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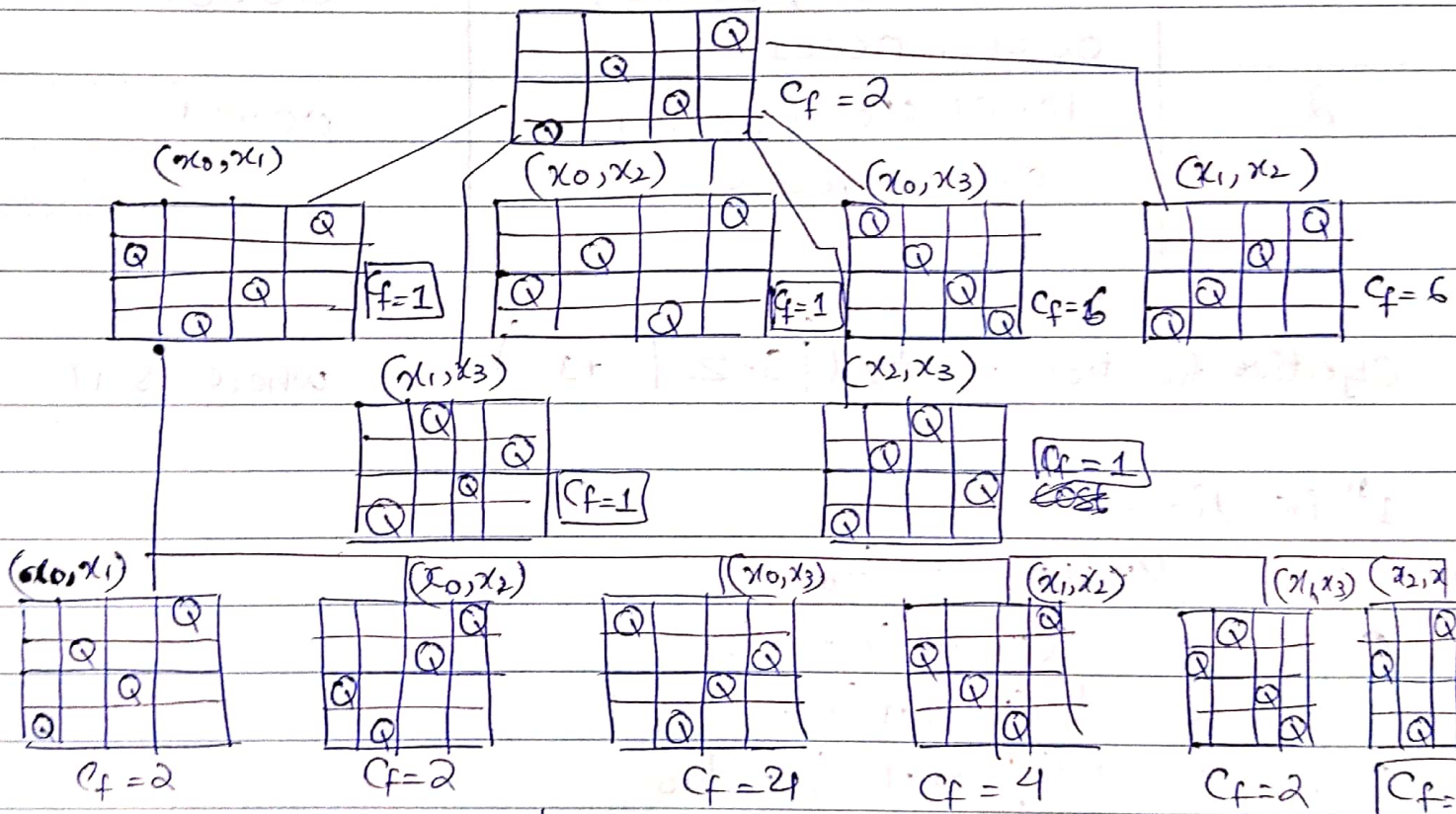
Question 1

(i) total no. of queens = 4
In a single swap, 2 queens will change position.
total neighbours = $^4C_2 = 6$

(ii) Initial State: | 3 | 1 | 2 | 0 |



Goal state reached in 2 steps

| 1 | 3 | 0 | 2 |

~~Step 1~~ Initial state: | 3 | 1 | 2 | 0 | $C_f = 2$

Step 1: | 1 | 3 | 2 | 0 | $C_f = 1$

Step 2: | 1 | 3 | 0 | 2 | $C_f = 0$

iii. Cost of this state is 6. This is local optimum since any swap made will still result in cost of 6.

Question 2

set = {2,3,4,8,16}, desired sum = 17, initial solution: 00000

Iteration No.	Intermediate solution	Selected solution
1	10000, 01000, 00100, 00010, 00001	00001
2	10001, 01001, 00101, 00011, 00000	00001

Objective function : $1/(|S-\Sigma| + 1)$ where S = 17

1st iteration

10000 : $1/(|17-21|+1) = 1/16$

01000 : $1/(|17-3|+1) = 1/15$

00100 : $1/(|17-4|+1) = 1/14$

00010 : $1/(|17-8|+1) = 1/10$

00001 : $1/(|17-16|+1) = 1/2$

00000 : $\frac{1}{18}$

2nd Iteration

10001 : $1/(|17-18|+1) = \boxed{1/2}$

01001 : $1/(|17-19|+1) = 1/3$

00101 : $1/(|17-20|+1) = 1/4$

00011 : $1/(|17-24|+1) = 1/8$

00000 : $1/(|17-0|+1) = 1/18$

Algorithm stops. no neighbour has better objective function than current state. using hill climb we get stuck in local optima and do not reach goal.