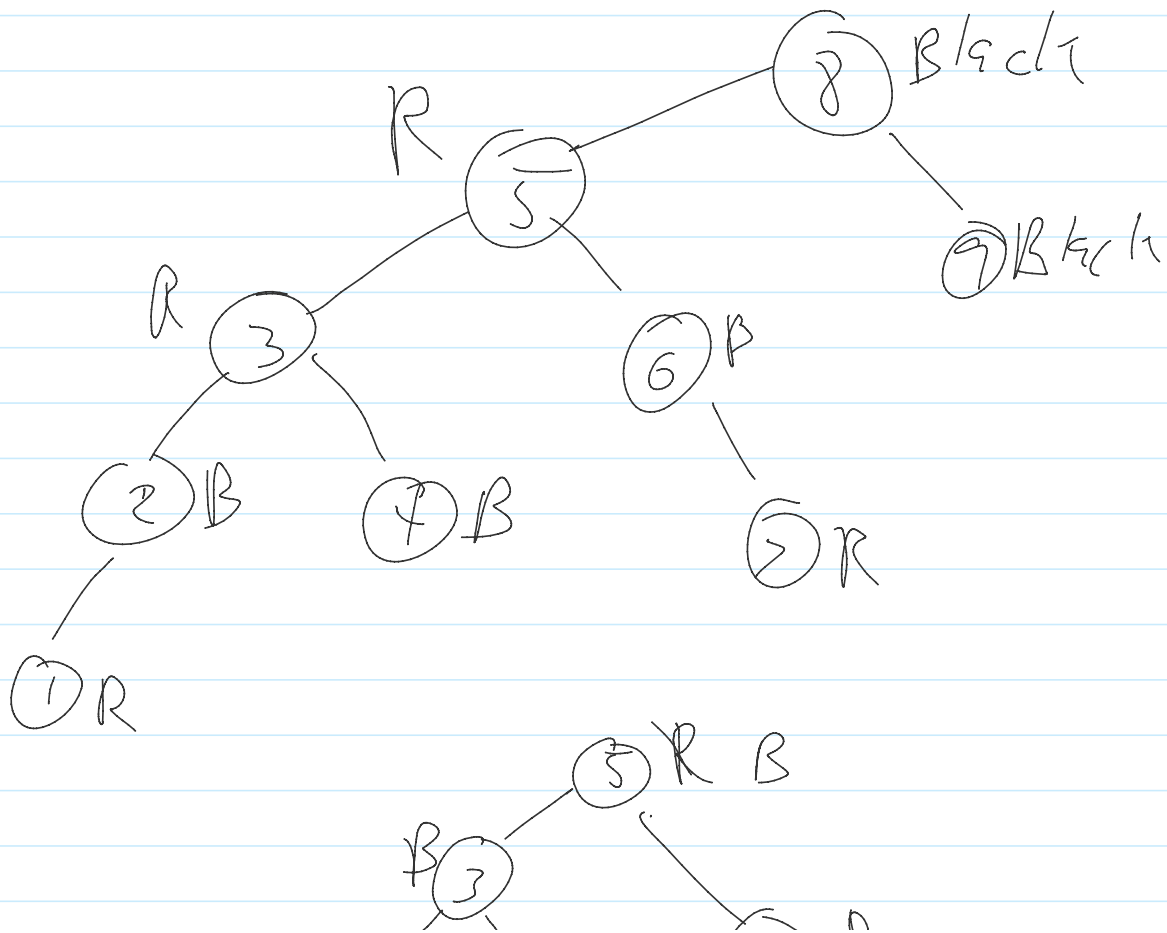
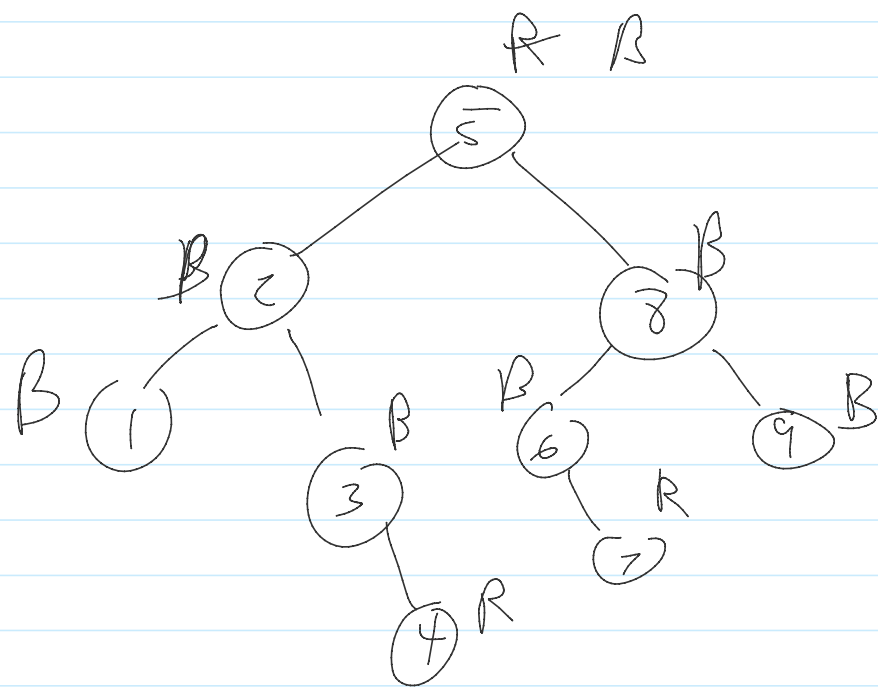
