Backtracking Algorithm

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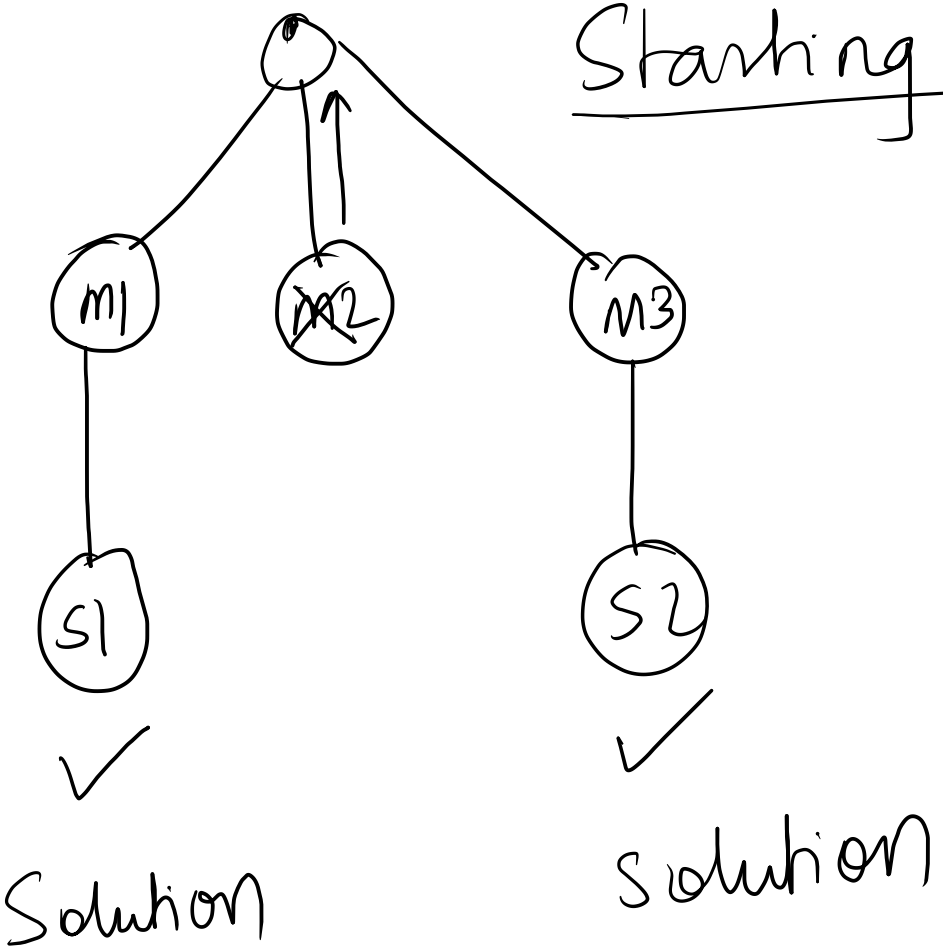
Examples of Backtracking


Starting point
M1
M2
M3
S1
S2
Solution
solution

Algorithm

1.) Build the solution step by step using recursion.

2.) State space tree is used to find all the solutions

3.) Explore the solutions and check if constraints are satisfied.

