Dated: AI Assignment #2

K21-3309 / BCS-6F

Q IIa)

	^{1}A	B^{6}	C^{5}	D^{7}
+	^{8}E	D^{6}	C^{5}	B^{6}
A^{1}	F^{0}	G_{3}	A_{1}	G_{3}

0 → F 5 → C
1 → A 6 → B
2 7 → D
3 → G 8 → E
4 9 → ~~E~~

$$\begin{array}{r} 1657 \\ +\ 8656 \\ \hline 10313 \end{array} \checkmark$$

$B + A + D = 6 + 1 + 7 = 14$

Ib)

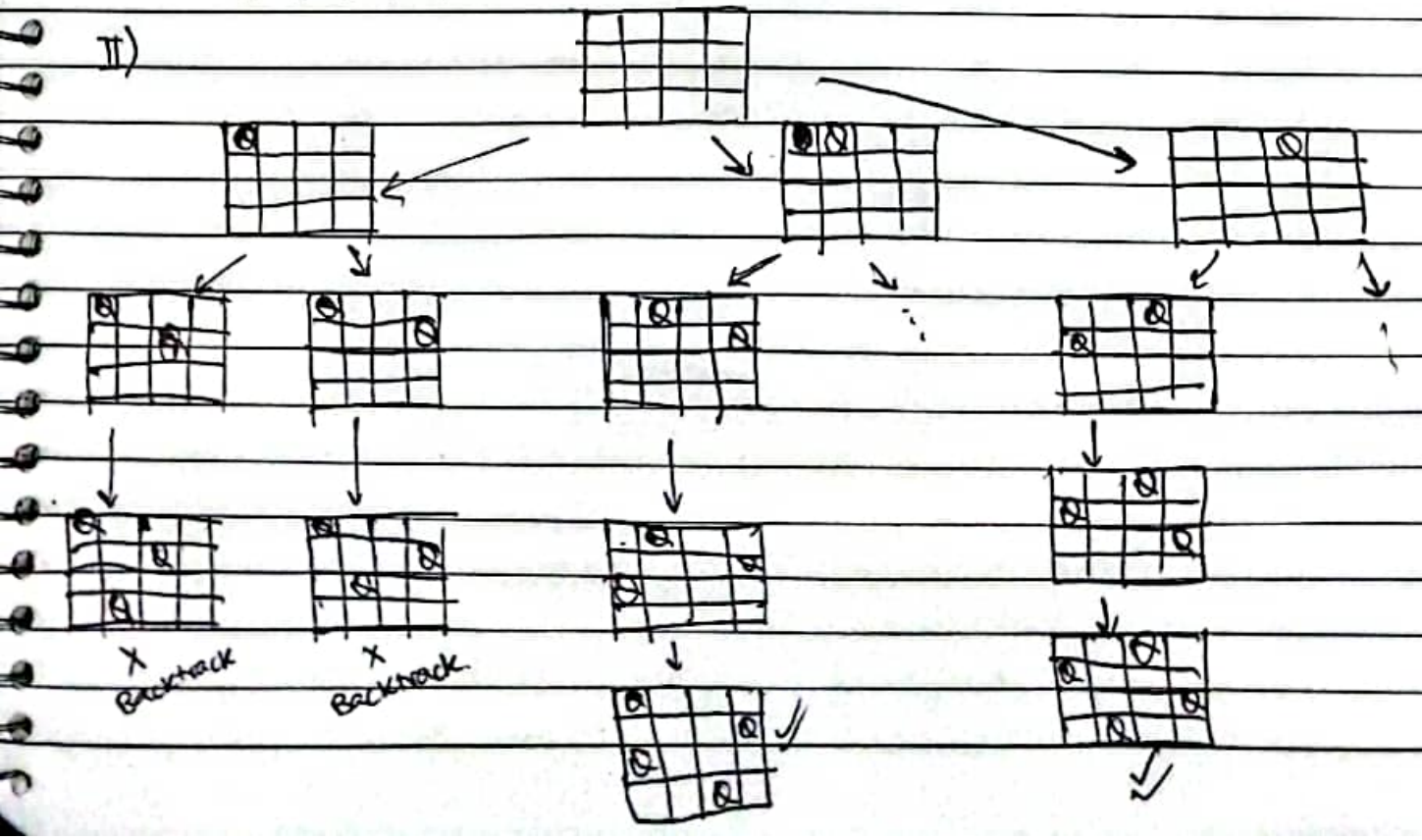
	W^{9}	I^{7}	R^{6}	E^{2}
+	M^{1}	O^{0}	R^{6}	E^{2}
^{1}M	O^{0}	N^{8}	E^{2}	V^{4}

