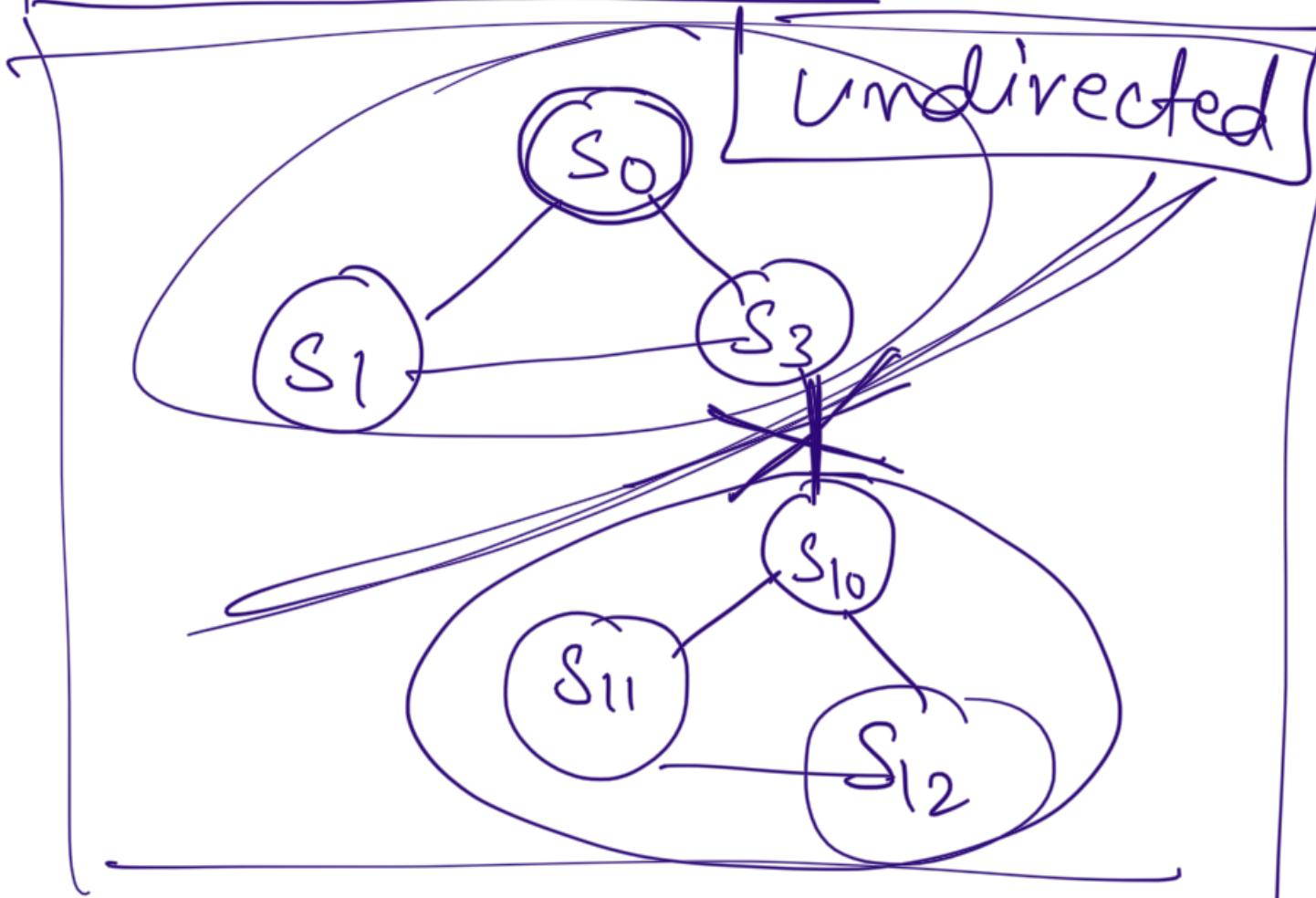
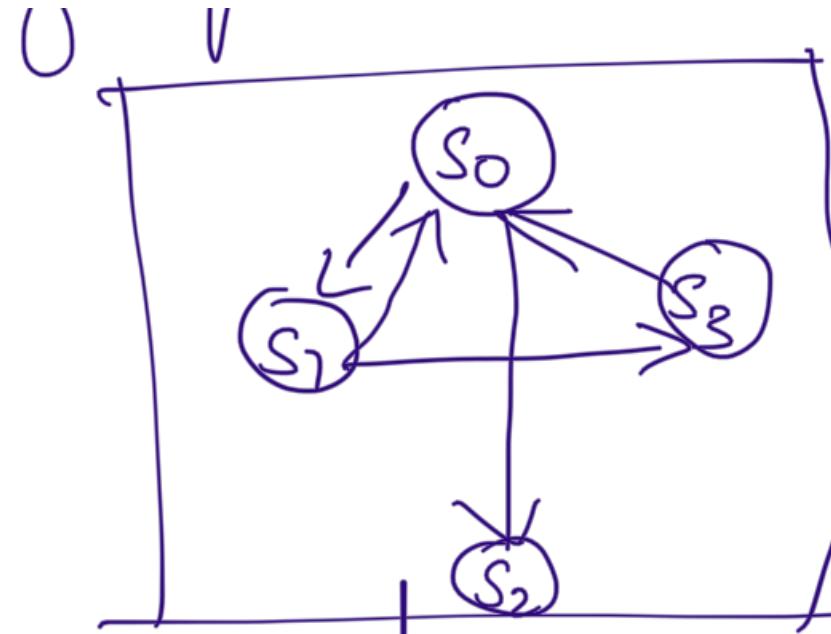
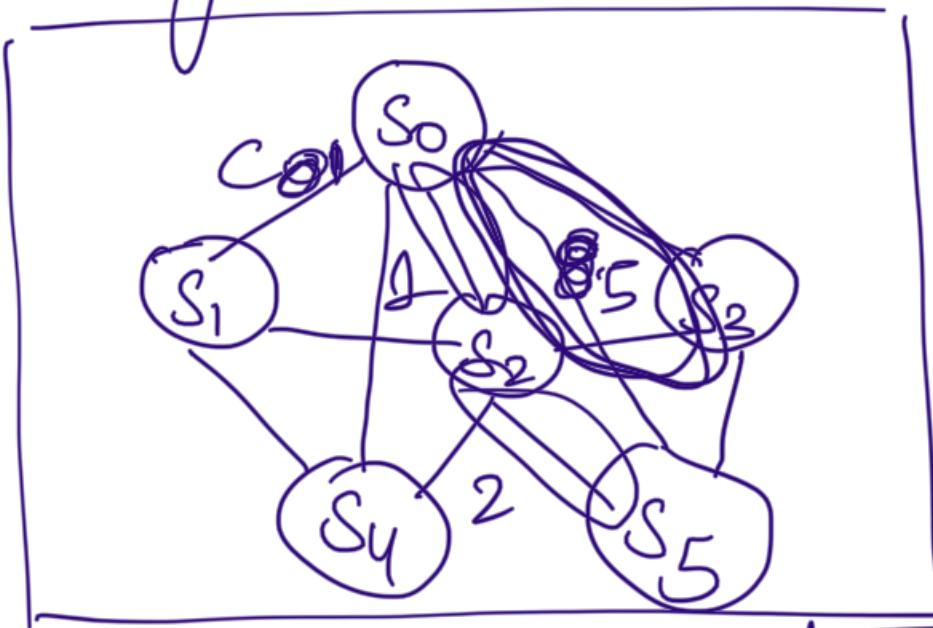
