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Q6 MSA using progressive approach:

S1: GATTCA

S2: GTCTGA

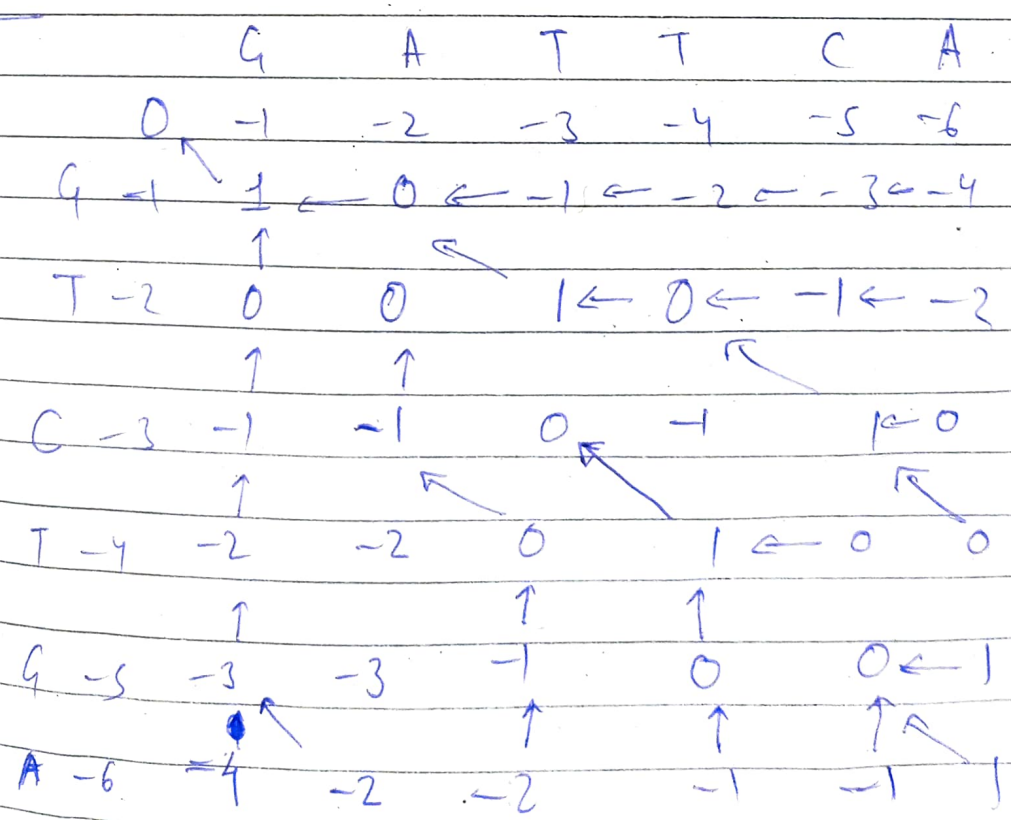
S3: GATATT

S4: GTCAGC

we have ${}^4C_2 = 6$ pairwise alignments.

We take the distance b/w 2 seq. as the no. of mismatches ; (Needleman Wunsch alg)