if constraints are satisfied

keep looking for the solution

else

algorithm returns to the previous level

A B C

Q.) All possible arrangements of A, B, C such that B cannot be in middle

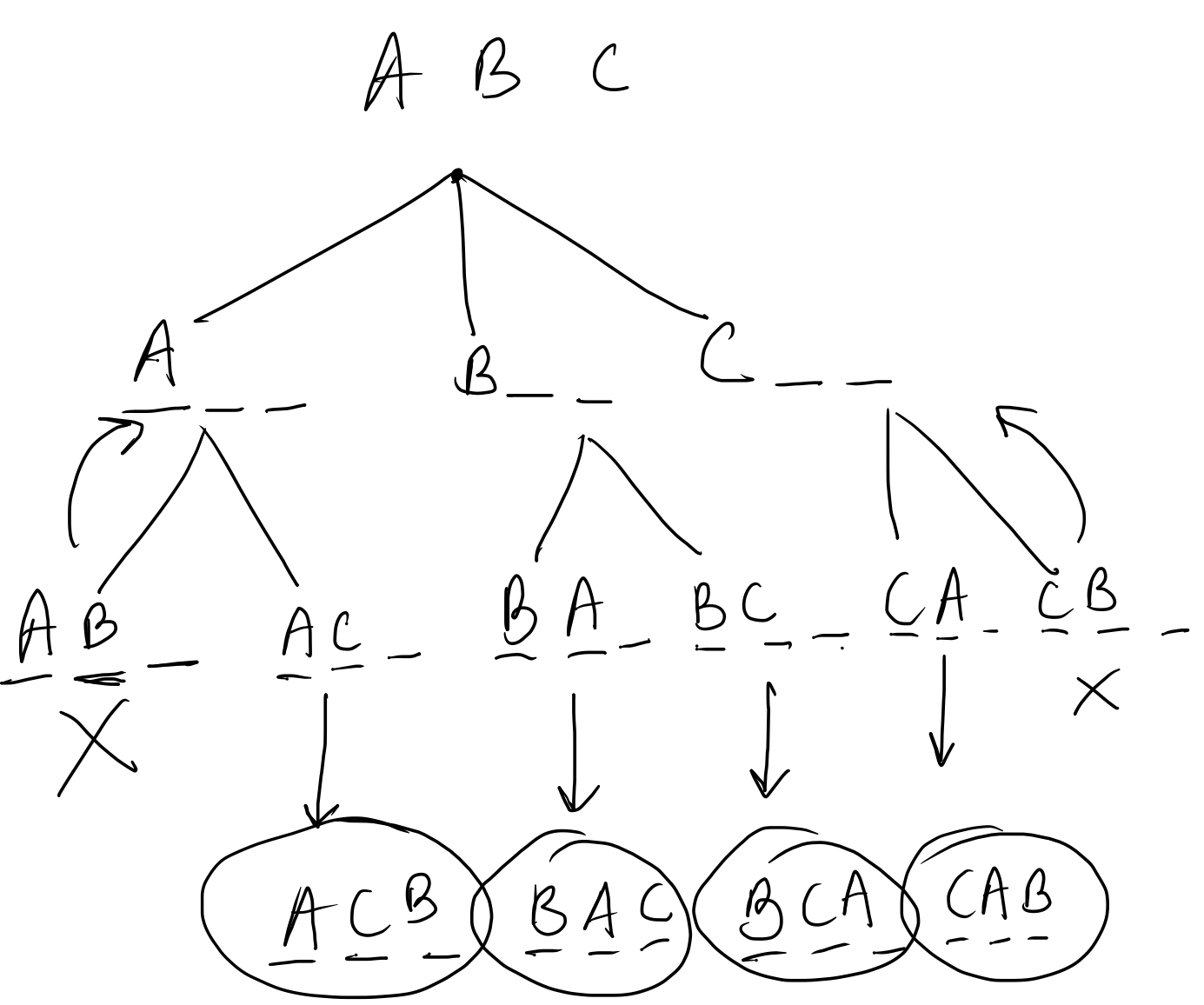
✓	X	✓
B	B	B
—	—	—

Example

B A C ✓

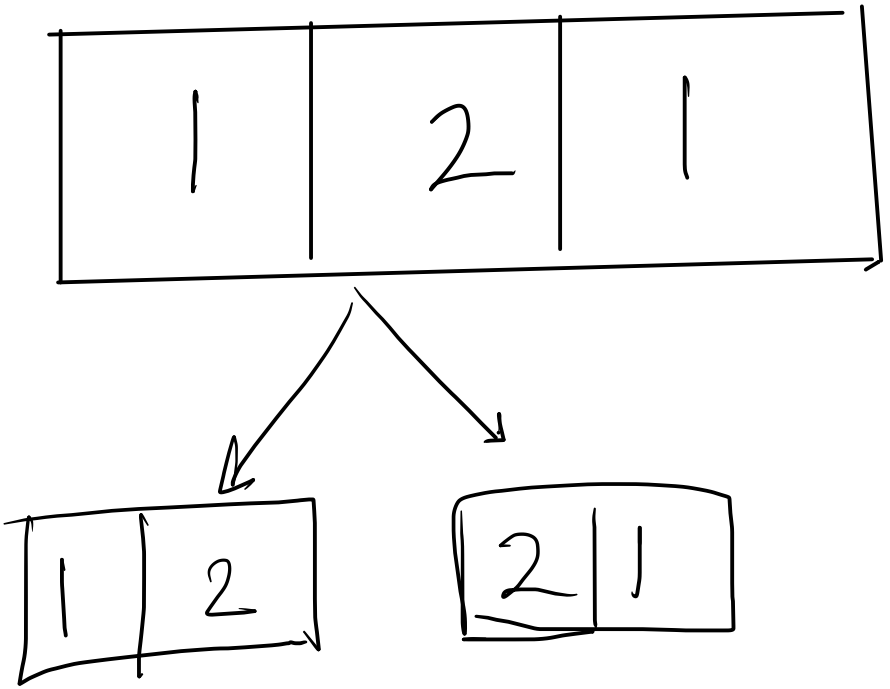
C A B ✓

