

- ③ fork cmd
- ④ parent closes  $fd \neq -1$  in and out
- ⑤ child closes next if  $\neq -1$
- ⑥ " dup2 in  $\rightarrow$  stdin
- ⑦ " closes in
- ⑧ " dup2 out  $\rightarrow$  stdout
- ⑨ " closes out
- ⑩  $\pi$  execs

- ⑪ parent in = next
- ⑫ " pipes
- ⑬ fork cmd2

⋮

if in  $\neq -1$

if out  $\neq -1$

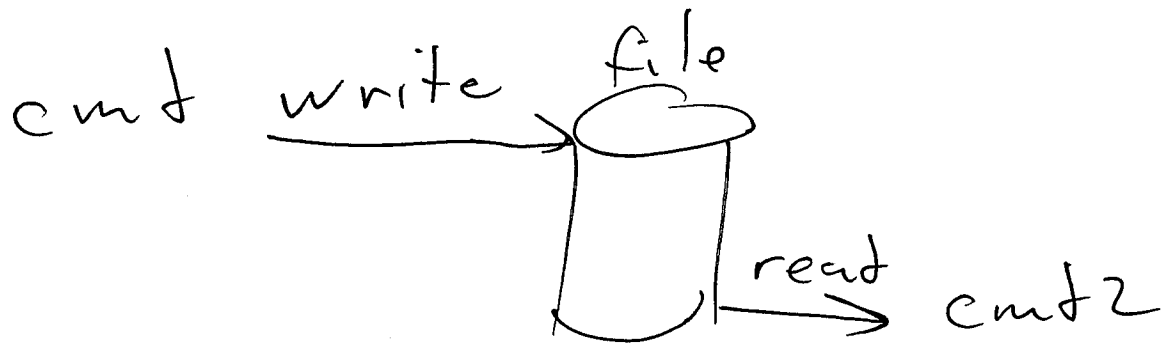
for > Outfile,

parent: out = open (outfile)  
next = -1

child: no change

Last command  
no pipe call  
out = next = -1

```
close (fd);
fd = -1;
```



~~ps~~ ps -elf | sort | grep cut | more

tee file2.dat

student Program < infile > outfile

diff outfile answerfile