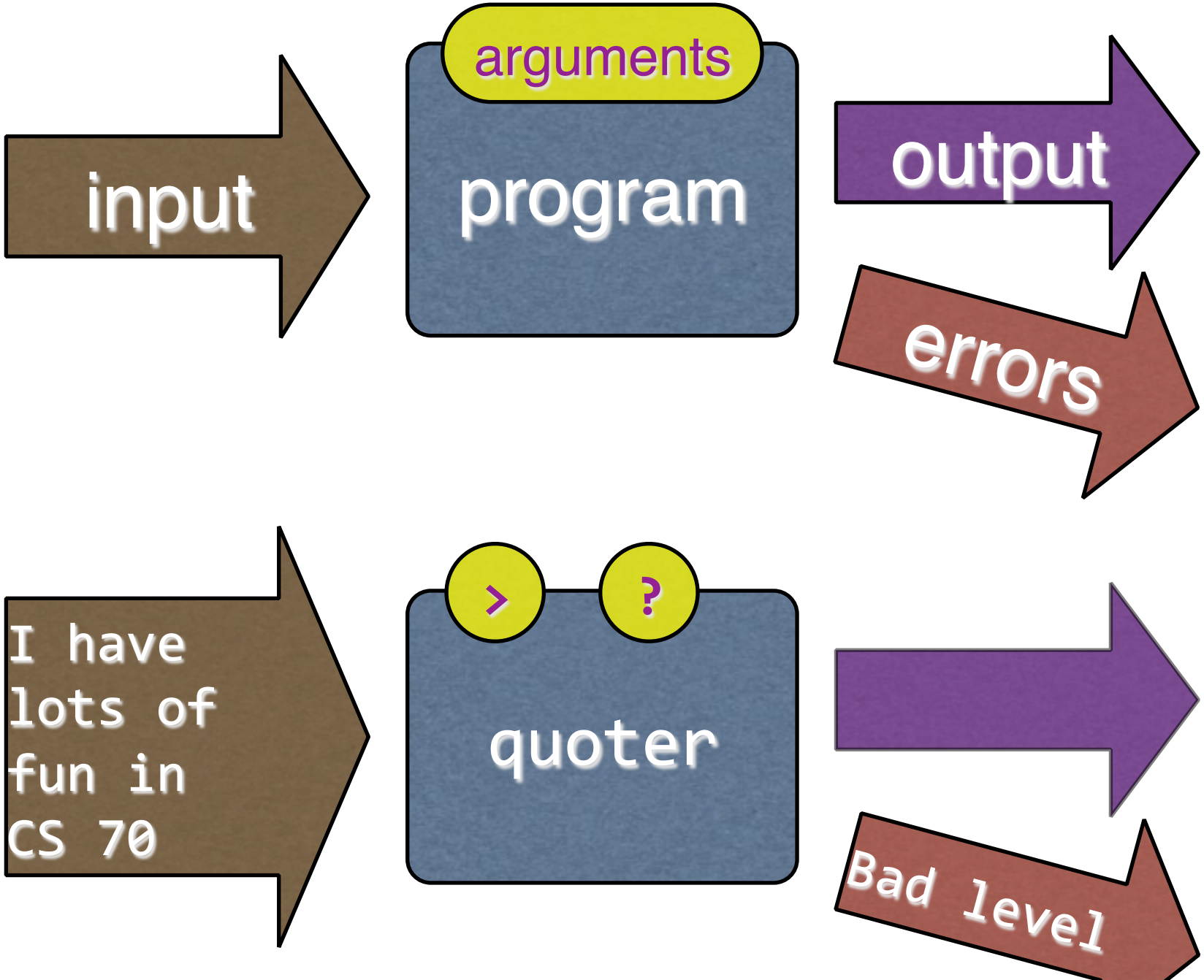


tory So Far

ograms have

- Arguments
- Input stream
- Output stream
- Error stream

Implemented as

- Array of strings
  - Arguments to `main`

he Shell

program that just exists to run other program

- Does the necessary setup first
- Can be *graphical* or *text-based*

hell Basics

ell reads a line from the user of the form

program-to-run arg1 arg2 arg3

g.,

```
/home/nfakaji/bin/quoter % 2
```

ut, output and error output default to the minal

Tip: Pressing Control-D signifies “end of input”

aths

bing this is a pain

- `/home/nfakaji/bin/quoter % 2`

e'd like to say

- `quoter % 2`

ell has notion of a *search path*

- List of directories in which to look for programs

lore about Arguments

ntrast these

```
quoter  %  2
quoter  %%%  2
quoter  % %  2
```

ed some way to tell the shell what we mean

get the last one right, we can use

```
quoter  "% %" 2
quoter  '% %' 2
```

O Redirection

hat if we don't want the input and output (I/O
faults?