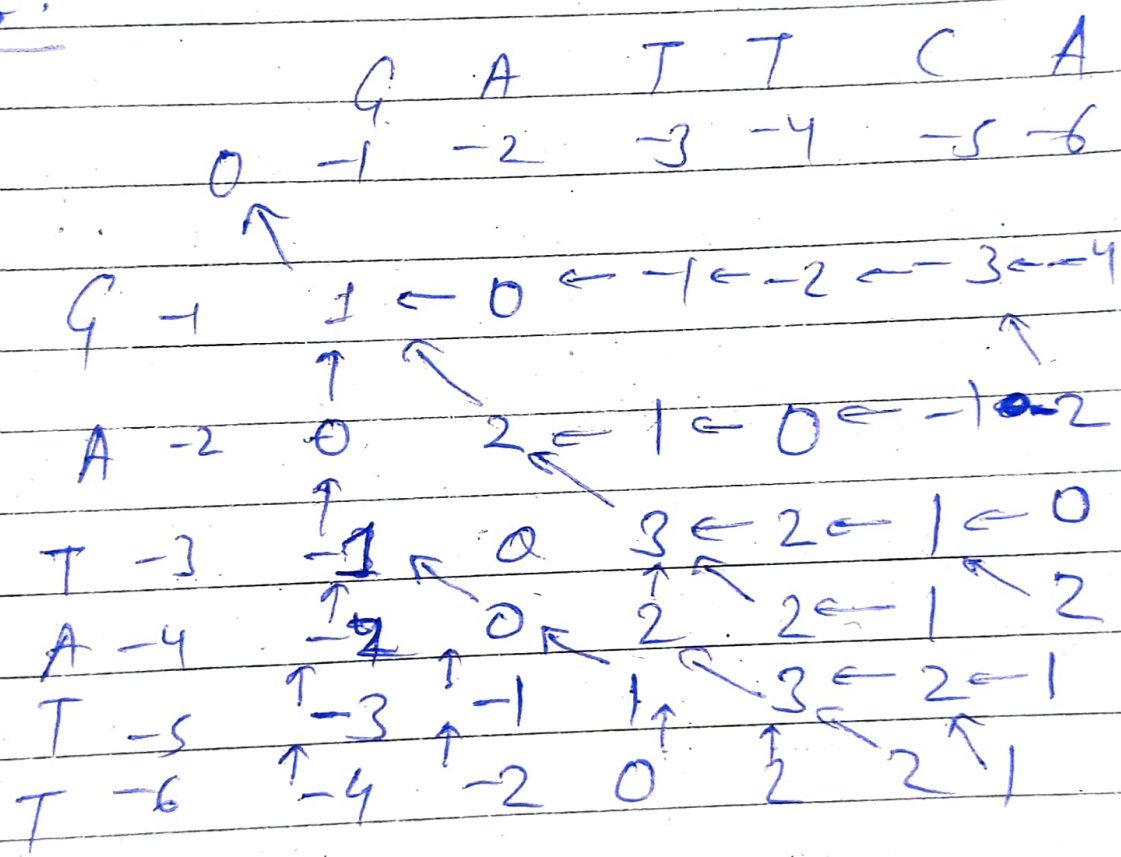
S1 S2



Alignment: GAT_TCA
G_TCTGA

score: 1 distance: 3

SIS3:

