

CSE422

Section -17

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Assignment 2

Let  $\lambda = i$   
Let  $t = 0$

$$\left[ (i - i) = (i - i) \right] \text{ or } (i - i) = (i - i)$$



Ans to the ques 1

a

Lets Assume  $N=4$

	1	3	2	4
4				$\Delta^3$
3		$\Delta^3$		
2			$\Delta^3$	
1	$\Delta^3$			
	0	1	2	3

so the solution chromosomes  
will look like  $[1, 3, 2, 4]$  representing queen  
positions on the  $i$ th index.

b

Max pairs =  $\frac{n(n-1)}{2}$  and

Conflict =  $(q_i = q_j)$  on  $(|q_i - q_j| = |i - j|)$

$$\therefore C = \sum_{i=0}^{n-1} \sum_{j=i+1}^{n-1} \left[ (q_i = q_j) \text{ on } (|q_i - q_j| = |i - j|) \right]$$

$i = x \text{ axis}$   
 $j = y \text{ axis}$

$$\therefore F = \frac{n(n-1)}{2} - C$$

Higher value of is fitter the  
chromosome.

## Answer to the Q2

a) Encoding scheme could be like  
this  $[0, 1, 0, 1, 1, 0]$

Here  $0 \rightarrow \text{group A}$   
 $1 \rightarrow \text{group B}$

b) So we have a similarity score.

so plan is to get the higher similar to the  
other group. Lower ones on the same group.

so a solution example

$[0, 1, 0, 1, 1]$

group 1  $\rightarrow \{A, C\}$

group 2  $\rightarrow \{B, D, E\}$

so From the given similarity score, we check  
all the combos, if they are in different group  
we add their mutual score. Else we subtract it  
Diff group  $F += S[i][j]$   
same group  $F -= S[i][j]$

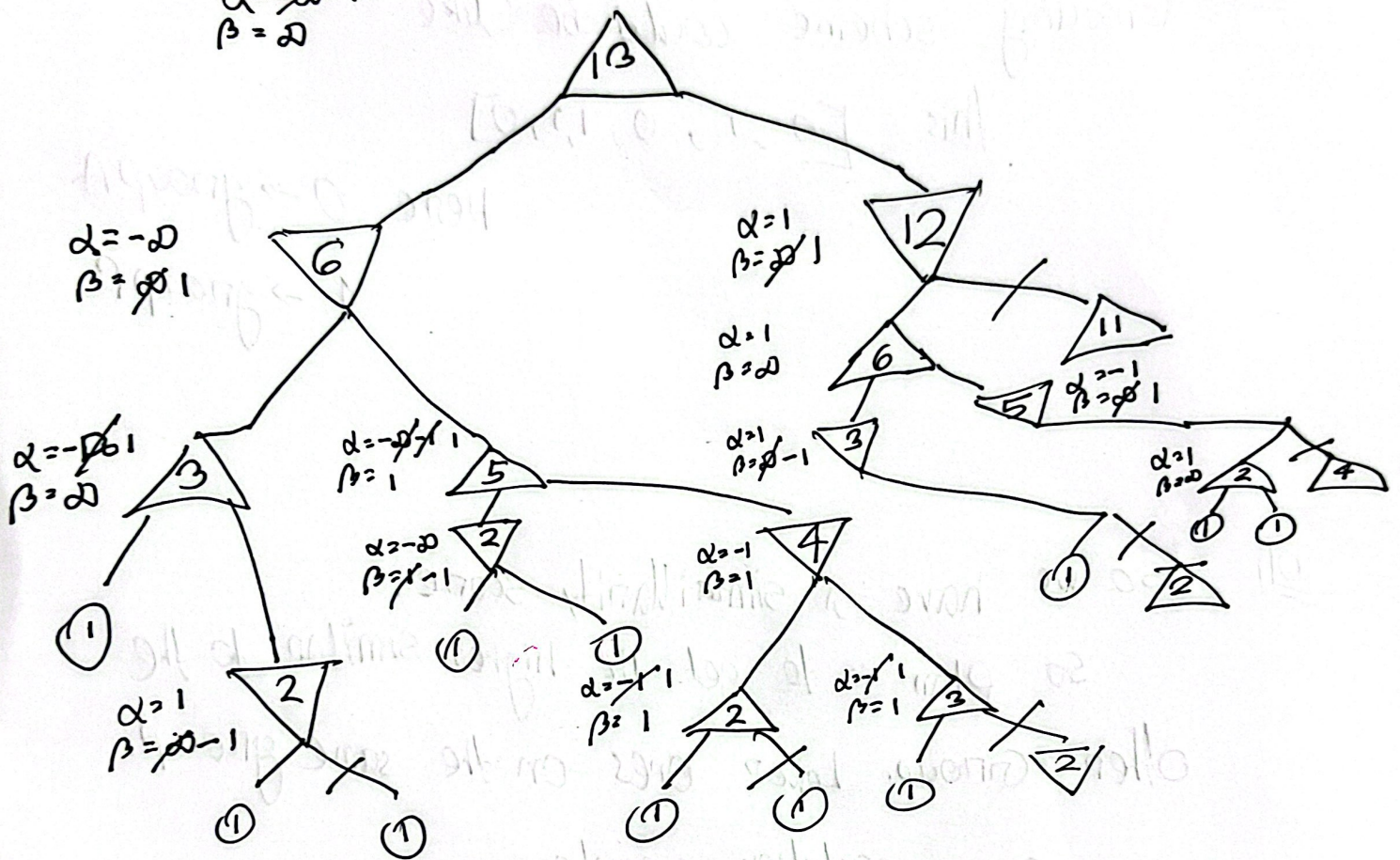
Higher the F, better the value.



# Ans to the Q4

$$\alpha = -\infty$$

$$\beta = \infty$$



$$[1, 1, 0, 1, 0]$$

$$[1, 1, 0, 1, 0]$$

$$[1, 1, 0, 1, 0]$$

so from the given simultaneous search we check  
 if the number of leaf nodes is different from  
 the number of internal nodes then we can say  
 that the game is not a zero-sum game.  
 If the number of leaf nodes is equal to the  
 number of internal nodes then the game is a  
 zero-sum game.



## Answer of Q3

a Chromosomes of <sup>circuit might</sup> look like  $\rightarrow$

$$C_1 = [a, b, d, c] \quad C_2 = [c, d, b, a]$$

b Fitness

$$F = \frac{1}{\text{Cost of Path}}$$

higher the cost better fitness

c Order cross [unique element only  $\rightarrow$  cross]

$$\begin{array}{cc|cc|c} a & b & c & d & e \\ d & b & a & e & c \end{array}$$

$$\Rightarrow \begin{array}{ccccc} a & b & e & c & d \\ d & b & c & a & e \end{array}$$

d swap mutation [unique element only so swap]

$$\begin{array}{ccccc} a & b & e & c & d \\ \uparrow & & \uparrow & & \\ d & b & c & a & e \end{array}$$

$$\Rightarrow a \quad b \quad c \quad e \quad d$$