0 → O 5
1 → M 6 → R
2 → E 7 → I
3 8 → N
4 → V 9 → W

$$\begin{array}{r} 9762 \\ +\ 1062 \\ \hline 10824 \end{array} \checkmark$$

$R \times I \times M = 6 \times 7 \times 1 = 42$

II)



Dated:

Q2a) $f(x_1) = (6+5) - (4+1) + (3+5) - (3+2)$
$= 11 - 5 + 8 - 5$
$= 9$
$f(x_2) = (8+7) - (1+2) + (6+6) - (0+1)$
$= 15 - 3 + 12 - 1 = 23$
$f(x_3) = (2+3) - (9+2) + (1+2) - (8+5)$
$= 5 - 11 + 3 - 13 = -16$
$f(x_4) = (4+1) - (8+5) + (2+0) - (9+4)$
$= 5 - 13 + 2 - 13 = -19$

x_2, x_1, x_3, x_4

most fit ⟷ least fit.

bi)

x_1 =	6	5	4	1	3	5	3	2
x_2 =	8	7	1	2	6	6	0	1

C_1 = 6 5 4 1 6 6 0 1 $\Rightarrow f(C_1) = 17$
C_2 = 8 7 1 2 3 5 3 2 $\Rightarrow f(C_2) = 15$

ii)

x_1 =	6	5	4	1	3	5	3	2
x_3 =	2	3	9	2	1	2	8	5

C_3 = 6 5 9 2 1 2 3 2 $\Rightarrow f(C_3) = -3$
C_4 = 2 3 4 1 3 5 8 5 $\Rightarrow f(C_4) = -5$

iii)

x_2 =	8	7	1	2	6	6	0	1
x_3 =	2	3	9	2	1	2	8	5

C_5 = 2 7 9 2 1 6 8 1 $\Rightarrow f(C_5) = -4$
C_6 = 8 3 1 2 6 2 0 5 $\Rightarrow f(C_6) = 11$

Dated:

c) $f(C_1) = 17$ $\quad f(C_4) = -5$

$f(C_2) = 15$ $\quad f(C_5) = -4$

$f(C_3) = -3$ $\quad f(C_6) = 11$

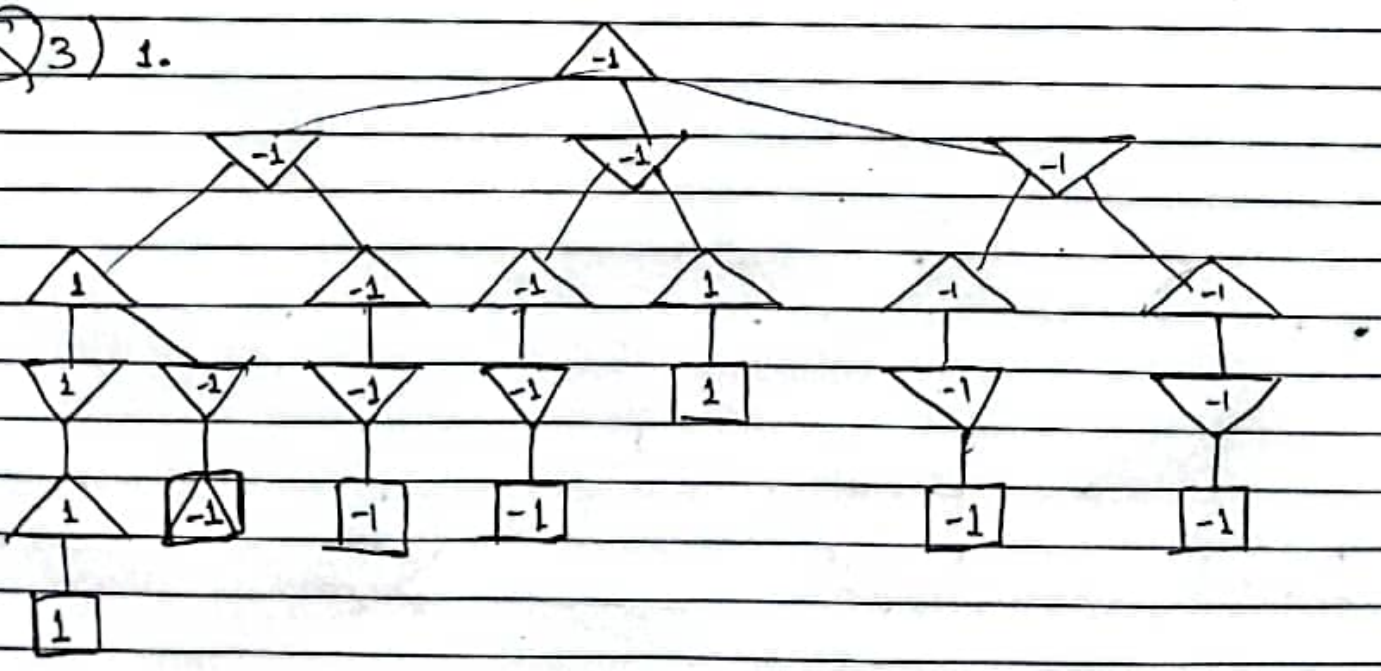
Yes, the overall fitness has improved.

