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CCA Test [AIES]

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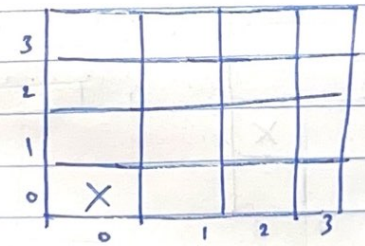
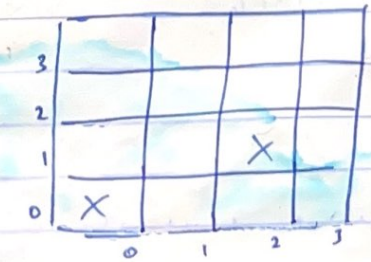
Q.1 Solve 4 - Queens problem with hill climbing algorithm.

→ In hill climbing algorithm, at each step current state is compared with new state, if it is better than current it is considered, else the neighbour state is checked.

STEP 1 : For First queen place - : (0,0)



Step 2 : Check where the next queen should be placed considering the condition (Queens cant attack each other)



Here it can be placed at (1,2) location.

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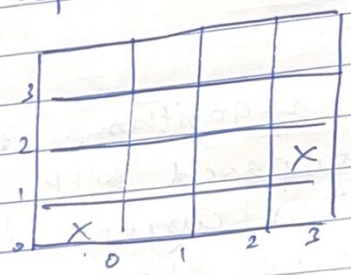
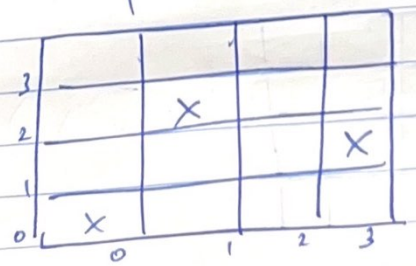
Step 3 : Now for 3rd queen.
It can be placed at (2,0), (2,1), (2,2) (2,3)

But at all these positions the condition is not satisfied.
Hence, we need to ~~back track~~ come to prev. state to 2nd queen and change its position.

Step 4 : New position of 2nd queen



Step 5 : Now the 3rd queen can be placed at (2,1)



Step 6 : But, the 4th queen cannot be placed at any of the desired location as it violates all rules.

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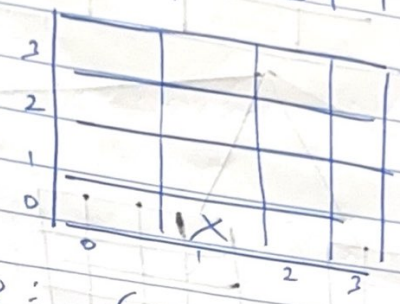
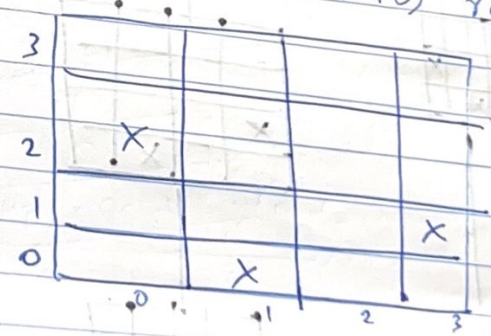
Step 7 : Hence, we need to come back to queen 1 and change its position
Now, new posn of 1st queen = (0,1)

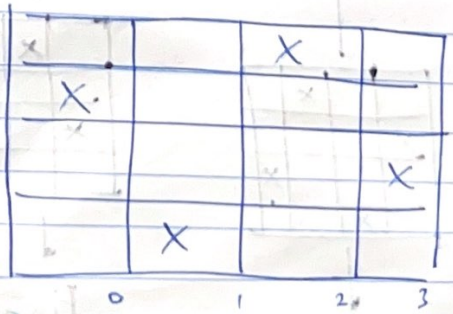


Step 8 : Consequently, 2nd and 3rd queen are at (1,3) and (2,0) resp.



Step 9 : Hence, now 4th queen can be placed at (3,2)

Final result.