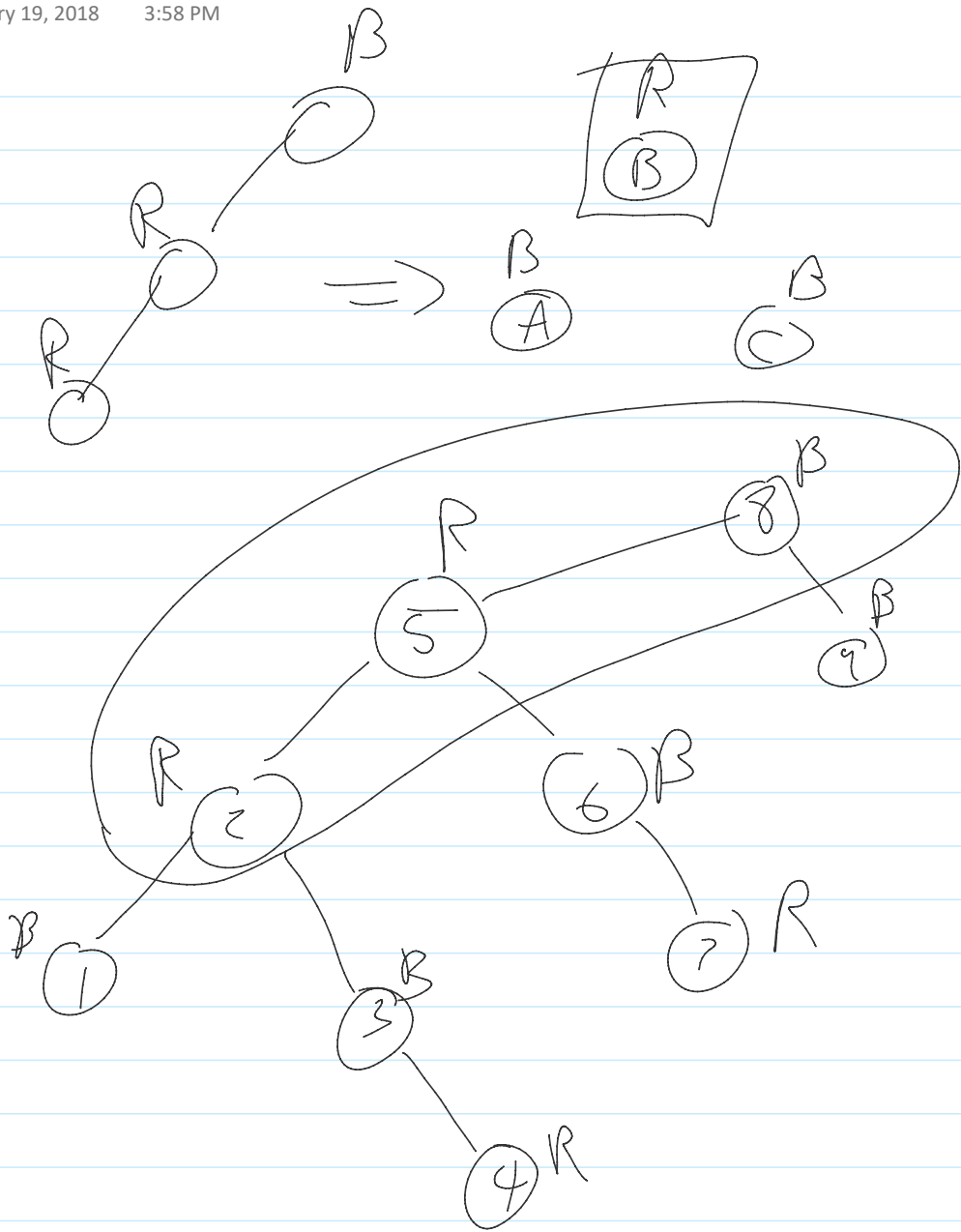
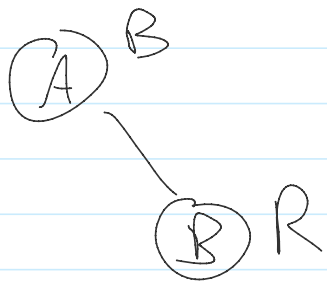