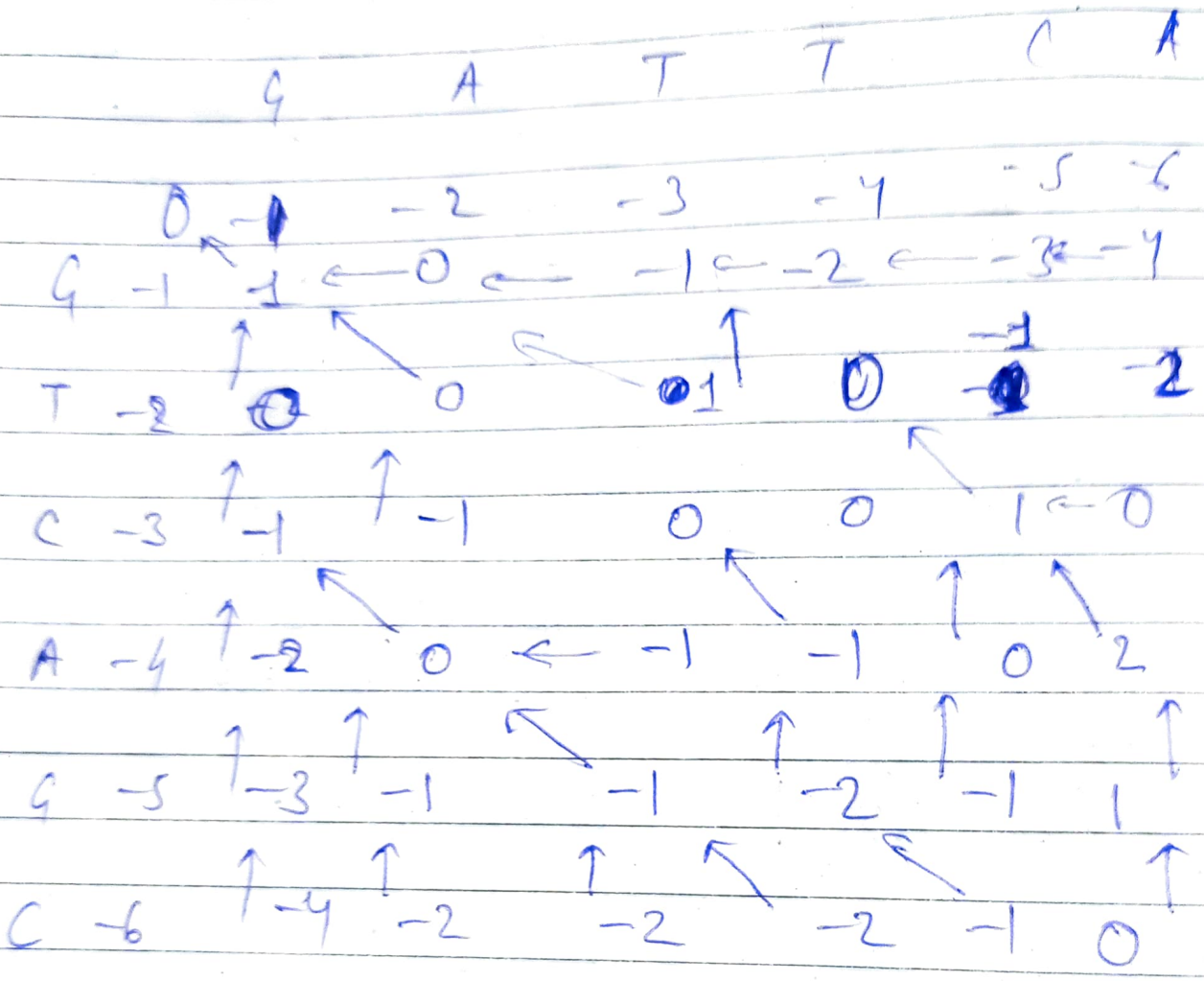


Alignment: GATTCA__
G_T_CAGC

score: 1 distance: 3

Date: / /

S1 S4 :