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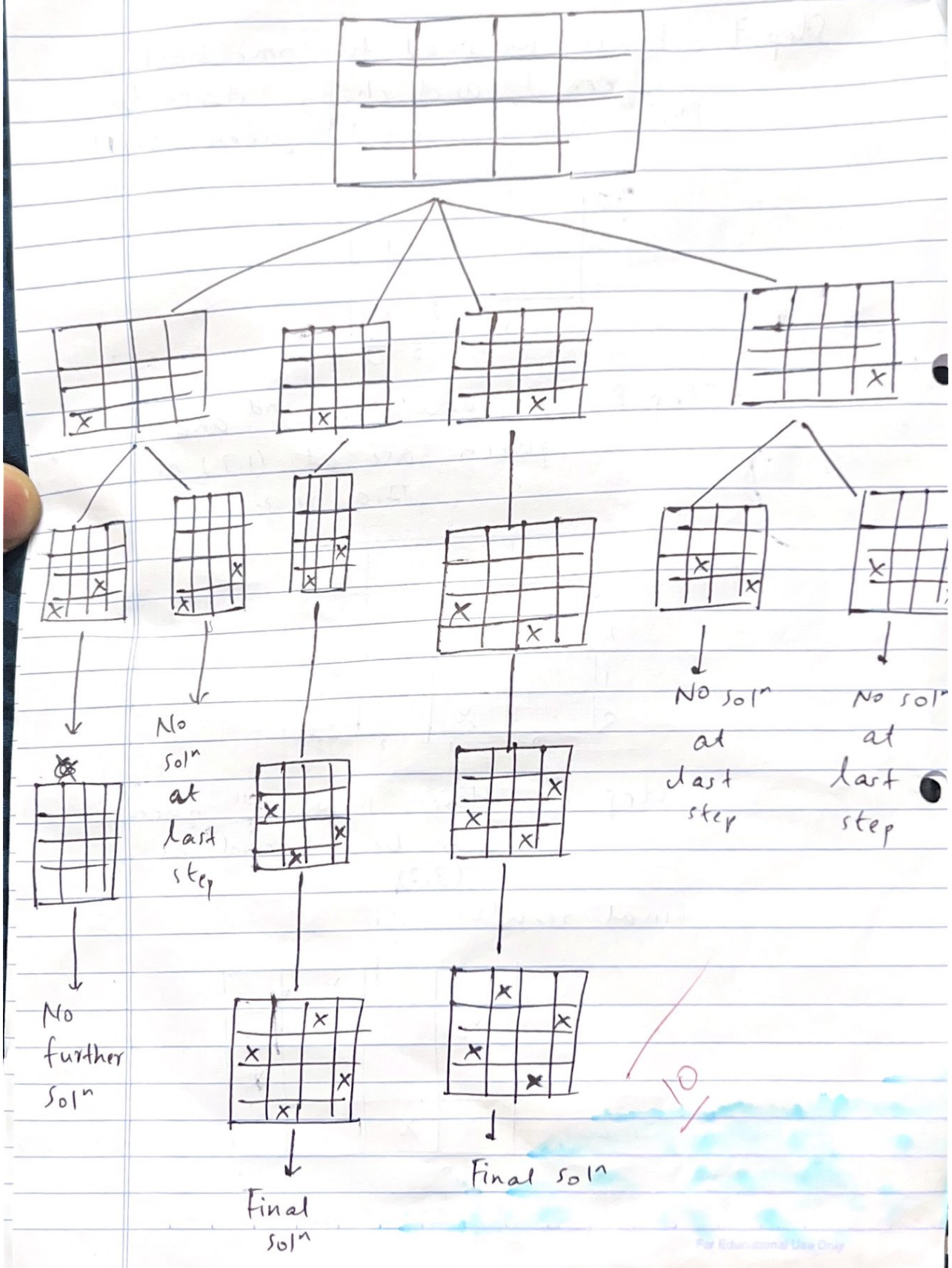

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2.

T A K E

A

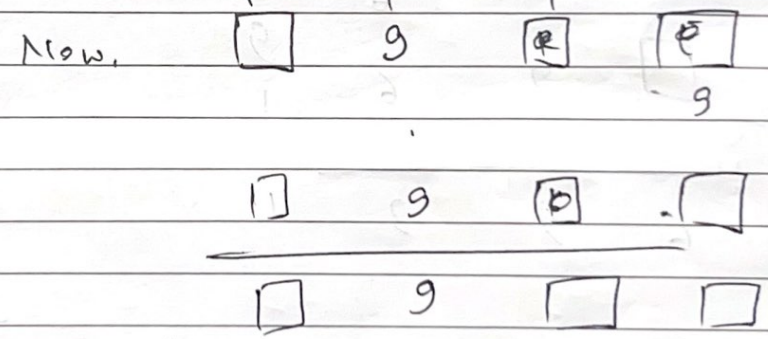
C A K E

K A T E

Now, we have $A + A = A$

Hence $\boxed{A = 9}$ if a carry is generated from prev step

i.e $K + K = T$

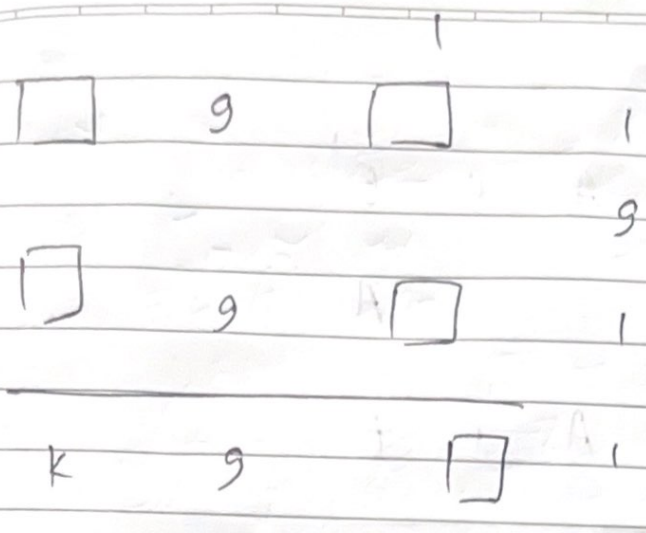


all oper will have a carry of 1

Now, $E + E + A = E + 10 \rightarrow$ carry.