- How to ask shell to set up I/O differently?

O Redirection

r Shell's Convention, add “dummy
guments”:

- < *file* — Standard input reads from *file*
- > *file* — Standard output writes to *file*
- 2> *file*— Standard error writes to *file*

.,

```
quoter  %  2  < quoteme.txt
```

oing More Things…

ppose we also had another program, `shout`.

```
quoter % 1  <quoteme.txt  >quoted.txt

shout  <quoted.txt  >loud.txt

rm quoted.txt
```

nicer option would be to feed output of one ogram straight into the input of another (a pe”).

```
quoter % 1  <quoteme.txt  |  shout  >loud.txt
```

nix Philosophy

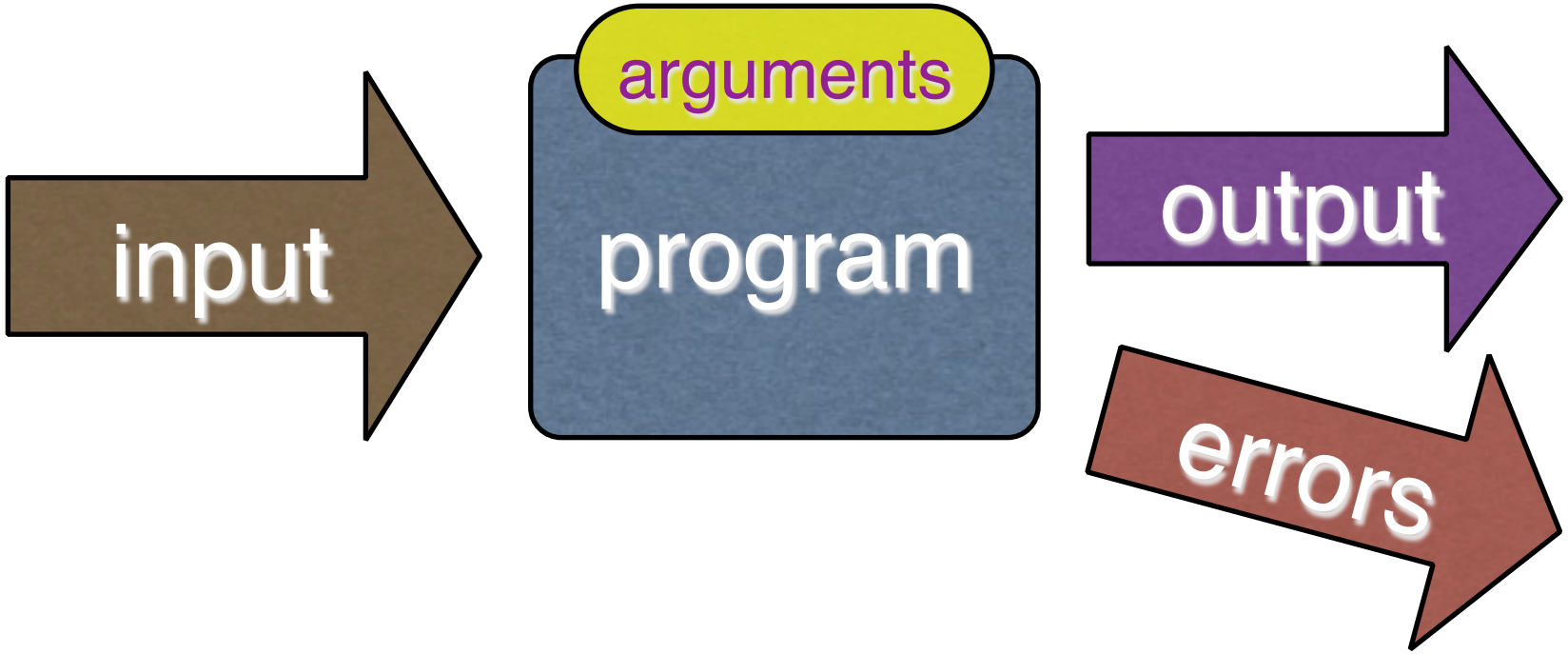
ovide simple but powerful tools

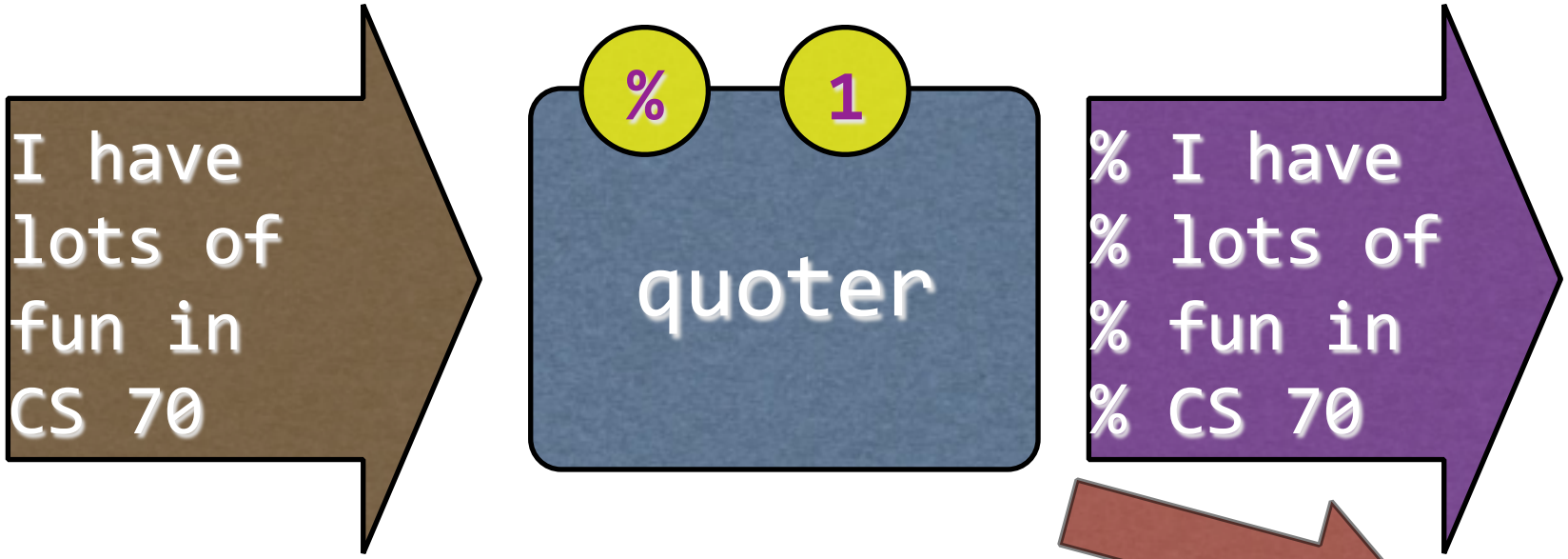
- Each tool has a single proficiency
- Plug them together in pipelines

g.,

- `sort`
- `head`
- `tail`
- `uniq`

What's a Program?