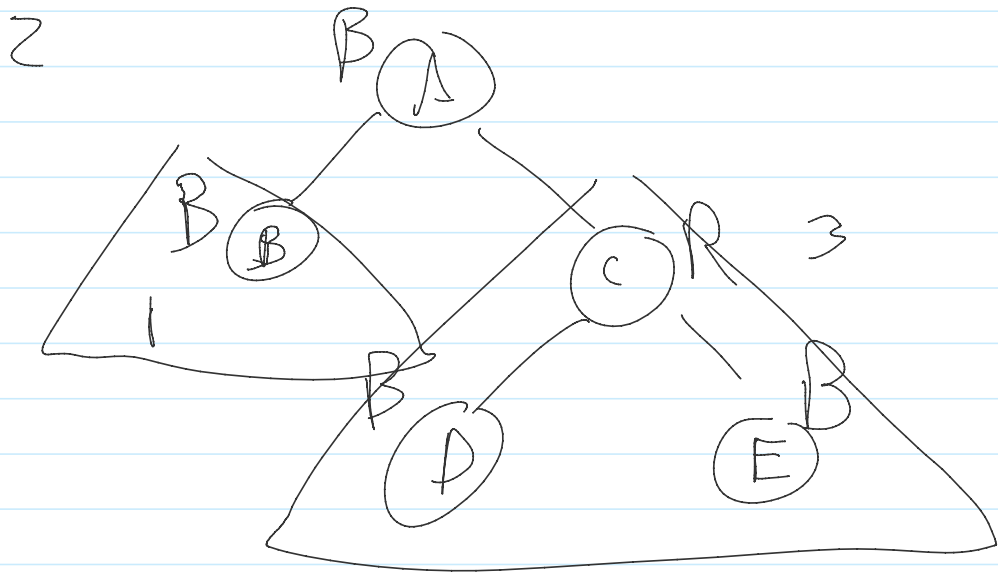
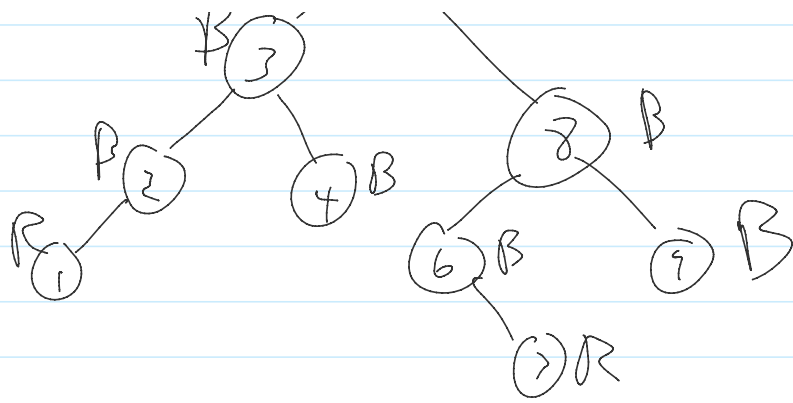