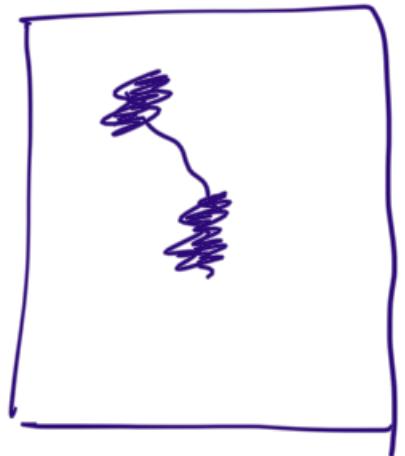
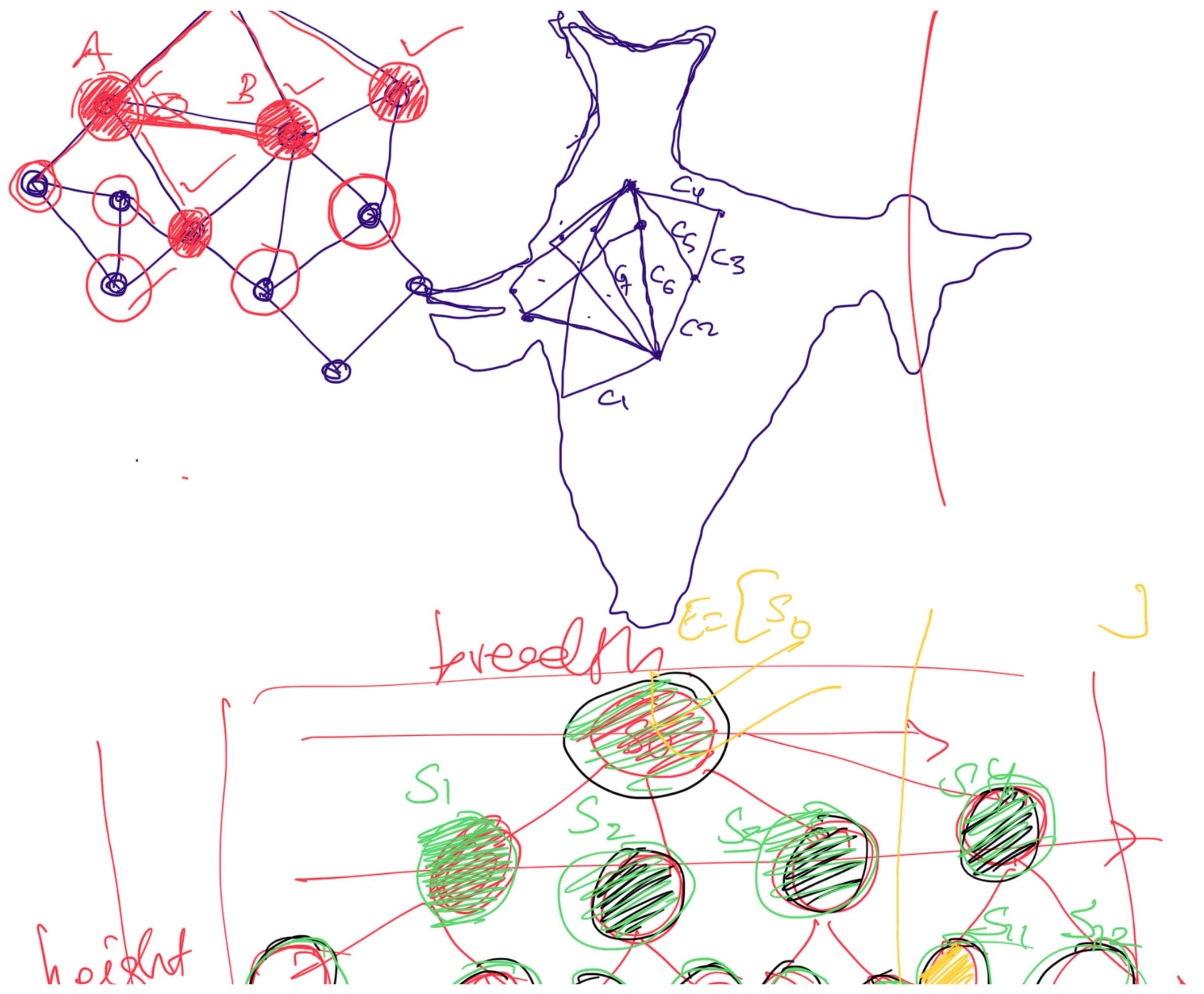
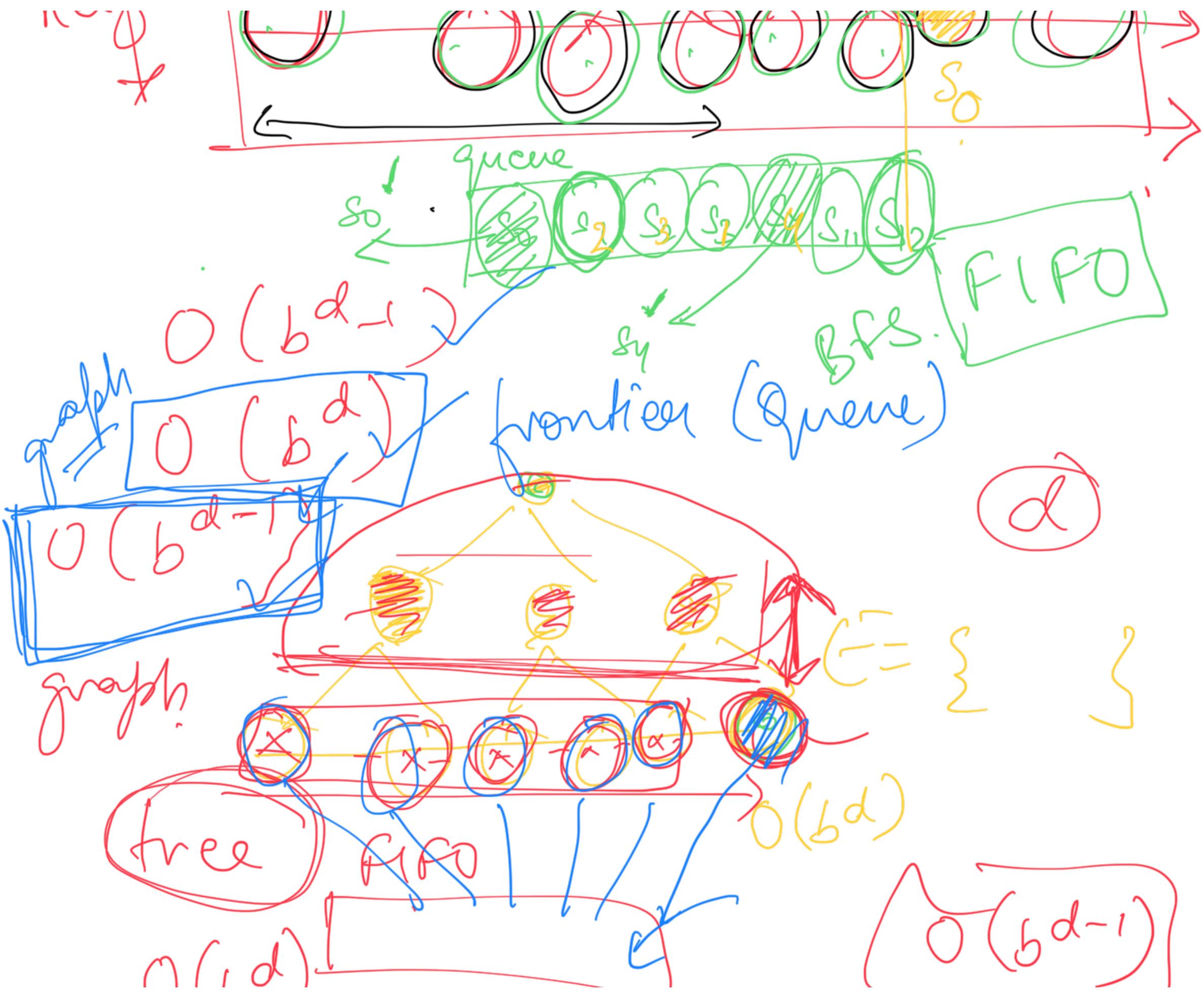


