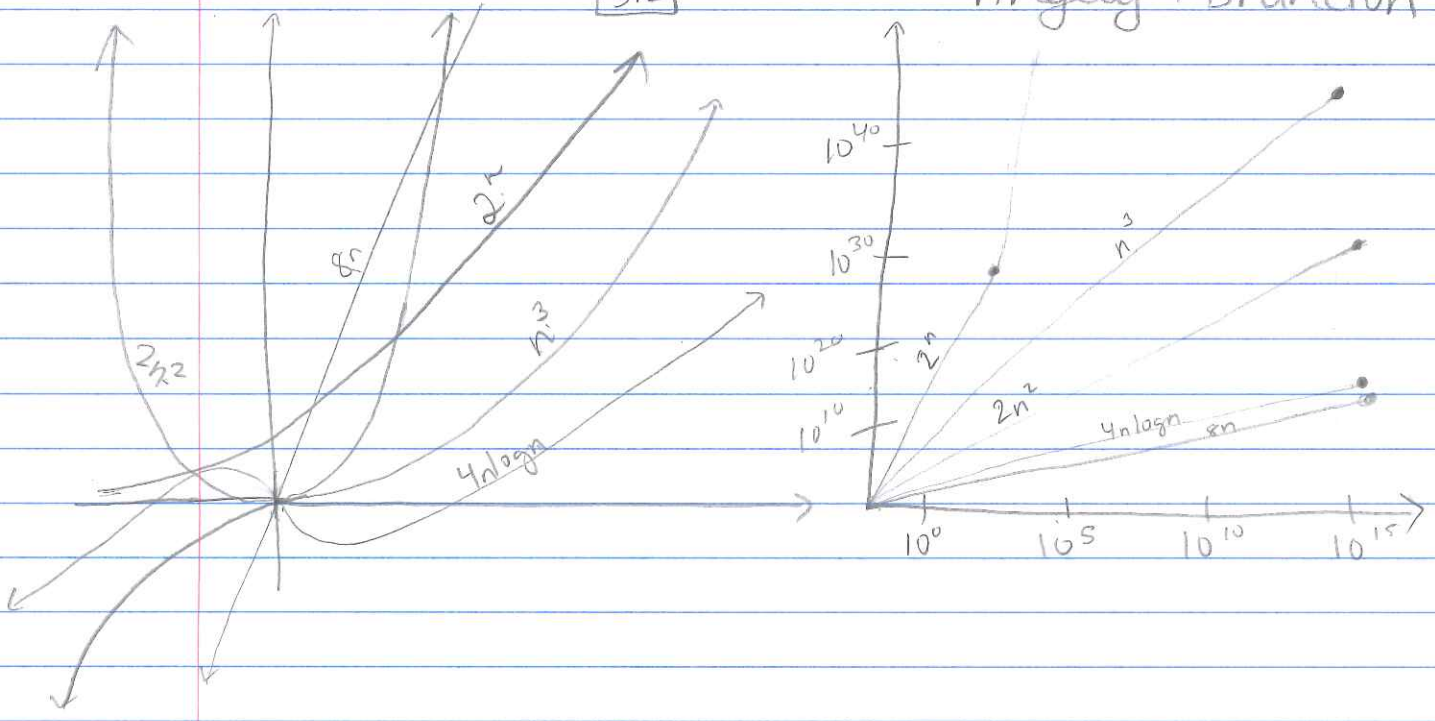
5 events @ $5.0/event

C341
Angely + Brandon

3.1



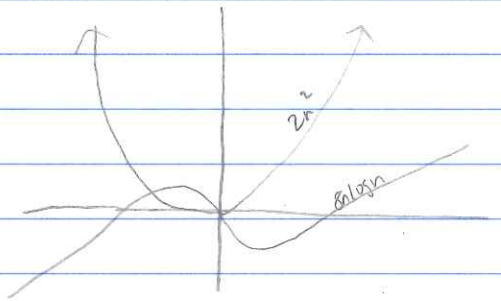
3.2

ops A and B
$8n\log n$ ↙ ↘ $2n^2$

n_0 A is better than B
↓ lower degree

$8n\log n = 2n^2$
$4n\log n = n^2$
$4\log n = n$
$4 = \frac{n}{\log n}$

at $n = 16$, $4 = \frac{16}{\log_2 16}$; $n_0 = 17$ is when A is faster in terms of run time, thus making it better