2/19 Exam Recap

Monday, February 19, 2018 3:58 PM





39 False Θ Ω

$$\lim_{n \rightarrow \infty} \frac{n^2}{n^3} = \lim_{n \rightarrow \infty} \frac{1}{n} = 0$$

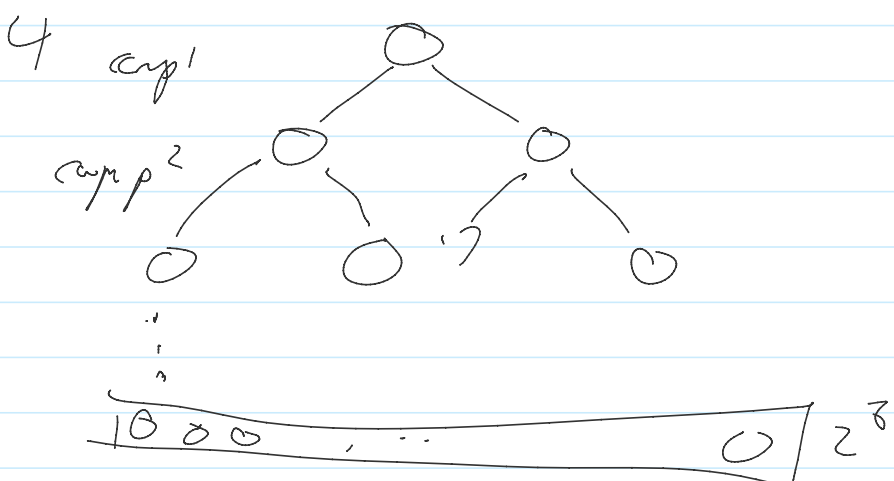
36 True

let $c = 3$ $3 \cdot 8 < 8 \cdot 3 \cdot \log_2(8)$
 let $x = 8$ $24 < 72$
 True for $n \geq 3$ $3n+3 \leq n \log_2(n) + 3$ $\log_2(n) \geq 3$
 $\leq n \log_2(n) + \log_2(n)$
 $\leq (n+1) \log_2(n)$
 $\leq (n+1) \log_2(n+1)$

3c True

$$\log(n^{100}) = 100 \cdot \log(n)$$

remove constant



$$\overbrace{1000 \dots 0}^k \cdot 2^8$$

$$N! \ll 2^8$$

$$s = N$$

5

while (k != 0) {

for (i = 0 to k) {

 {

 k /= 2; $\log(N)$

$$N + \frac{N}{2} + \frac{N}{4} + \frac{N}{8} + \dots$$

$$N \cdot \sum_{i=0}^{\infty} \frac{1}{2^i} \leq 2 \cdot N$$

$$N \cdot \sqrt{N} + \frac{N}{2} \sqrt{\frac{N}{2}} + \frac{N}{4} \sqrt{\frac{N}{4}} + \dots$$

$$N \cdot \sqrt{N} + \frac{N \sqrt{N}}{2 \sqrt{2}} + \frac{N \sqrt{N}}{4 \sqrt{4}} + \dots$$

$$N \cdot \sqrt{N} \left(\sum_{i=0}^{\infty} \frac{1}{(2 \sqrt{2})^i} \right) \leq N \cdot \sqrt{N} \cdot C$$