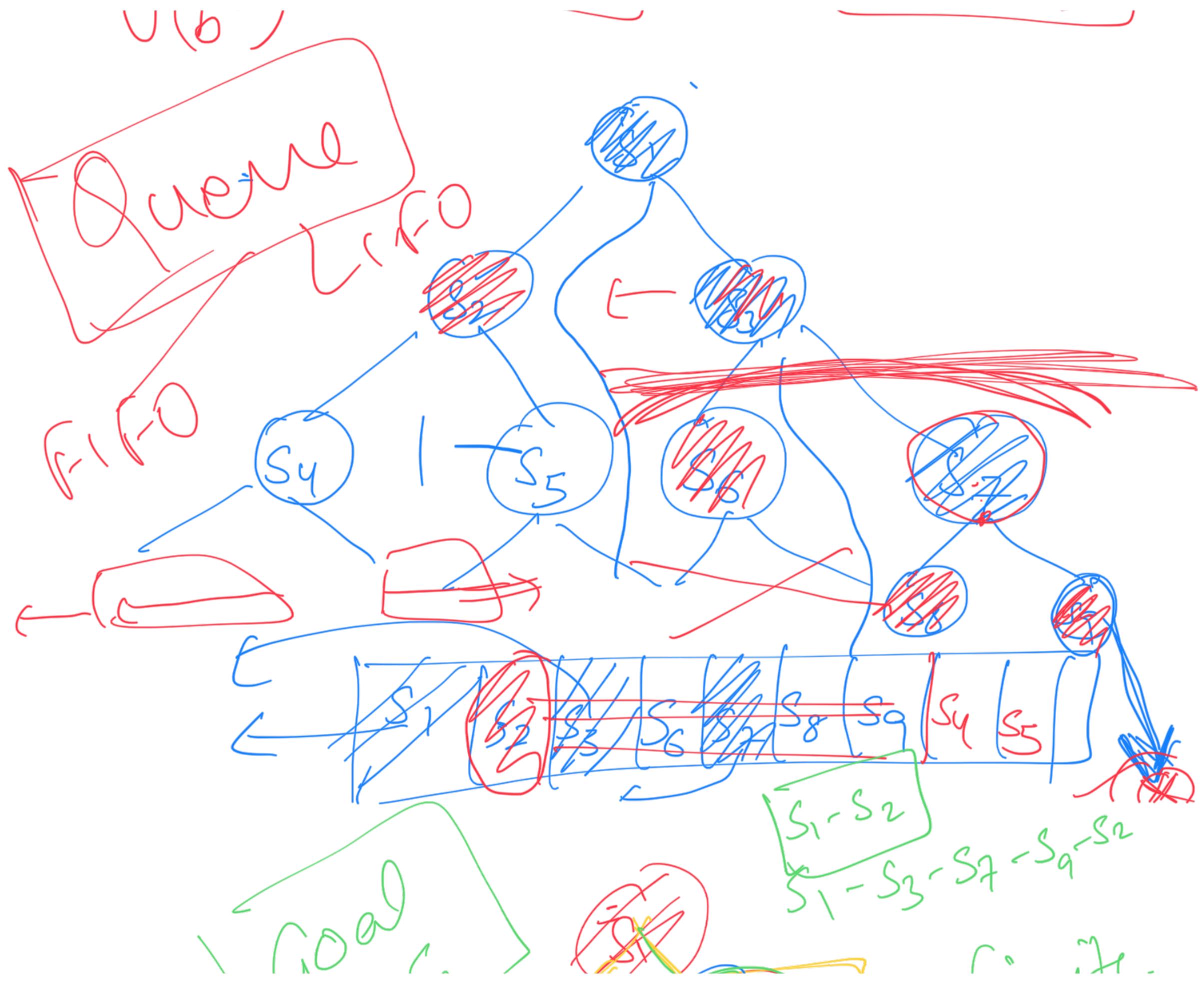
$S = \{S_1, \dots, S_n\}$ graph
 Undirected