d) No, it will not reach the optimal solution without mutation operator.
The fittest value is:

99 00 99 00

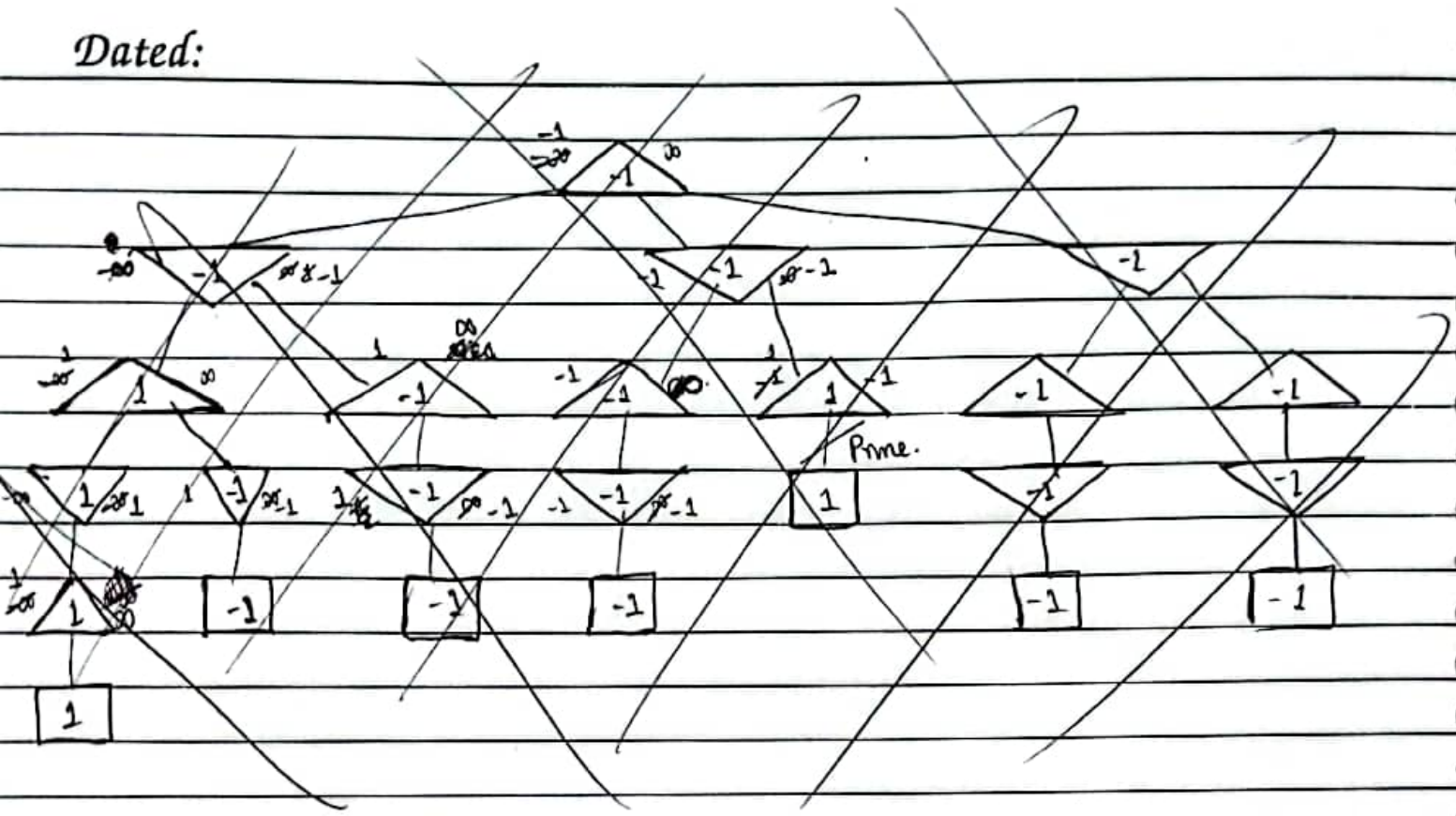
However, ~~some places do not~~ there are no chromosomes that have '9' or '0' in some of the places.

