Search strtegies & Algorithms

SHAHAD NOTES

Finding the sequence of actions that help us reach our goal

- Input: Problem
- Output: action sequence that help us reach our goal

In search Algorithms, we go from initial state → goal state.
reaching the goal state will cost us path costs.
Solutions with lowest path cost are Optimal Solutions.

How do I define a problem?

1. Initial State
2. possible actions
3. Transition Model
   describe what each action does.
4. Goal test
   is this final state my goal state?
5. Path Cost
   we use number to count the cost.

Ok, and where do I search for solutions for my problem?

We find solutions in our Search Space, it is all the possible states out there for our problem.

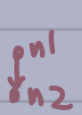
Some states lead us nowhere, while other lead to our goal, this is why we need a good Search Strategy

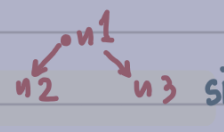
Lets learn Graph theory! to understand any problem's complexity

& structure, we can use graph theory.

- node
- arc
- Directed graph
- Undirected graph
- Labeled graph

the one node with No children is a leaf





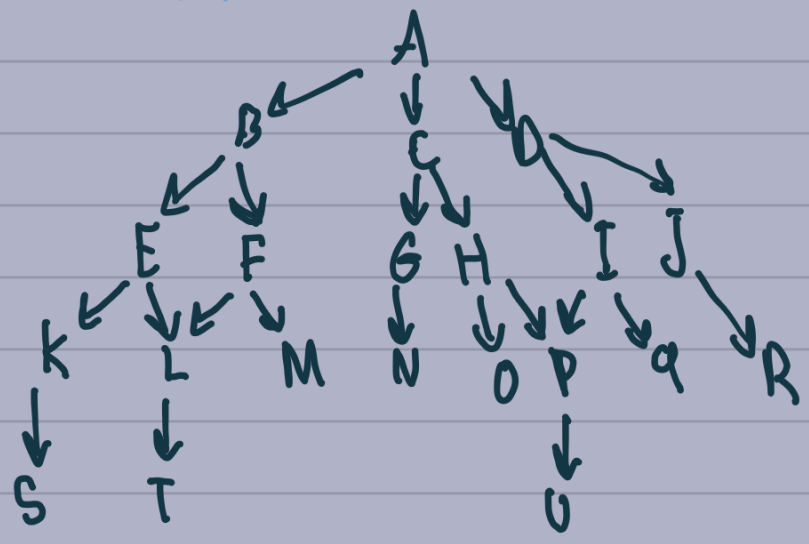
root node: node كل الـ ماليها بارنت ويتفرع منها

* If there's a root node, then the graph is called Rooted Graph

Backtracking Algorithm:

After Iteration	CS	SL	NSL	DE
0	A	[A]	[A]	[]
1	B	[BA]	[BCDA]	[]
2	E	[EBA]	[EFBCDA]	[]
3	H	[HEBA]	[HIEFBCDA]	[]
4	I	[IEBA]	[IEFBCDA]	[H]
5	F	[FBA]	[FBCDA]	[EIH]
6	J	[JFBA]	[JFBCDA]	[EIH]
7	C	[CA]	[GCA]	?
8	G	[GCA]	[GCA]	?

Depth first



open = [A]	closed = [ ]
[B C D]	[A]
[E F C D]	[B A]
[K L F C D]	[E B A]
[S L F C D]	[K E B A]
[L F C D]	[S K E B A]
[T F C D]	[L S K E B A]
[F C D]	[T L S K E B A]
[M C D]	[F T L S K E B A]
[C D]	[M F T L S K E B A]
[G H D]	