CSC 369 Worksheet 2 Solution

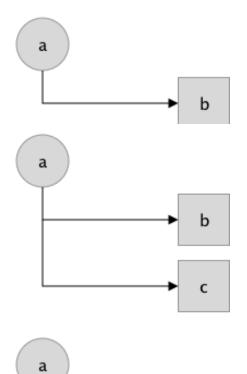
August 16, 2020

1 Homework (Simulation)

- 1. I need to create process trees at each step when the command ./fork.py -s 10 is run.
 - 1) Action: a forks b

2) Action: a forks c

3) Action: c EXITS



4) Action: a forks d

a b d

a b d

5) Action: a forks e

Notes

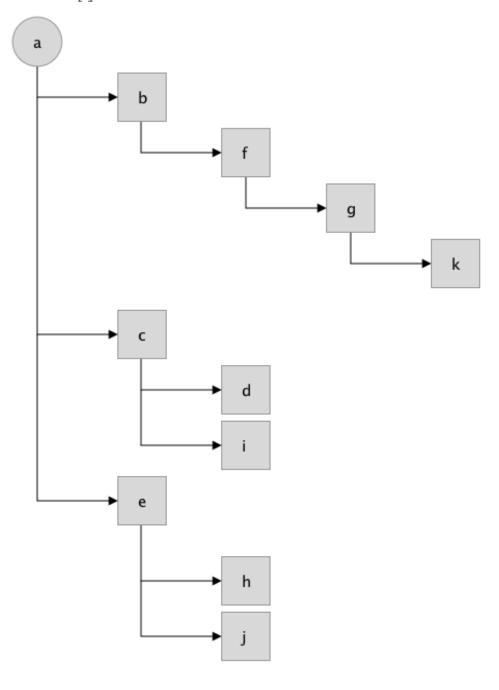
- fork()
 - Is used to create a new process
 - $\ \mathbf{Creator} \to \mathrm{parent} \ \mathrm{process}$
 - $\ \mathbf{Newly} \ \mathbf{Created} \to \mathbf{child} \ \mathbf{process}$
 - Child process is nearly identical to parent process
- exec()
 - Allows a child to break free from its similarity to its parent and execute an entirely new program.
- wait()
 - Is used to let parent code delay its execution until the child finishes executing.
 - Makes the output deterministic
- 2. I need to write what the resulting final process trees will look like as the fork-percentage changes. Here I ran command (./fork.py -s 10 -a 10 -f 0.1 and ./fork.py -s 10 -a 10 -f 0.9)

$\underline{\text{Notes}}$

• ./fork.py -s 10 -a 10 -f 0.1



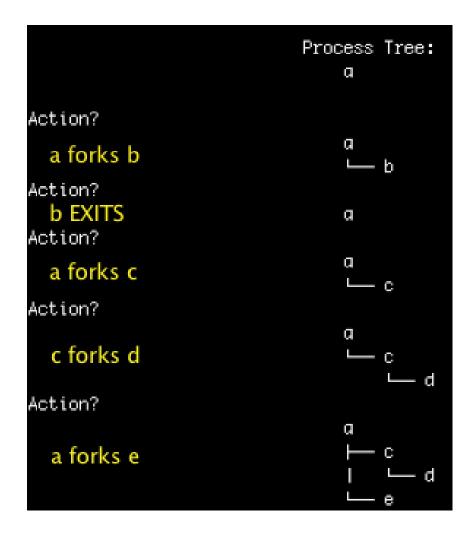
• ./fork.py -s 10 -a 10 -f 0.9



Based on the diagram above, I can deduce that the lower the fork percentage, the more likely that exit() is executed by the childmost process, and the final tree will either have a single node or none.

On the other hand, the higher the fork-percentage is, the more likely that fork() is executed by the childmost process, and the final tree will have nodes that are deeply nested.

3. I need to fill out blank entries created by the command (./fork.py -t)



4. I need to write what happens when a child exits; what happens to its children in the process tree.

When a child exists, all of its children will also exit.

I am not sure what happens when -R flag is used.

Correct Solution

I need to write what happens when a child exits; what happens to its children in the process tree.

When a child exists, its parentmost child, along with its children, will be attached to the parentmost node

When -R flag is used (i.e./fork.py -A a+b,b+c,c+d,c+e,c- -R) and a child exists, its parentmost child, along with its children will be attached to the parent node of the child that exits

```
Action: c forks e

a

b

c

H

d

e

Action: c EXITS
```

5. I need to write down the final tree by looking at the series of actions generated (here, the command ./fork.py -F is used).

```
Process Tree:
a

Action: a forks b
Action: b EXITS
Action: a forks c
Action: c forks d
Action: c forks e

Final Process Tree?
```

2 Homework (Code)

1.