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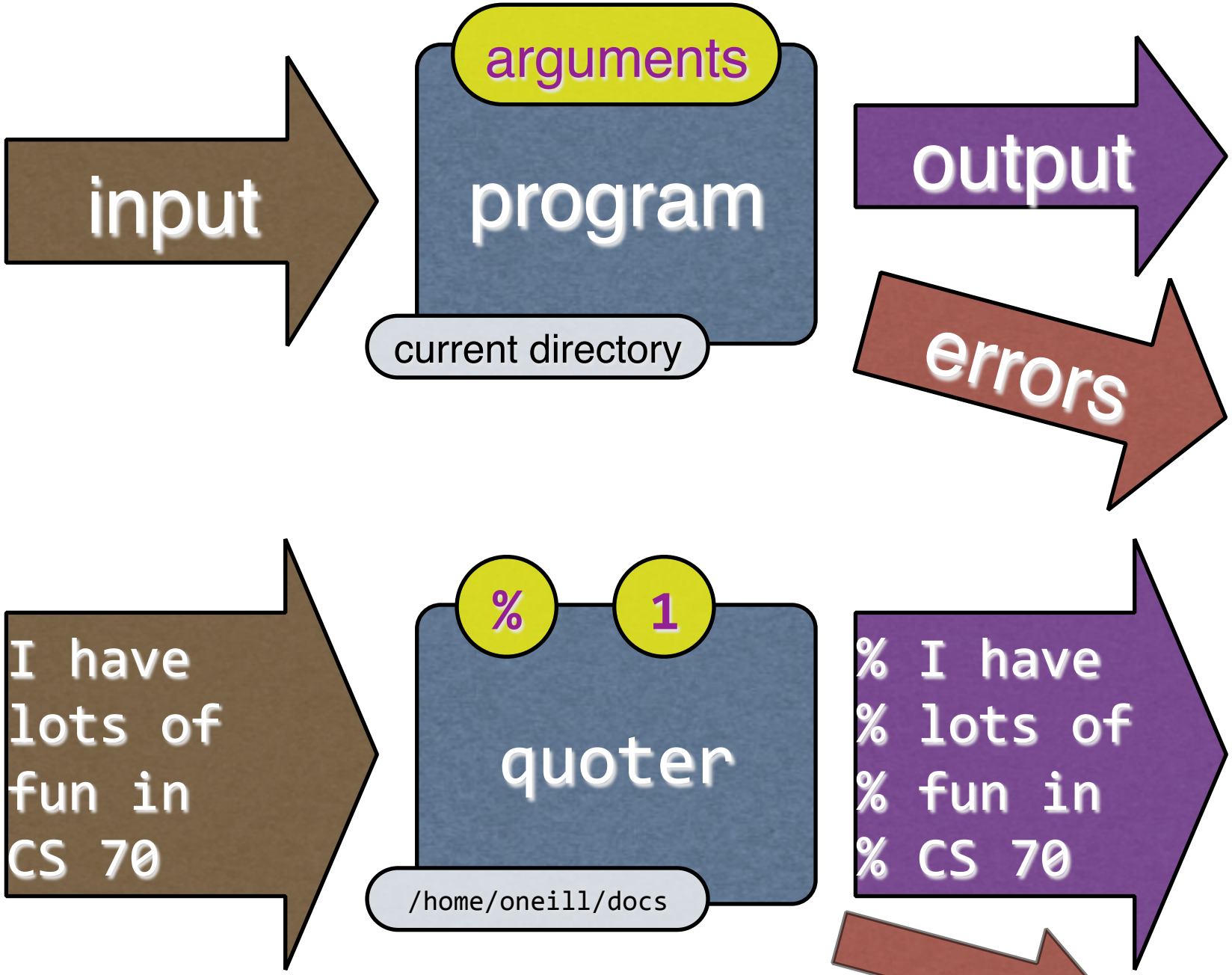