3.8

2^{10}, $2^{\log n}$, $3n + 100 \log n$, $4n$, $n \log n$, $4n \log n + 2n$, $n^2 + 10n$, n^3, 2^n

increases left to right

3.10

$d(n)$ is $O(f(n))$, $d(n) \leq c_1 f(n)$ for $n \geq n_{0_1}$

$e(n)$ is $O(g(n))$, $e(n) \leq c_2 g(n)$

$d(n) e(n)$ is $O(f(n) g(n))$

$d(n) e(n) \leq c_1 f(n) e(n)$

$c_1 f(n) \cdot e(n) \leq c_1 c_2 f(n) g(n)$

$d(n) e(n)$ is $O(f(n) g(n))$ for $n \geq \max\{n_{0_1}, n_{0_2}\}$

3.14

$O(\max\{f(n), g(n)\}) = O(f(n) + g(n))$

* max of a set of 2 functions should result in one function.

$f(n) + g(n) \leq 2 * \max\{f(n), g(n)\}$ $n_0 > n$

if $c = 2$ $n_0 = 1$

by definition of big-Oh, $f(n) + g(n)$ is in $O(\max\{f(n), g(n)\})$

3.17

Angely + Brandon

$(n+5)^5$ is $O(n^5)$

$n^5 + 25n^4 + 250n^3 + 1250n^2 + 3125n + 3125$

$\leq$

$(1 + 25 + 250 + 1250 + 3125 + 3125)n^5$.

by definition of big-oh

$(n+5)^5 = O(n^5)$

3.18

2^{n+1} is $O(2^n)$

$2^n \cdot 2^1 \leq c \cdot 2^n$

$c \geq 2 \quad n_0 = 0$

3.20

n^2 is $\Omega(n \log n)$

$n^2 \geq n \log n$.

$n \geq \log n$.

$c > 0 \quad n_0 = 1$

by definition of big Omega

3.27

$O(n^3)$

because there are 3 for loops are in this code, you are going through n 3 times.

C. 335

Since elements are disjoint, so they are unique sets, mix the 2 sets and then sort the sets. Then you can sequentially move through the structure, as it will be linear. Since the majority of the time will be spend on sorting $O(n \log n)$

Angely + Brandon.