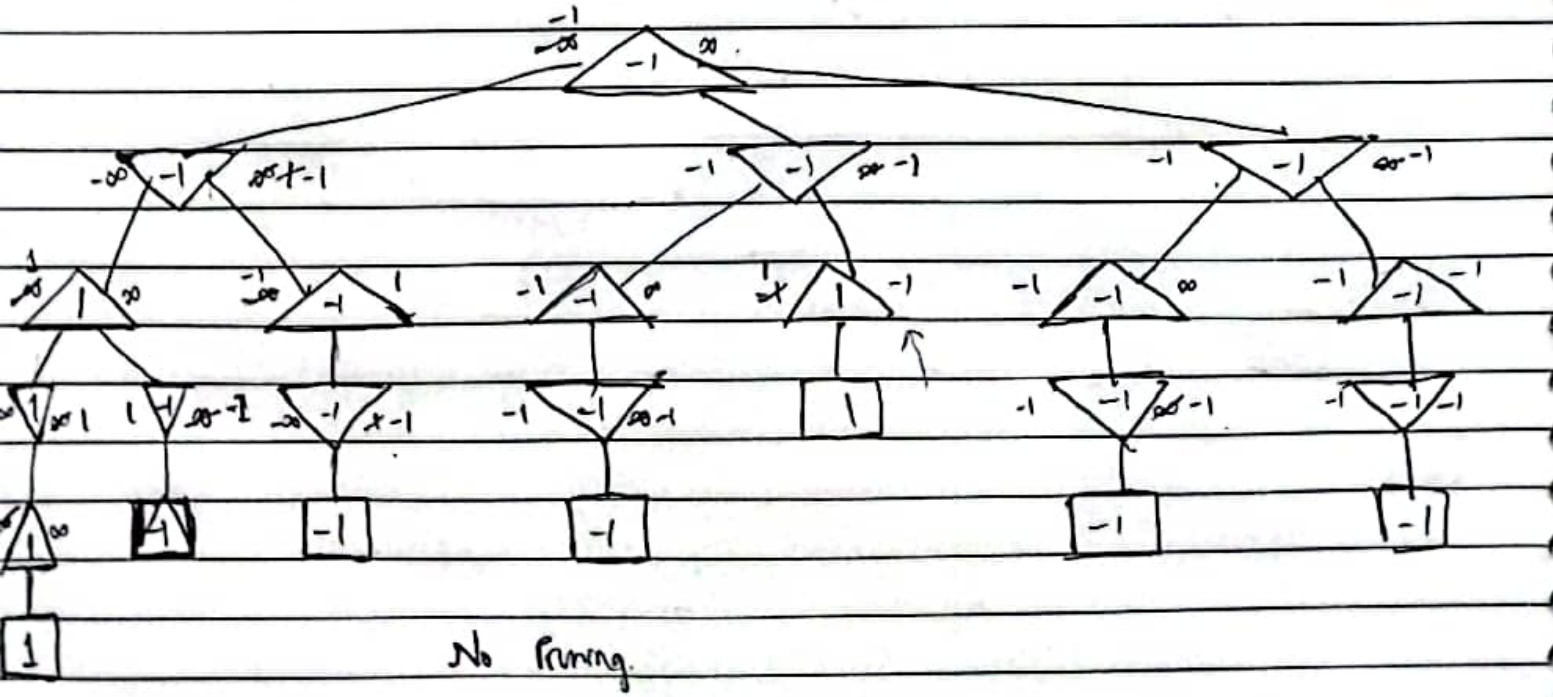
(Q3) 1.



There is no best move for root player.
It depends on 2nd player. If 2nd player plays correct moves then root player can never win.
Root player can only win if 2nd player makes huge blunder.

Dated:





No Pruning.