rograms vs Functions

ograms are a lot like functions

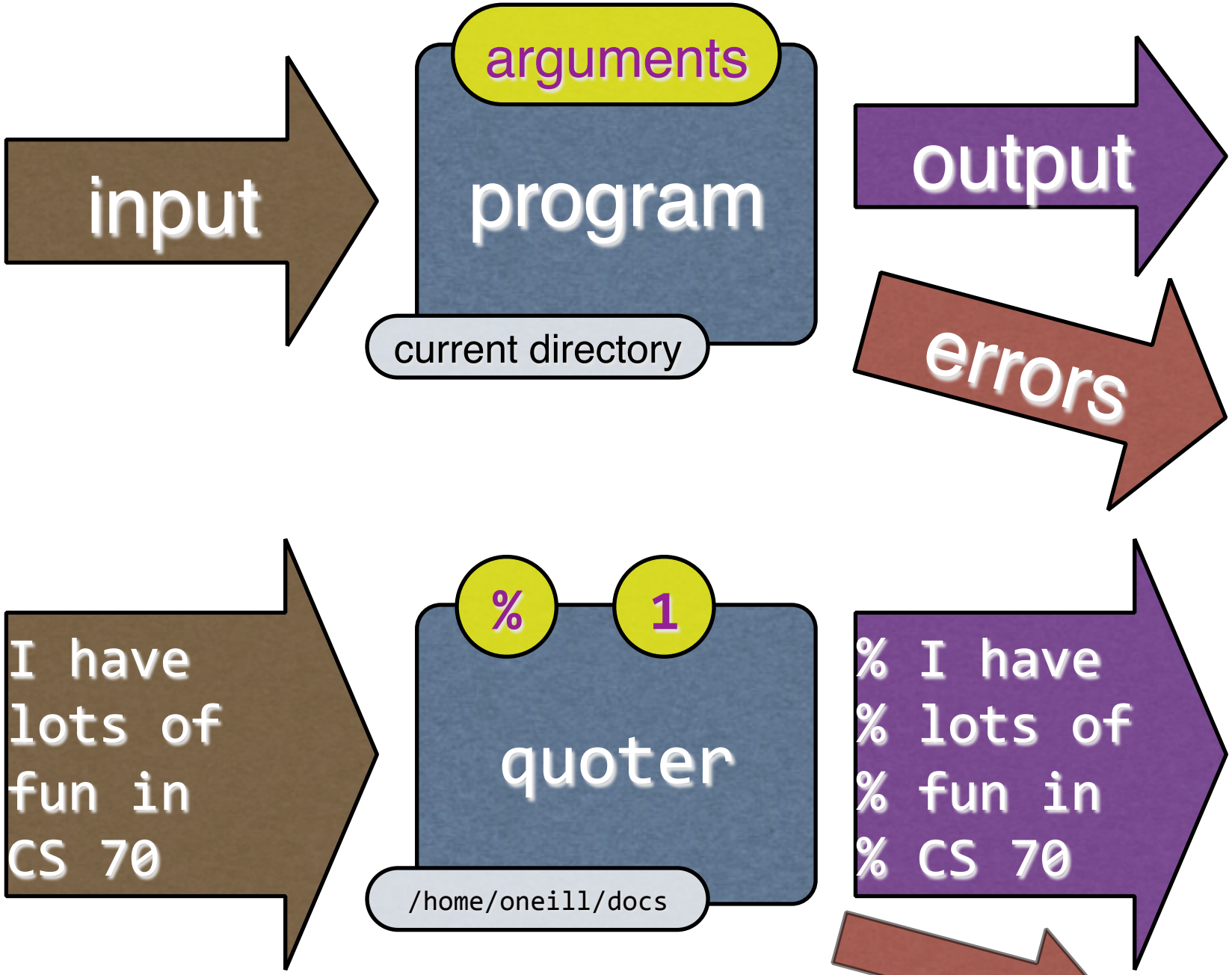
- Execute them to do stuff
- Take arguments

t functions can refer to global constants

- It'd be nice to do the same for programs

Name	Value
QUOTE_PREFIX	%

What's a Program?