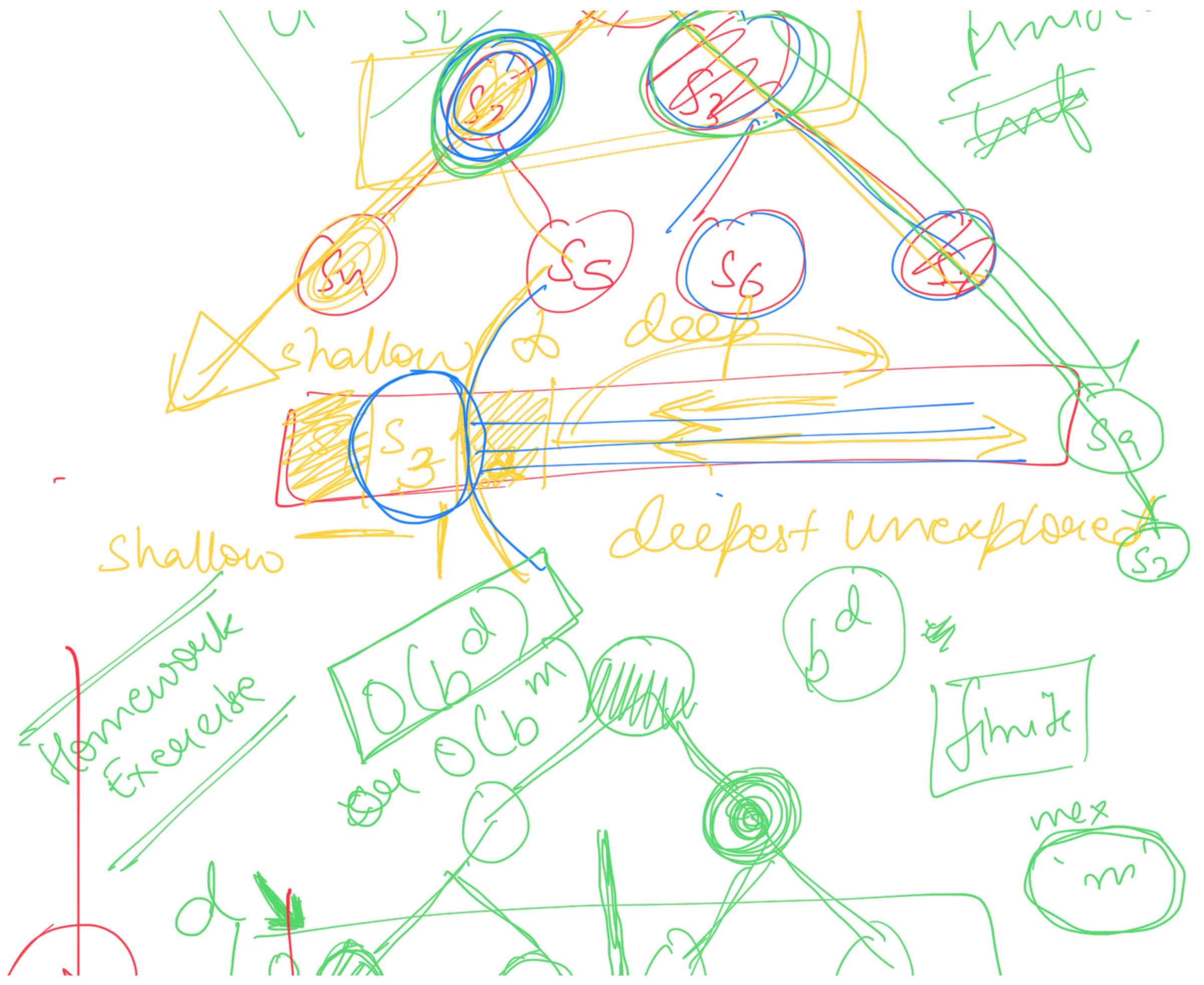
directed
 graphs

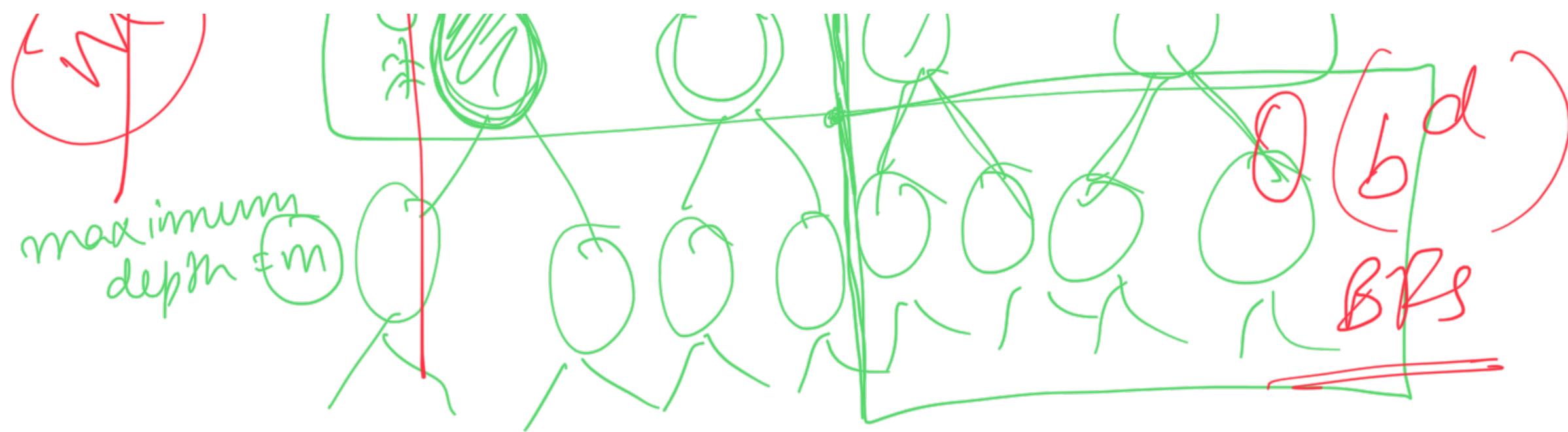












BFS

complete
✗ optimal

DPS

✗ complete (if infinite)
✗ optimal

huge

...

that in case
of finite state
spaces which
are within
reasonable
limits if
one can choose