Let $\boxed{E = 1}$

Thus, $\therefore 1 + 1 + 9 = 1 + 10$

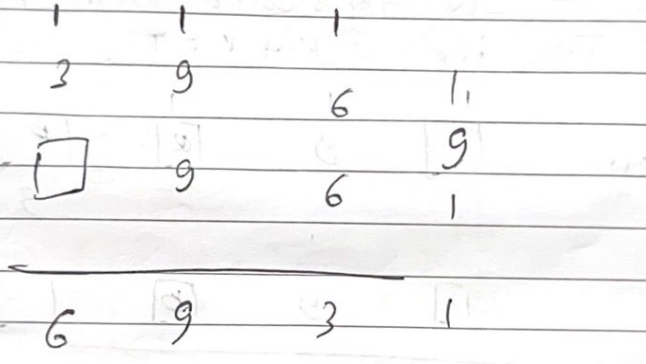


Now, $K + K = T + 10 \rightarrow$ Carry

let $K = 6$

$1 + 6 + 6 = T + 10$

$\boxed{T = 3}$



Now, $1 + T + C = K$

$1 + 3 + C = 6$

$C = 2$

Hence, final ans., $C = 2$, $T = 3$, $A = 9$, $K = 6$, $E = 1$

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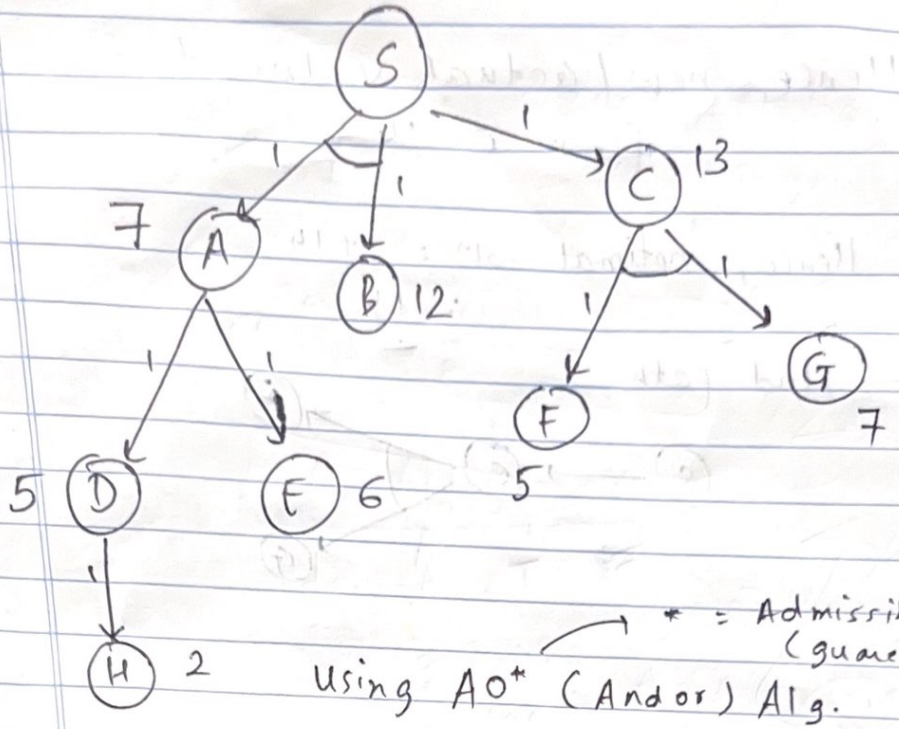
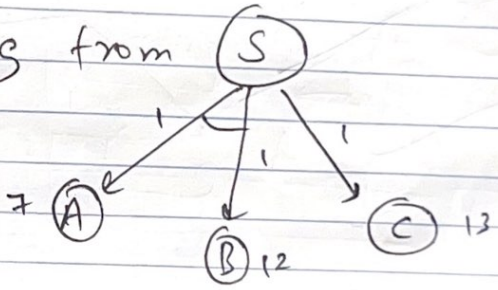
3.



* = Admissible (guaranteed soln).

Using AO* (And or) Alg.

→ Starting from



$S \to AB$ ~~f(A and B)~~ = 7 + 1 + 1 + 12
= 21

$S \to C$ f(C) = 1 + 13
= 14.

} ∵ 14 < 21

Hence, (S) ⟶ (C)

Now from (SC) → (F) 5
→ (G) 7

∴ f(S) SC → FG : 5 + 1 + 1 + 7 = 14

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Hence, new / actual value of
~~f(c)~~ : c = 14

Hence, optimal soln : 1+14
= 15

And path