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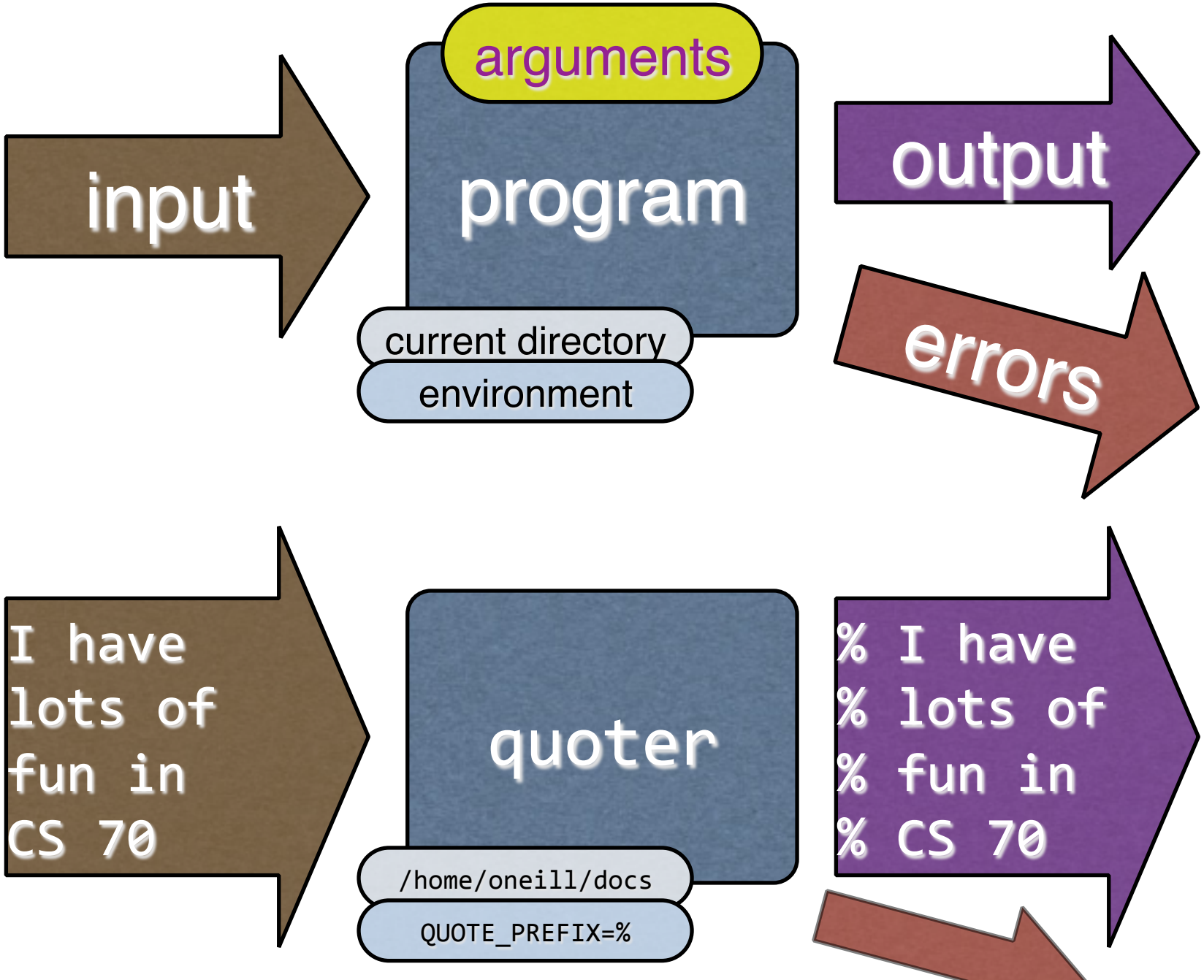


seful Environment Va

veral already exist, by convention…

me	Value
H	/bin:/usr/bin:/usr/local/bin:/opt/local/
TOR	emacs

ange by saying

```
export EDITOR=pico
```

Wildcards

remove all files ending with "`.o`", we can s

```
rm *.o
```

like the `del` command in windows,
e *shell* handles the mechanics of expanding
t `*.o`

nuth & Lab Macs

milarities

- Same student directories
- Not the same as CIS
- Both Unixish

Differences

- Different flavors o Unix (Linux vs M OS X)
- Code compiled o one won't run on the other

onnecting to knuth

log into knuth from the lab macs, use

- `ssh -Y knuth`

e `-Y` means “forward X11” as a trusted clie

Selecting an Editor

- You don't have to use emacs or vim
  - Xcode is fine, as are other editors
  - gedit is fine