3.49

$F(n)$ is $\Omega\left(\left(\frac{3}{2}\right)^n\right)$

$F(n) \geq c\left(\frac{3}{2}\right)^n$

$c = \left(\frac{2}{3}\right)^2 = 4/9$

$F(n) \geq c\left(\frac{3}{2}\right)^n$

$n = 1, 2, 3.$

$n_0 = 1$

n	F(n)	$(3/2)^n$	$c \cdot (3/2)^n$
0	0	1	4/9
1	1	3/2	2/3
2	1	9/4	1
3	2	27/8	3/2

Induction: $F(k) \geq (c^{3/2}) \quad k \geq n_0$

$F(k+1) = F(k) + F(k-1)$

$\geq c\left(\frac{3}{2}\right)^k + c\left(\frac{3}{2}\right)^{k-1}$

$= c\left(\frac{3}{2} + 1\right)\left(\frac{3}{2}\right)^{k-1}$

$\geq c\left(\frac{3}{2}\right)^2\left(\frac{3}{2}\right)^{k-1}$

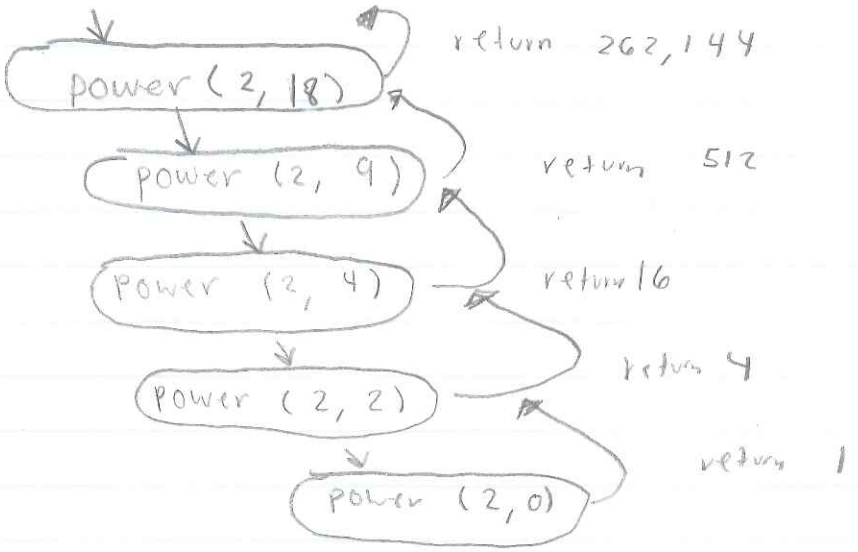
$= c\left(\frac{3}{2}\right)^{k+1}$

5/2

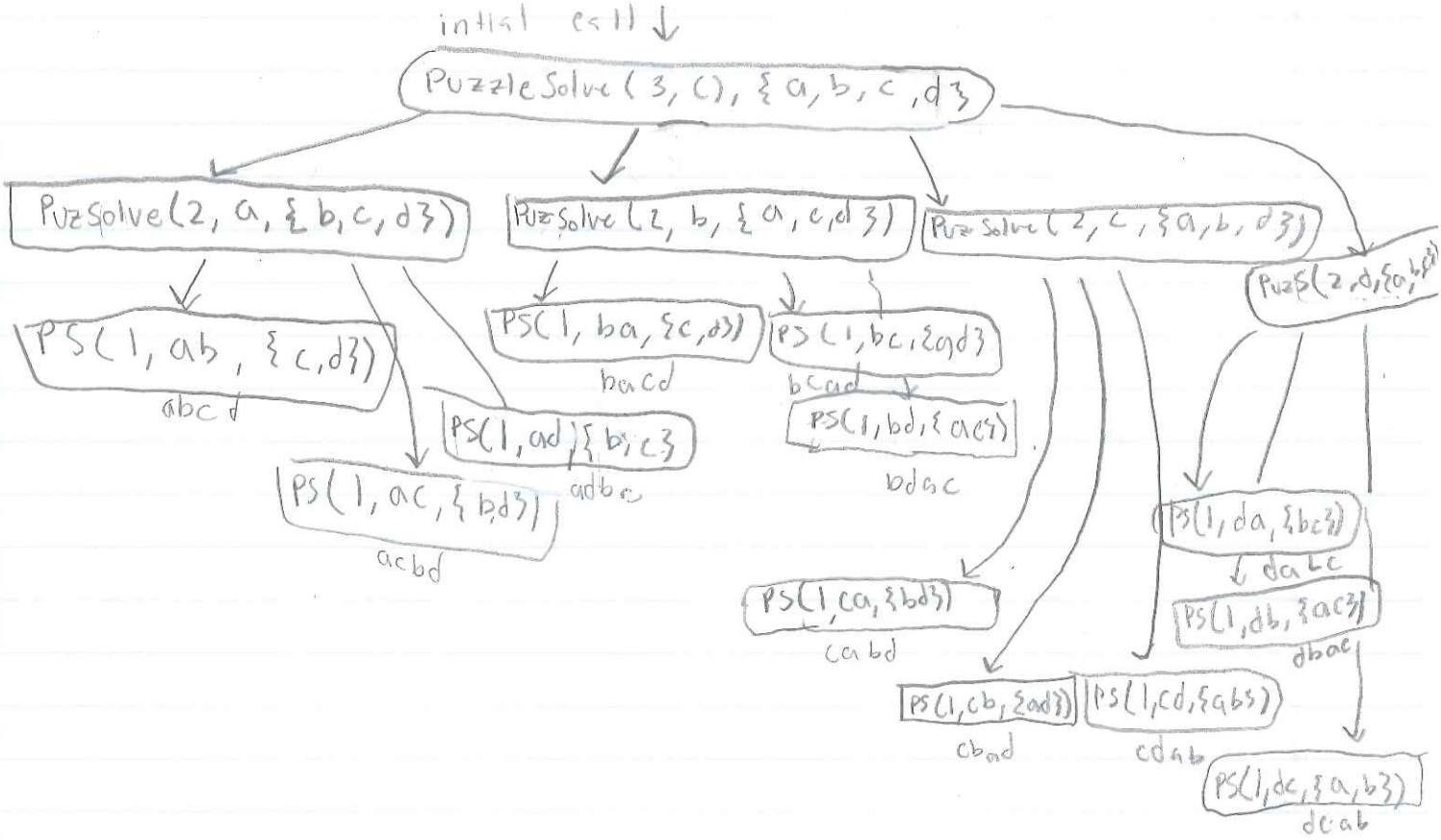
9/4

Brandon Wyne
bmwyne

- R-4.3: power(2, 18)



- R-4.5: PuzzleSolve(3, S, U), S = empty, U = {a, b, c, d}



- 4.7:
```
def convert_string(s, acc):
    if (s == "")
        return acc
    return convert_string(s[1:], 10*acc + ord(s[0])-48)
```

- 4.11:
```
def unique(s)
    if len(s) = 1:
        return True
    else:
        index = s[0]
        rest = s[1:]
    isUnique = index not in rest
    storage = unique(rest)
    return isUnique and storage
```