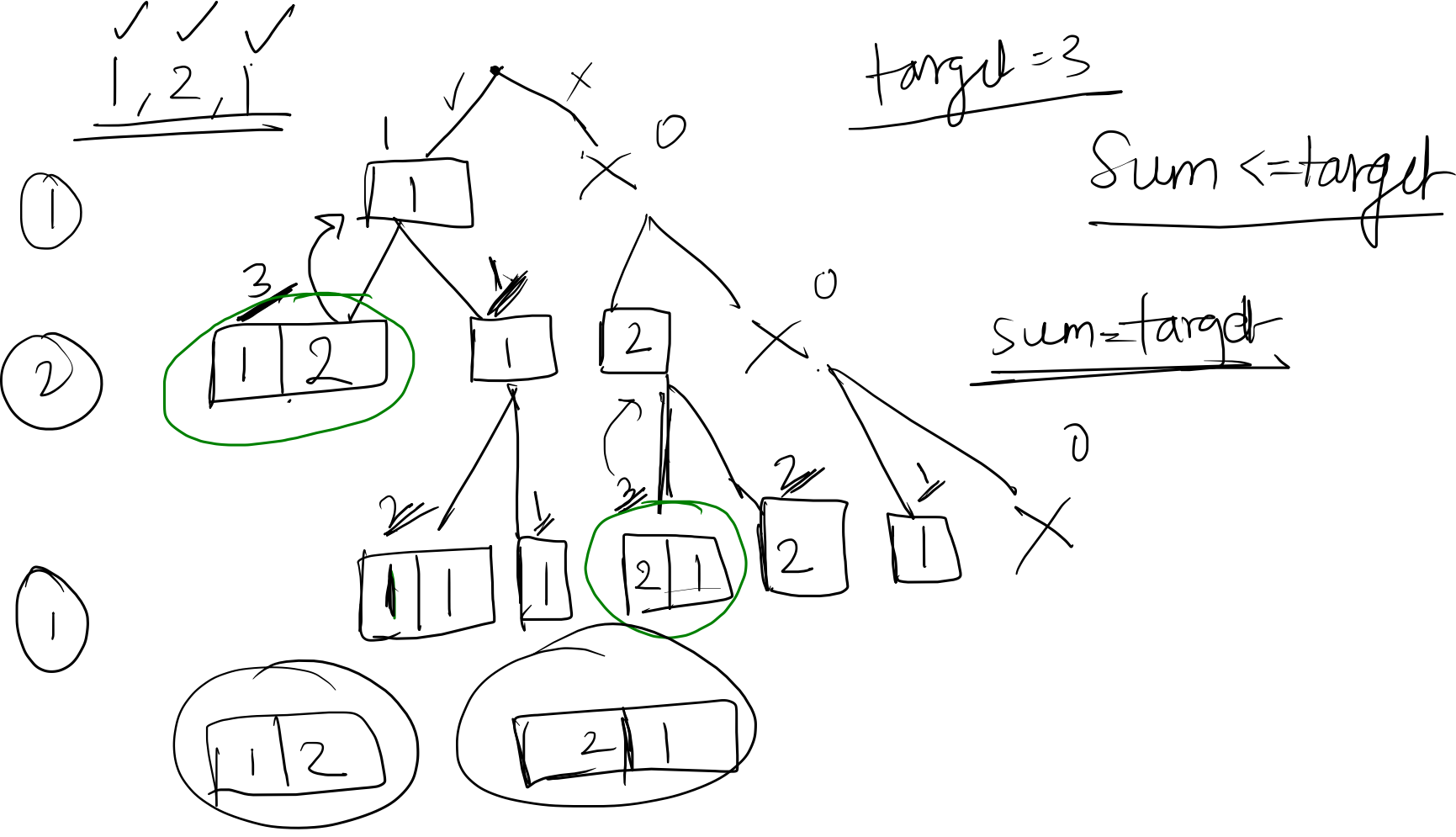
A B C X


A B C
A
B
C
A B
A C
B A
B C
C A
C B
A C B
B A C
B C A
C A B

Q 2.) Subset sum

target = 3




1, 2, 1
target = 3
Sum <= target
sum = target

Problems on Backtracking

1. Subset Permutations & Combinations
2. Rat in a maze
3. N-Queens Problem
4. Sudoku Solver