$\boxed{\text{Practice Final 2a}}$

Prove that $\log^2(n) \in o(n^{1/2})$

if $\lim_{n\to\infty} \frac{f(n)}{g(n)} = 0$, then $f(n) \in o\,g(n)$

$$\lim_{n\to\infty} \frac{\log^2(n)}{n^{1/2}} = \lim_{n\to\infty} \frac{2\log(n)\frac{1}{n\ln 2}}{\frac{1}{2n^{1/2}}}$$

$$= \lim_{n\to\infty} 4\log n \frac{n^{1/2}}{n\ln 2}$$

$$= \lim_{n\to\infty} \frac{4}{\ln 2} \cdot \frac{\log n}{n^{1/2}}$$

$$= \lim_{n\to\infty} \frac{4}{\ln 2} \frac{\frac{1}{n\ln 2}}{\frac{1}{2n^{1/2}}}$$

$$= \lim_{n\to\infty} \frac{8n^{1/2}}{n(\ln 2)^2} = \lim_{n\to\infty} \frac{8}{(\ln 2)^2} \cdot \frac{1}{n^{1/2}} = \underline{0}$$

So $\log^2(n) \in o(n^{1/2})$

$\boxed{\text{Practice exam q3}}$

# of edges + # nodes even in a forest

is this possible

T_1 T_2

forest: • •

nodes : 2

edges : 0

So edges + nodes : 2 → even

double nested loop invariant

"no invariants on final"

practice Final 6a

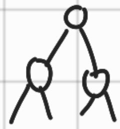
	0	1	2	3	4	5	6
0	0	0	0	0	1	1	1
1	0	0	1	1	0	0	0
2	0	1	0	1	1	1	0
3	0	1	1	0	1	0	1
4	1	0	1	1	0	1	1
5	1	0	1	0	1	0	0
6	1	0	0	1	1	0	0

practice final 3b

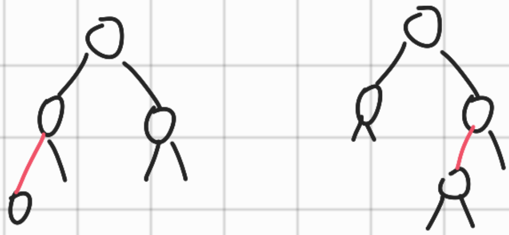
1 node

2:

3:



4:



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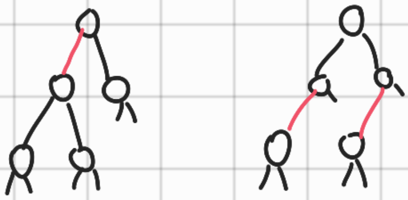
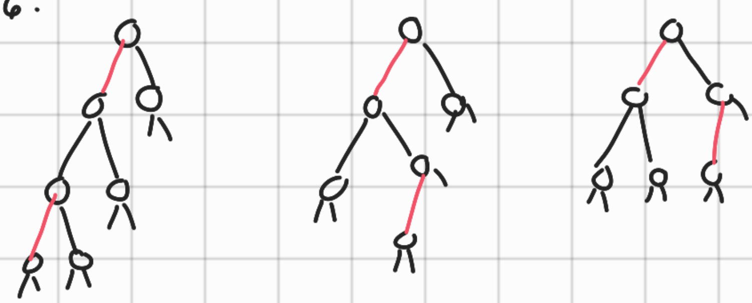
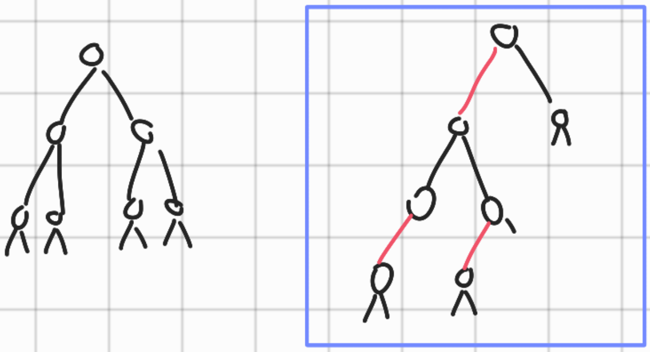


6:

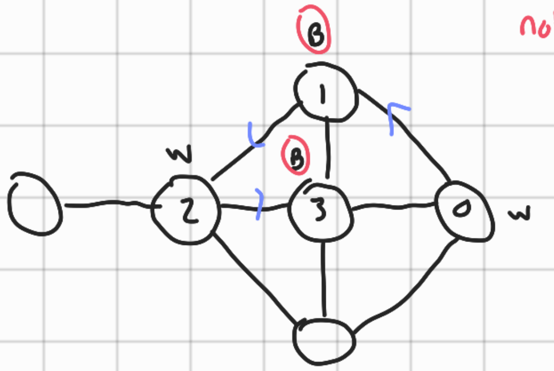


7:



Practice Final 8

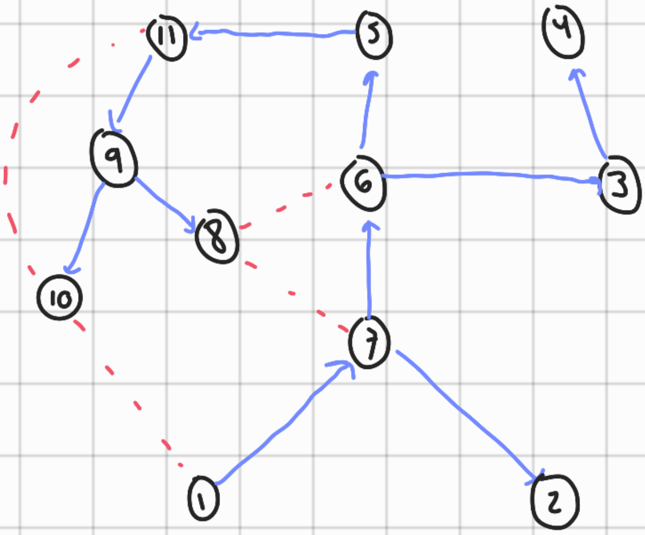
DFS, BFS $\in O(n+m)$



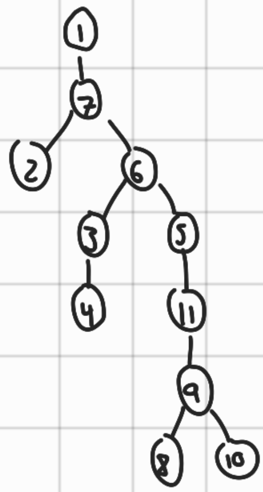
not valid

Practice Final 7c

postorder: [2 4 3 8 10 9 11 5 6 7 1]



corresponding tree:



practice final 7a

bfs : [1 7 10 2 6 8 9 11 3 5 4]