

CSCB09H Worksheet: Makefiles

Suppose the current working directory contains the following files:

```
cheese  makefile
```

The contents of `makefile` is shown in the box to the right.

In the table below are three commands that are run sequentially (one after the other) from the shell. Complete the table by filling in the output that is printed to standard out and the names of files that are changed or created.

```
dinner: pizza salad

pizza: cheese topping.peppers
    echo making pizza
    cat cheese topping.peppers > pizza

cheese:
    echo gooey cheese > cheese

topping.%:
    echo yummy $@ > $@

salad:
    echo salad is healthy
```

Command	Output printed to standard output	Names of files created or changed
make salad	salad is healthy	N/A
make pizza	gooey cheese yummy topping.pepper making pizza	
make dinner		

CSCB09H Worksheet: Fork

Consider the program below that runs without errors. In the table to the right, indicate how many times the name of each fruit is printed.

```
int main() {
    int i;
    printf("Mangoes\n");
    int r = fork();
    printf("Apples\n");
    if (r == 0) {
        printf("Oranges\n");
        int k = fork();
        if (k >= 0) {
            printf("Bananas\n");
        }
    } else if (r > 0) {
        printf("Peaches\n");
        for(i = 0; i < 3; i++) {
            if ((r = fork()) == 0) {
                printf("Pears\n");
                exit(0);
                printf("Nectarines\n");
            } else if (r > 0) {
                printf("Plums\n");
            }
        }
    }
}
```

Fruit Name	Times Printed
Mangoes	1
Apples	2
Oranges	1
Bananas	2
Peaches	1
Pears	3
Nectarines	0
Plums	3

Several orderings of the fruit names are possible valid output. Some of these orderings even have the unix prompt displaying before the final fruit name (or names). Explain why this happens.

each process concurrent & indep
 → child process may terminate earlier than parent

Not all of the fruit names could appear after the prompt in a valid output. For example the word Mangoes will never appear after the prompt. List all the fruit names that could occur after the prompt.

shell 提示符.

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