Time
Comp.
Space

$O(b^d)$

$\boxed{O(b^d)}$

$O(b^m)$

$O(bm)$

equally interesting

| BFS / DPS

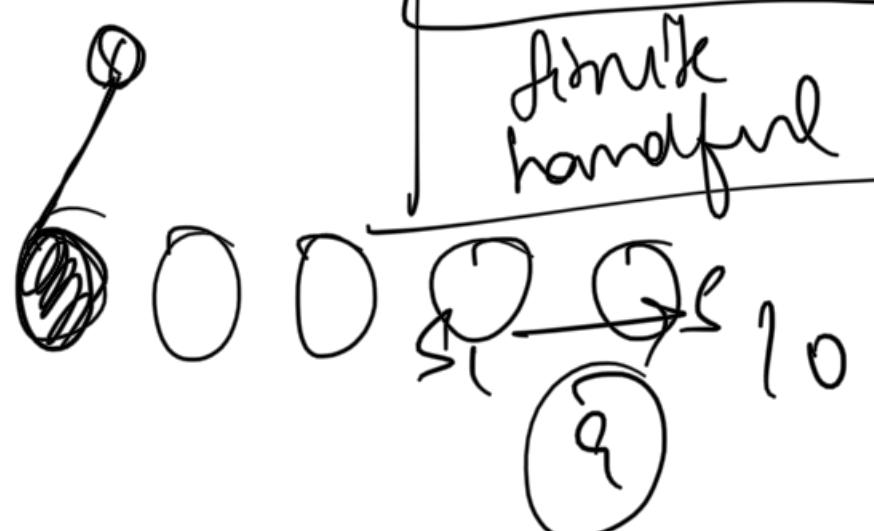
to operate in the exponential realm

Paradox

$$b = 10$$

$$\{S_1, \dots, S_{10}\}$$

small
horizon



BFS
useless

$$b = 10$$

$$10^{10}$$

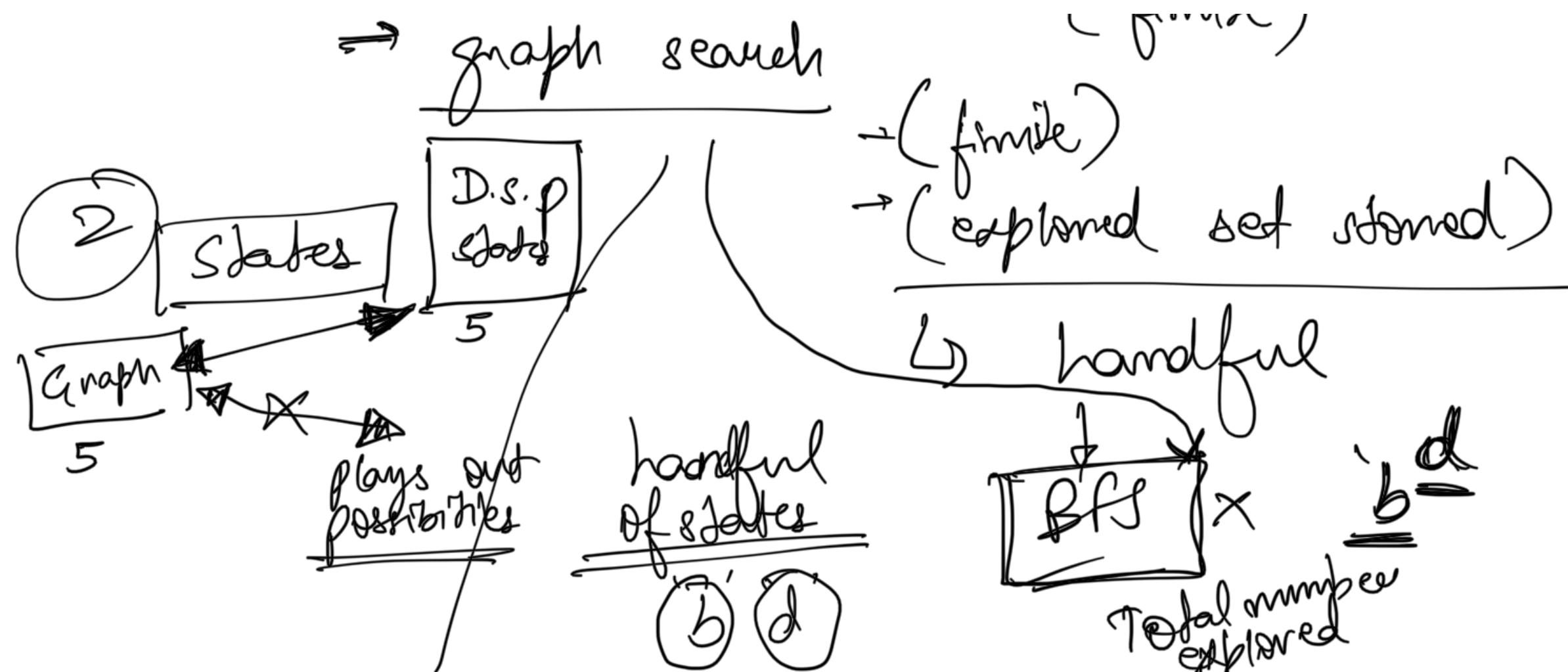
$O(b^d)$ T.C

$O(b^d)$ S.C

depth first

1

DFS can be made complete
(Limited)