Alignment : G A T T C A _ _

G _ T _ C A G C

Score : 0 distance = 4

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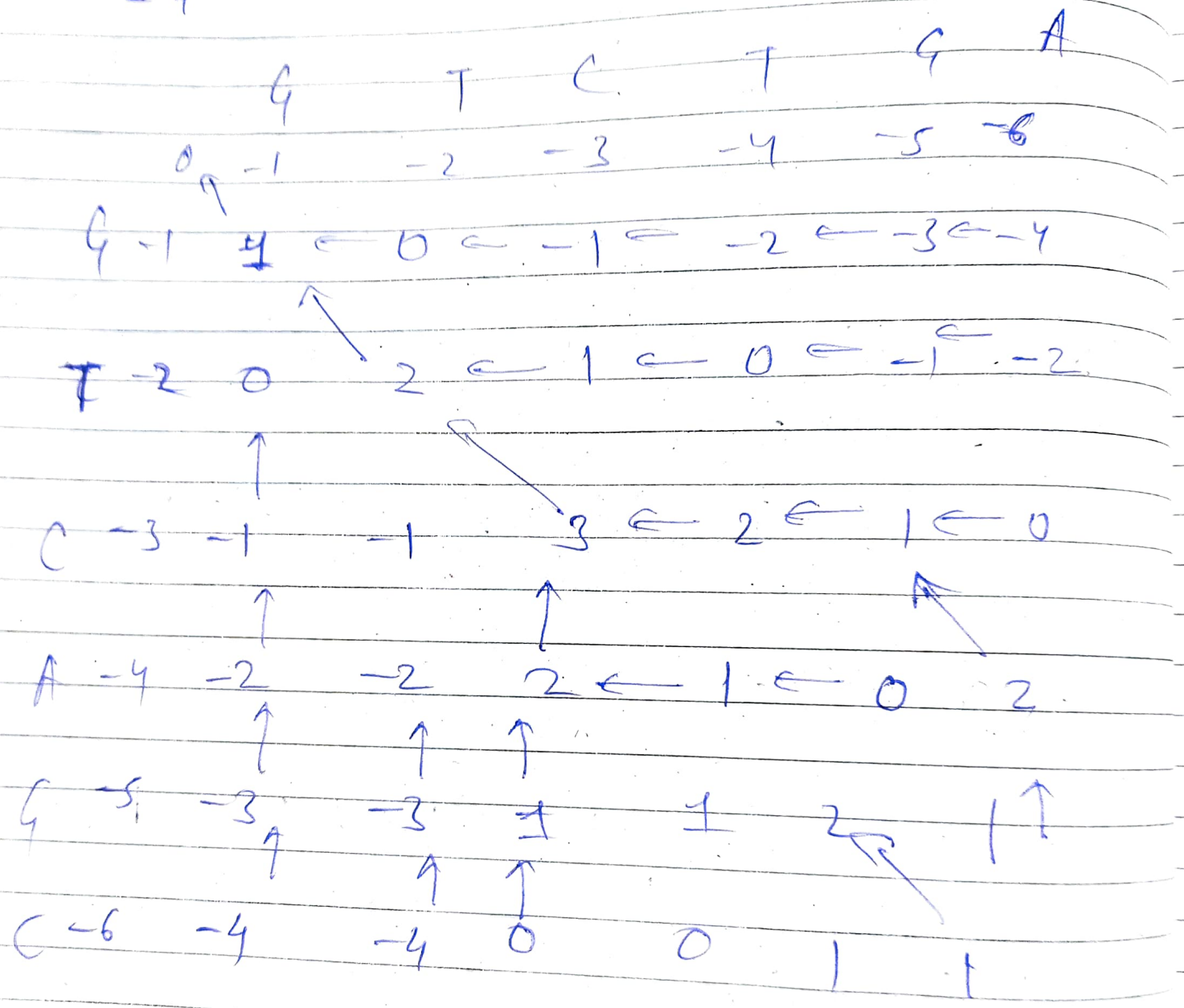
S_2 S_4 :



Alignment: GTC_TGA
GTCA-GC

score: 1 distance: 3

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S_3 S_4 :

		G	A	T	A	T	T
	0	-1	-2	-3	-4	-5	-6
G	-1	1	0	-1	-2	-3	-4
T	-2	0	0	1	0	-1	-2
C	-3	-1	-1	0	0	-1	-2
A	-4	-2	0	0	1	0	1
G	-5	-3	-1	0	0	-1	
C	-6	-4	-2	-2	-1	-1	-1