elpful Commands

n

<*filename*>

ff <*filename1*> <*filename2*>

man

manu

Shows documentation for a program

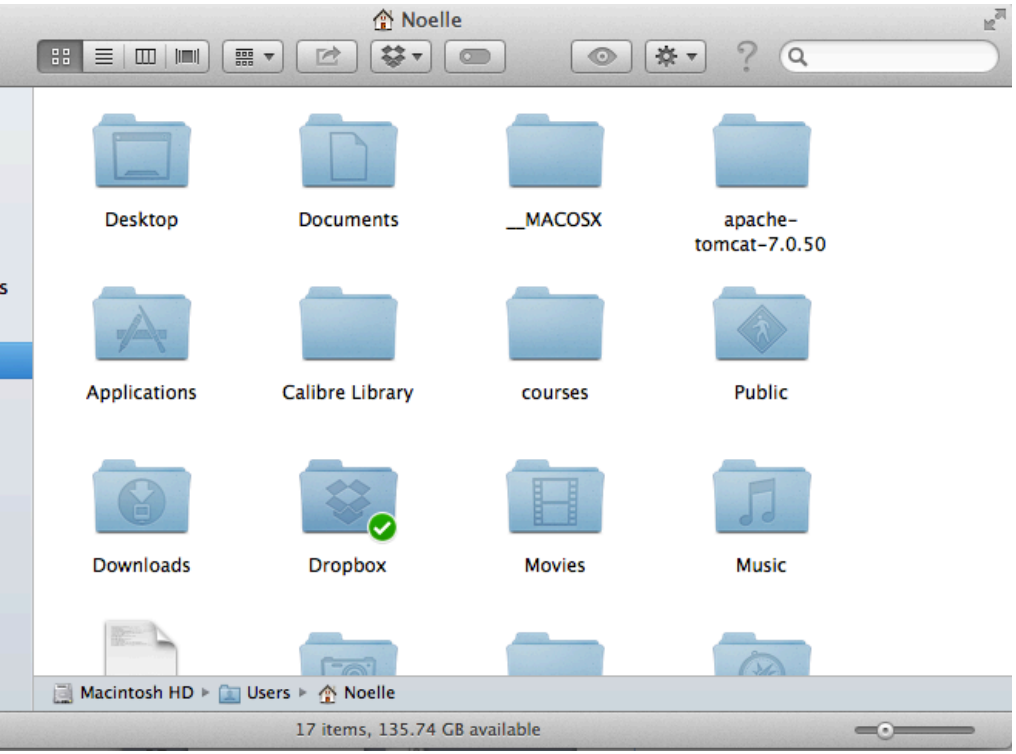
- `man <program>`
- `man -k <program>`

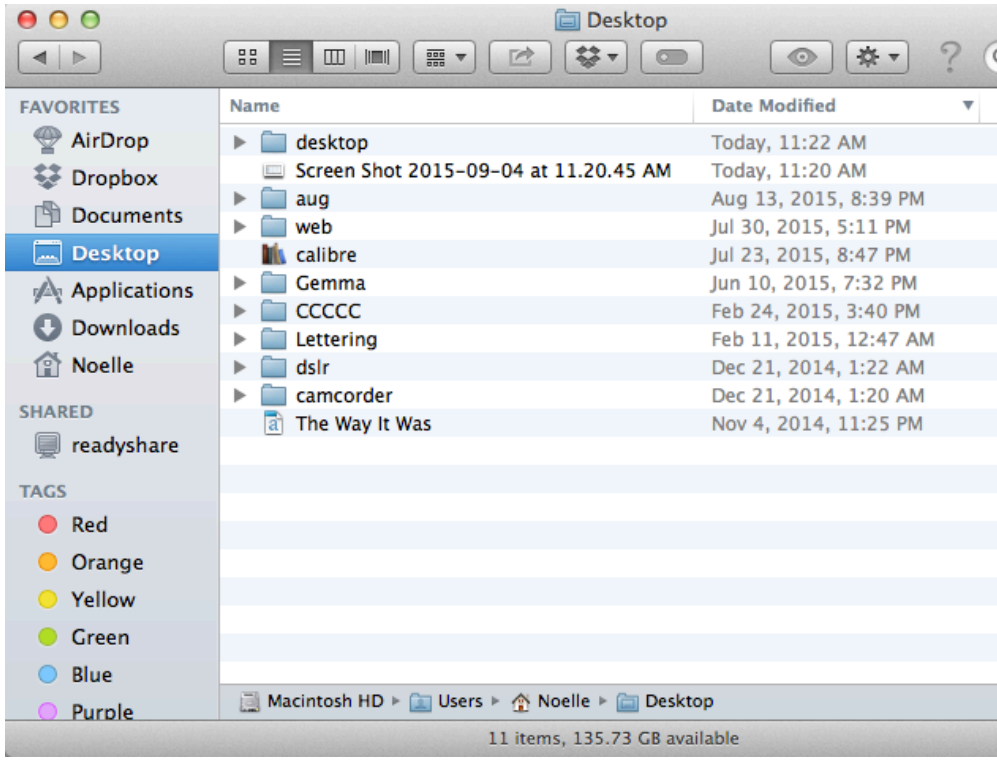
d change directo

vigate through directories

```
cd <directory>

cd ..
```





s

Lists the files in the current directory

- `ls`
- `ls -l`
- `ls -a`

There are many more options, for example t
st files by size, by date, recursively etc.

ther hints

Hit the up arrow

Tab completion

etting Help

ts of ways

- Class Wiki (add things too!)
- Google (including for tutorials, etc.)
- Ask grutors and instructors

To the lab!

Grab a handout!