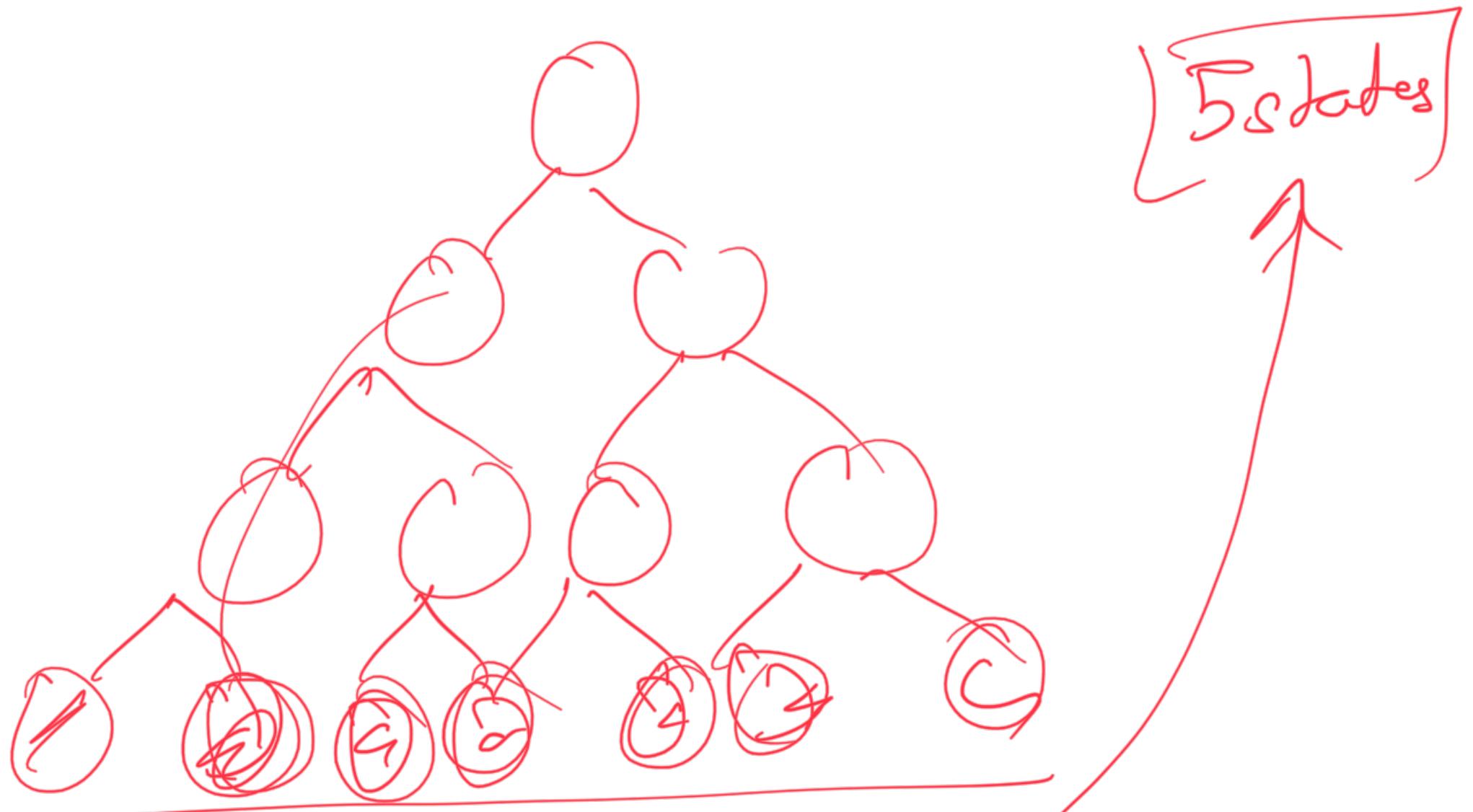


Explored = $\{ s_0, s_1, s_2, s_3 \}$ Paths to ~~what~~ what next

frontier states = { }



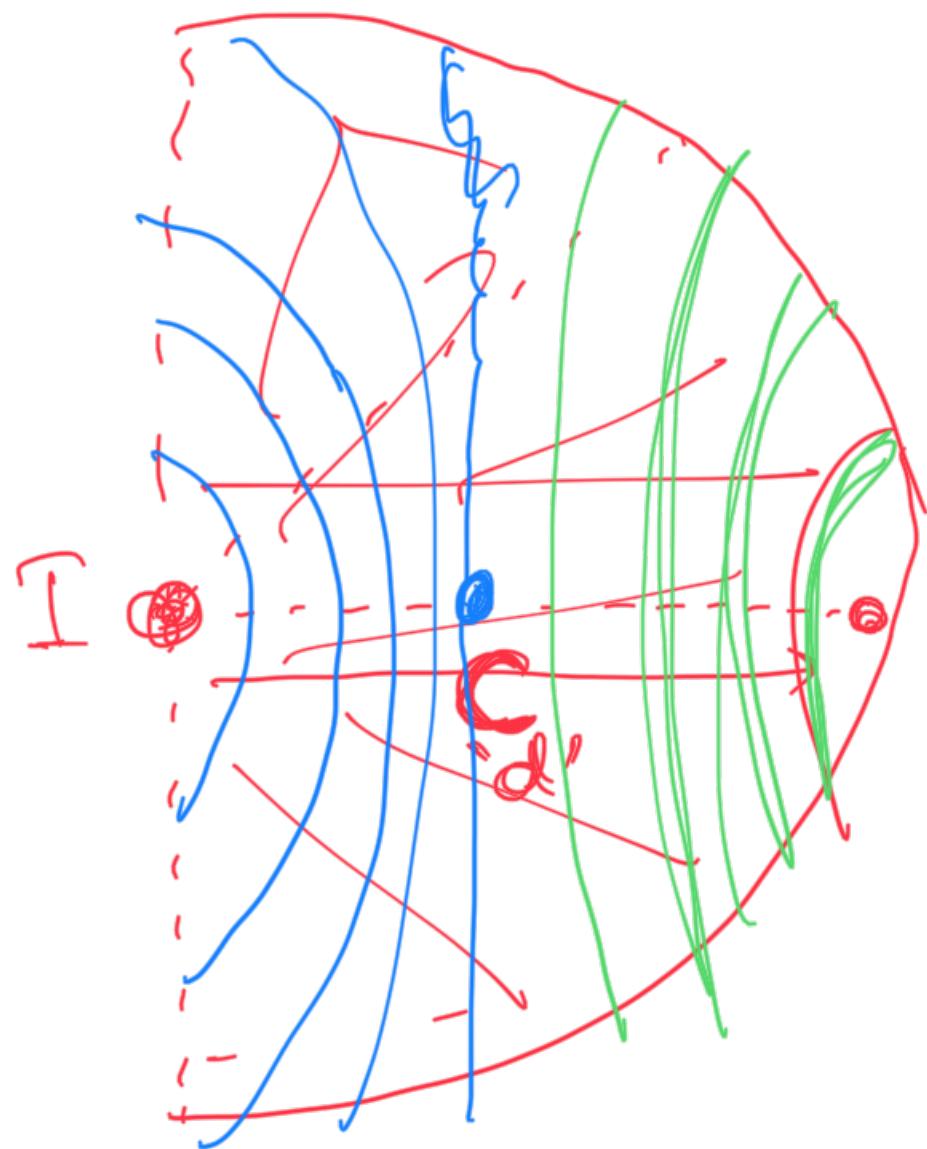
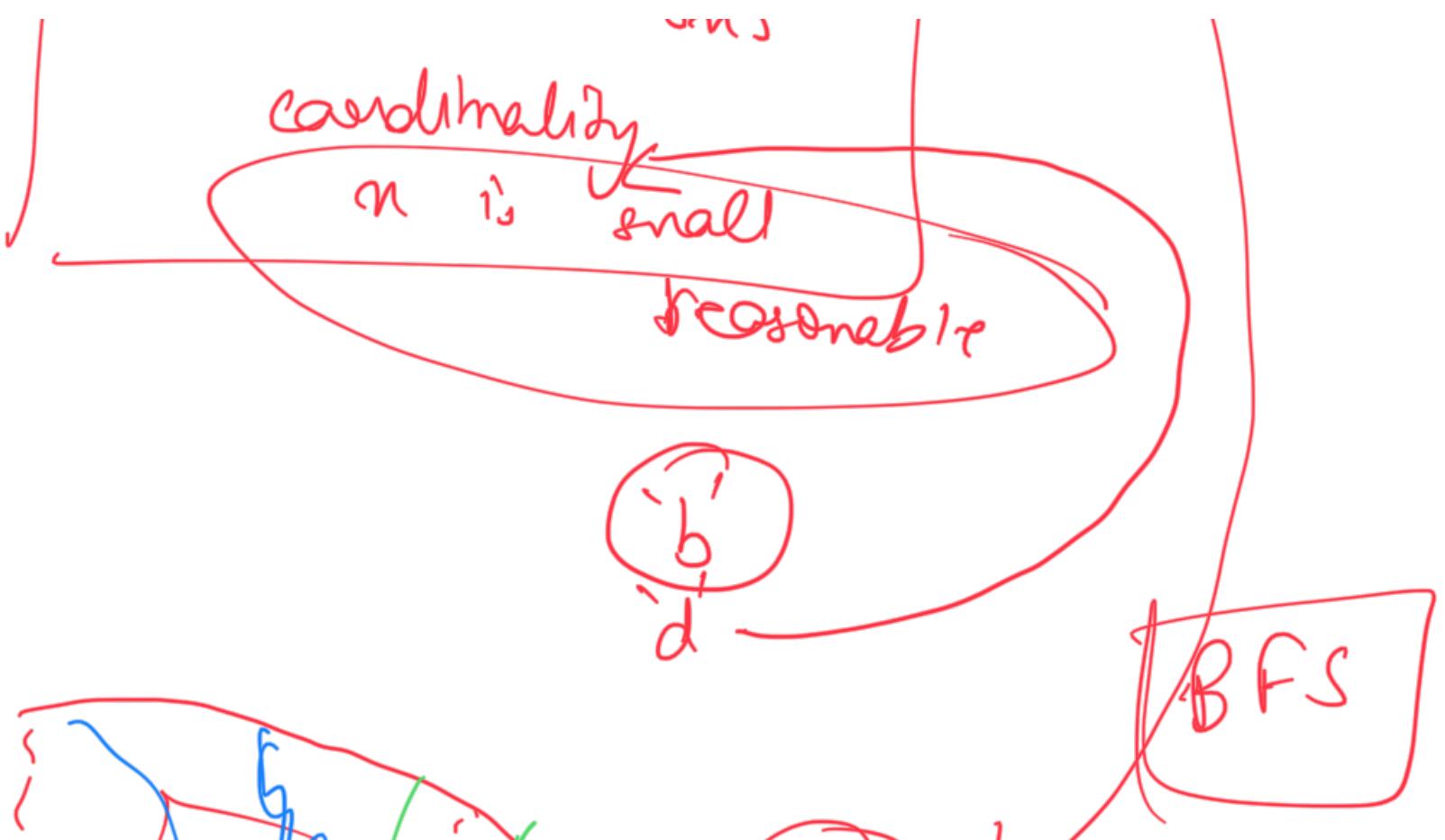
$[S_U - S_{\text{explored}}]$