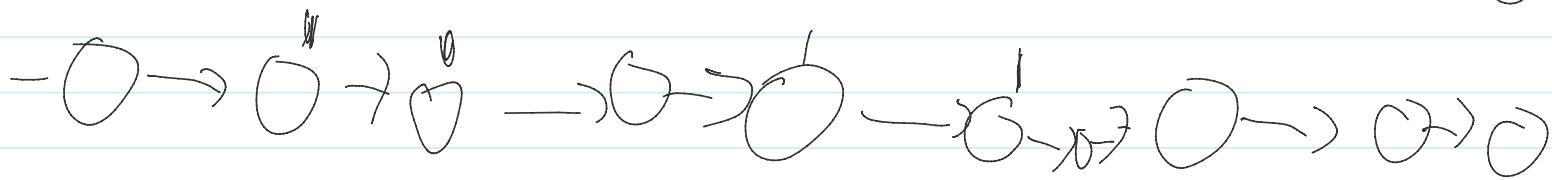
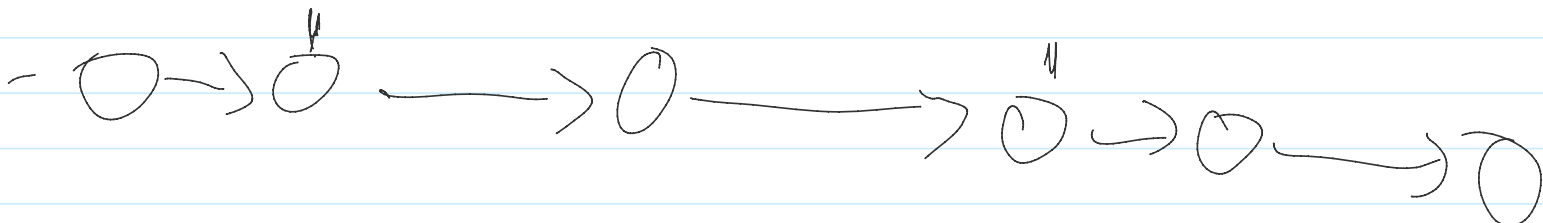
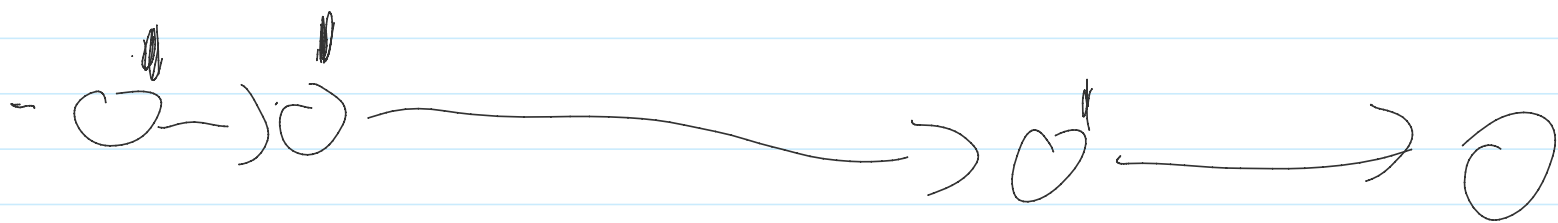
$$N \sqrt{N}$$