Alignment: GAT_ATT
G_TCAGC

score: -1 distance: 4

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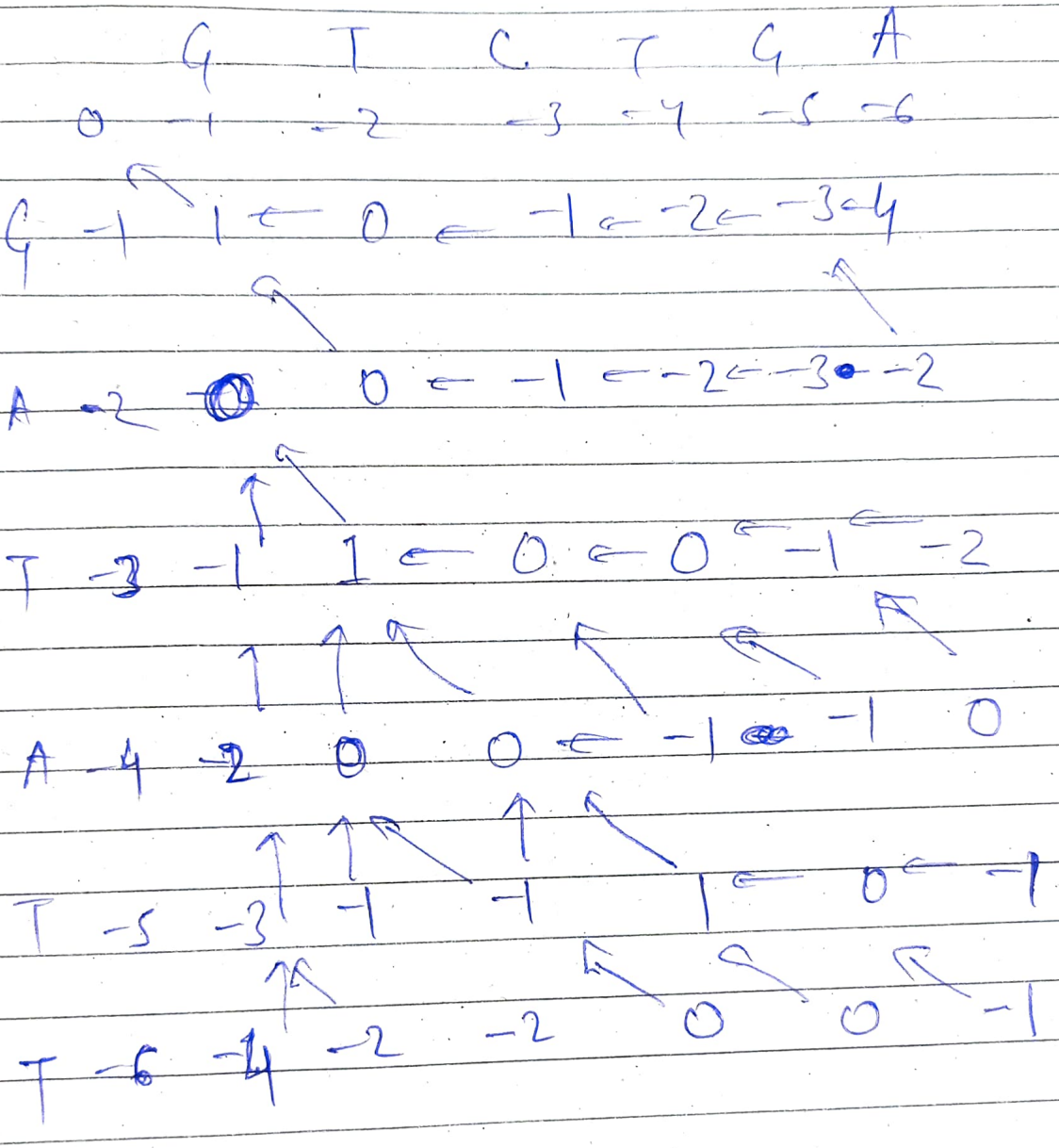
S2S3 :



Alignment : G _ T C T G A
G A T A T _ T

score : -1 distance : 4

Scoring pairwise matrix

	S_1	S_2	S_3	S_4
S_1	–	1	1	0
S_2	–	–	1	1
S_3	–	–	–	1
S_4	–	–	–	–

distance matrix:

	S_1	S_2	S_3	S_4
S_1	–	3	3	4
S_2	–	–	4	3
S_3	–	–	–	4
S_4	–	–	–	–