10 states

$$S = \{S_1, \dots, S_{10}\}$$

S_i finite
 $S - S_i$



$O(b^d)$

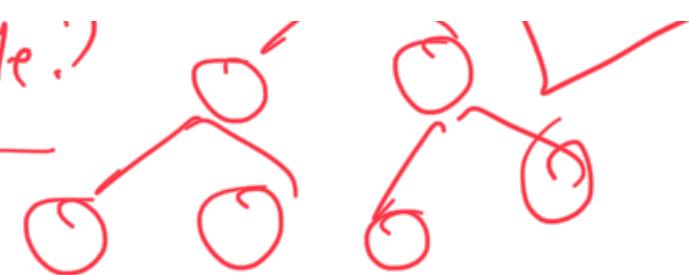
$O(b^{d/2})$

$O(b^{d/2})$

BFS

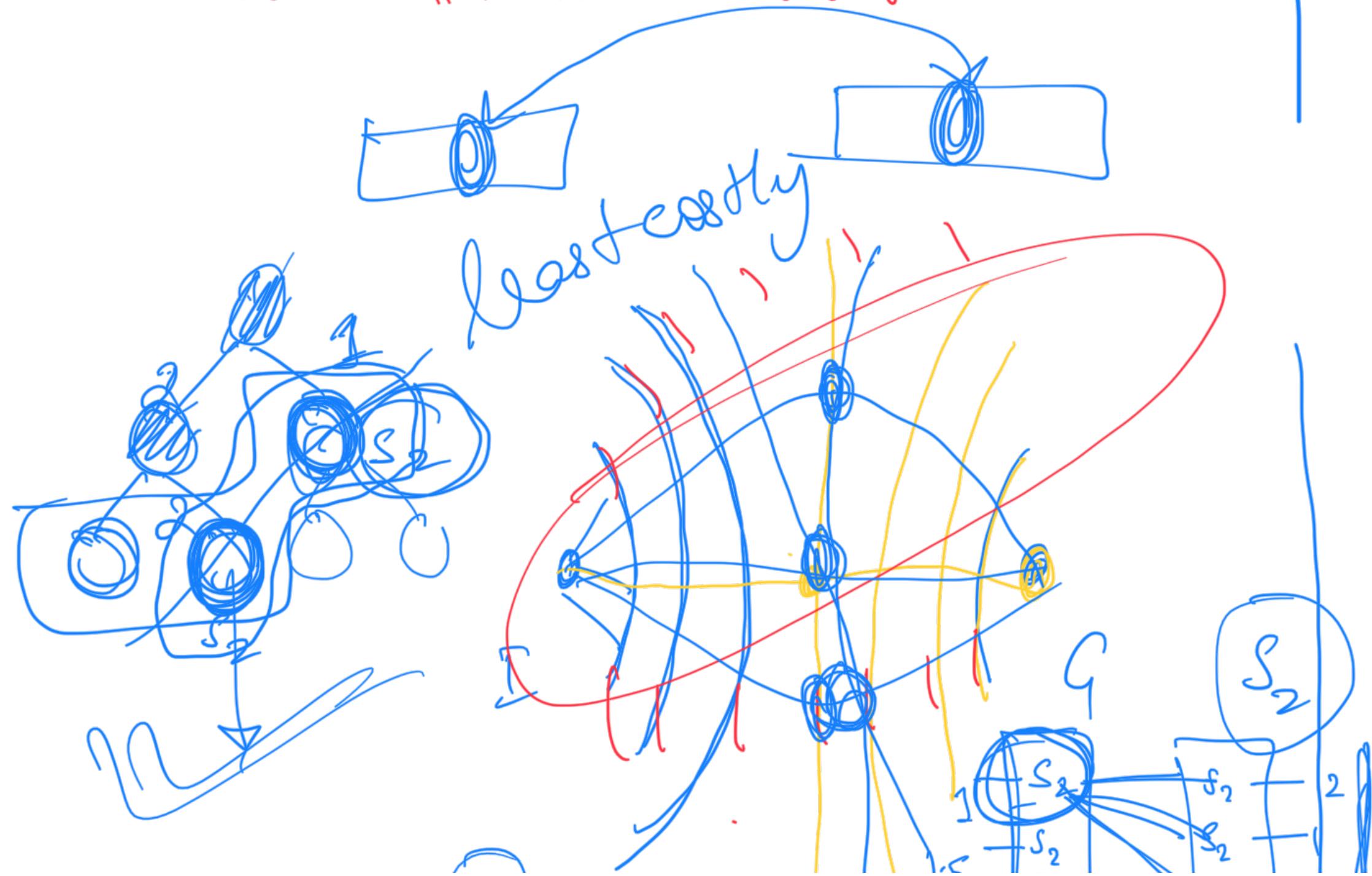
exhaustive
level
by
level

1. How to do bidirectional - Is it possible?

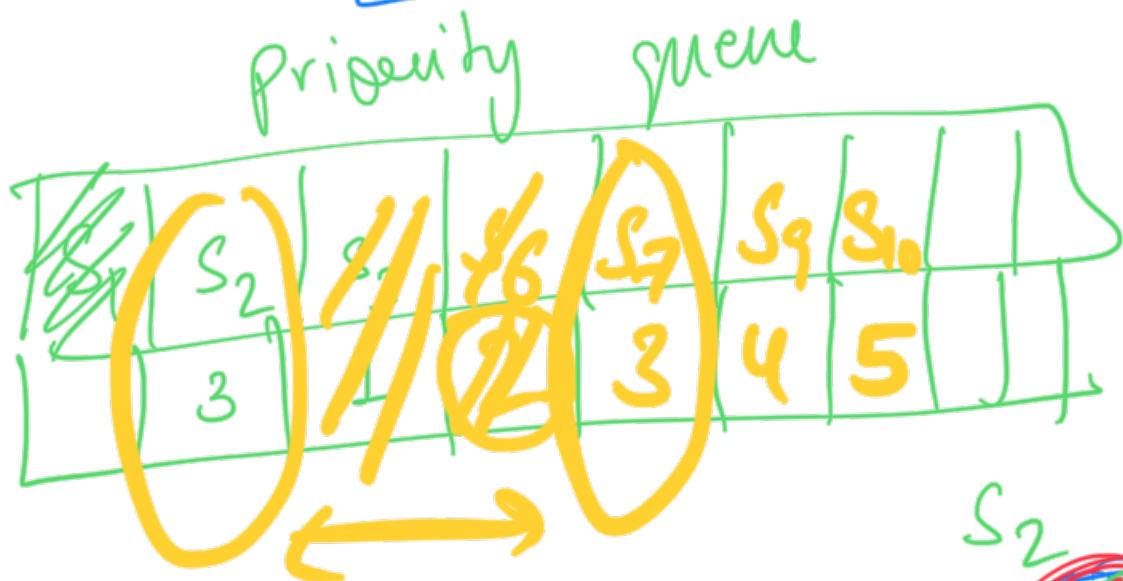
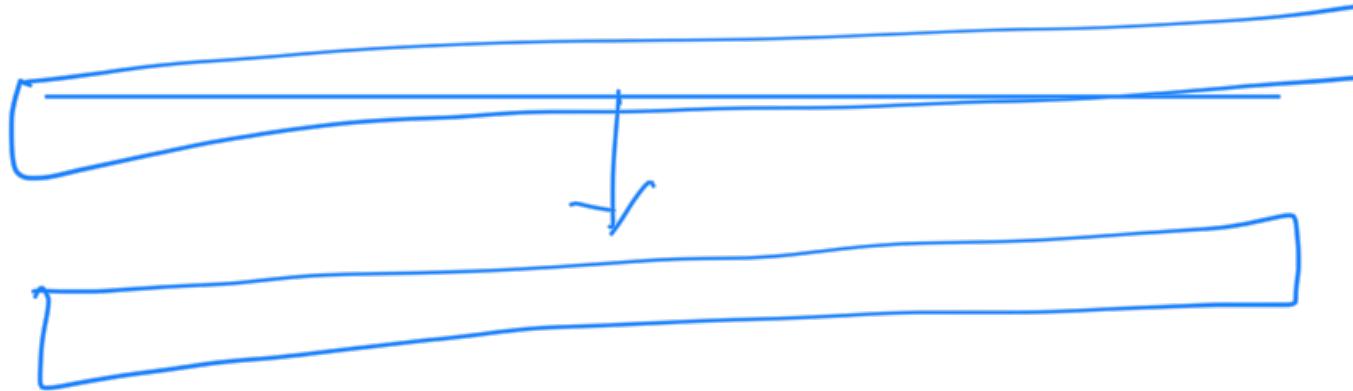
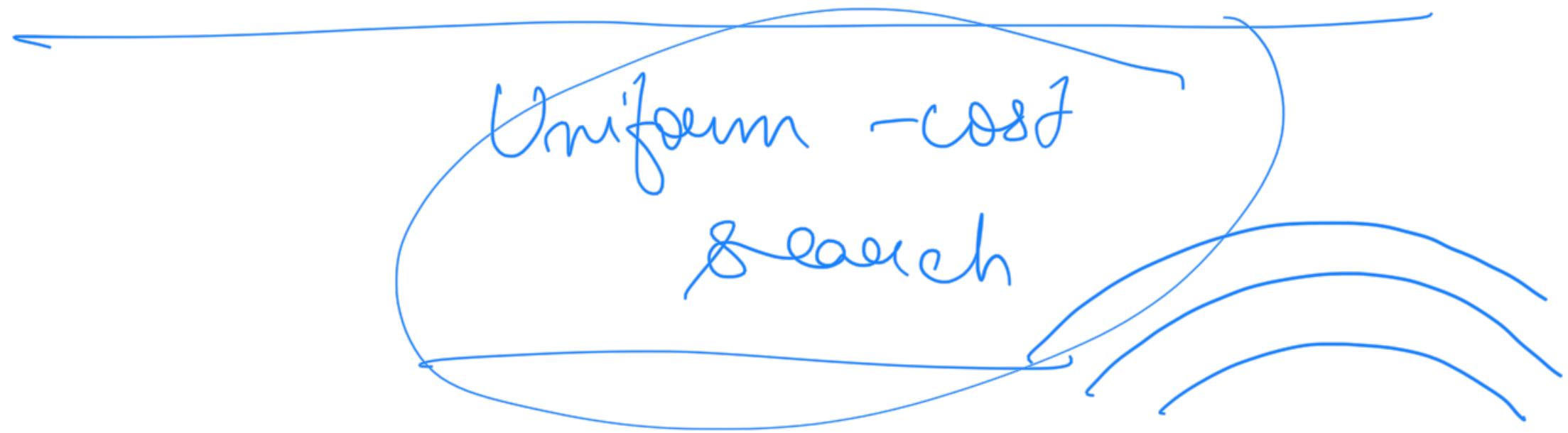


2. Is it beneficial?

3. Gathering this argument logical O(b²)
extreme for mutation building.



U Explode | ! 3 $\boxed{s_2}$ $s_2 + 2$ ||



The diagram illustrates the calculation of the f-value and the operation of the A* search algorithm.

$f(s_i) = g(s_i)$ (cost to get to s_i) + $h(s_i)$ (heuristic cost to goal).

The A* search algorithm maintains a priority queue (Priority Queue, PQ) where nodes are sorted by their f-values. The current node being expanded is labeled "UCS".

The diagram shows the following states and transitions:

- States: s_1 , s_2 , s_3 , s_4 , s_5 .
- Transitions: $s_1 \rightarrow s_2$, $s_1 \rightarrow s_3$, $s_2 \rightarrow s_4$, $s_3 \rightarrow s_4$, $s_3 \rightarrow s_5$, $s_4 \rightarrow s_5$.
- Priority Queue (PQ): Contains nodes s_1 , s_2 , and s_3 . Node s_1 is highlighted in yellow and labeled "1", indicating it is the next node to be expanded. Nodes s_2 and s_3 are also highlighted in yellow and labeled "2", indicating they are in the PQ.
- Heuristic Values (h): $h(s_1) = 5$, $h(s_2) = 3$, $h(s_3) = 2$, $h(s_4) = 1$, $h(s_5) = 0$.
- Actual Costs (g): $g(s_1) = 0$, $g(s_2) = 3$, $g(s_3) = 2$, $g(s_4) = 4$, $g(s_5) = 5$.
- F-values (f): $f(s_1) = 5$, $f(s_2) = 6$, $f(s_3) = 4$.



least costly