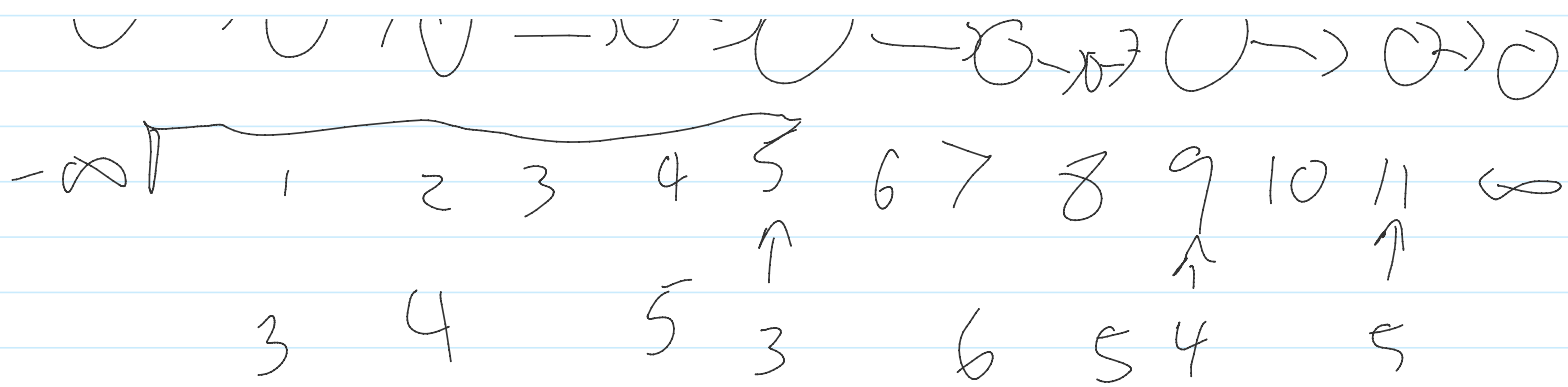
6

$$E(N) = 1 + \frac{1}{N-1} (E(0) + E(1) + \dots + E(N-1))$$

$$\log(N)$$

7





3
4
3
5
4
6
5
5

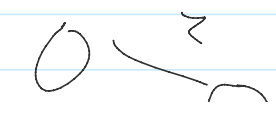
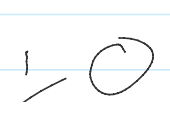
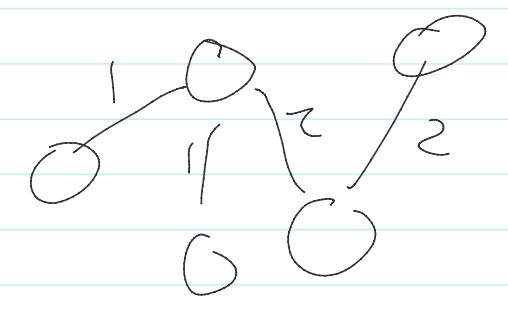
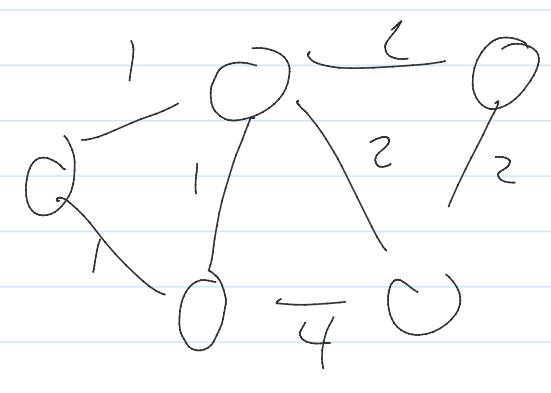
8

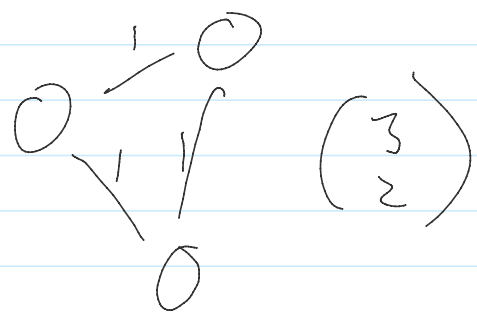
```

if (root == value)
    return true;
if (this == bottom-sentinel)
    return false;
if (root > right.value)
    return right.contains(root);
return below.contains(root);

```

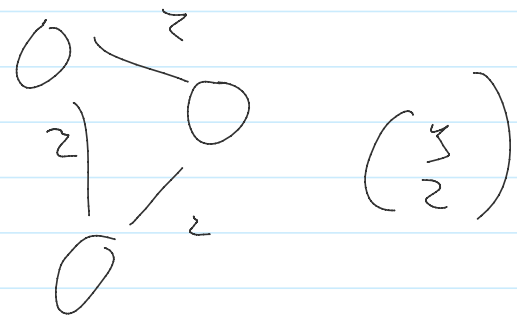
9





$$\begin{pmatrix} 3 \\ 2 \end{pmatrix}$$

3



$$\begin{pmatrix} 3 \\ 2 \end{pmatrix}$$

3

9