23K-0062

Q:2

Date

Initial Population: [[1,2,3,1,2,3,1], [2,1,3,2,3,1,1],
[3,3,1,2,2,1,3], [1,3,2,1,2,3,3],
[3,1,2,3,1,2,1], [2,3,1,1,3,2,2]]

Now selecting parents through roulette wheel selection but firstly calculating probabilities of population.

fitness_values: [410, 435, 400, 420, 430, 445]
probabilities: [0.16, 0.17, 0.15, 0.16, 0.16, 0.17]

Now N. Randomly choose parent.
parent 1: [1,3,2,1,2,3,3] parent 2: [1,2,3,1,2,3,1]

Selecting child by doing single point cross over
point = 3
child 1: [1,3,2,1,2,3,1] child 2: [1,2,3,1,2,3,3]

Applying Mutation
idx1 = 2 idx2 = 4
After mutating
child 1: [1,3,2,1,2,3,1] child 2: [1,2,2,1,3,3,3]

Add both childs in new population and assign it to population
do these steps until generation not equals to 50/myz.

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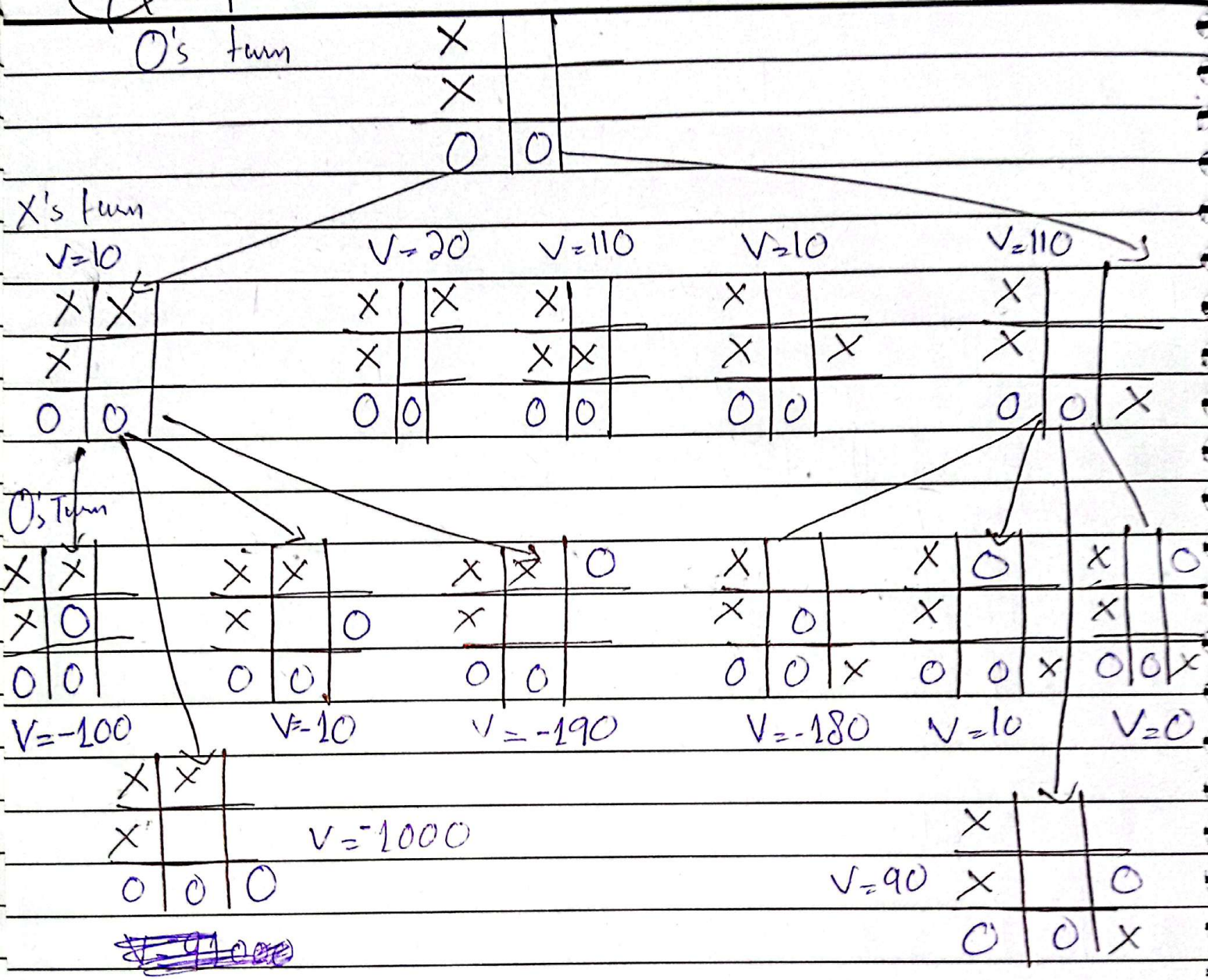
Q:4

Date _____



X will choose the right most block to maximize their utility.

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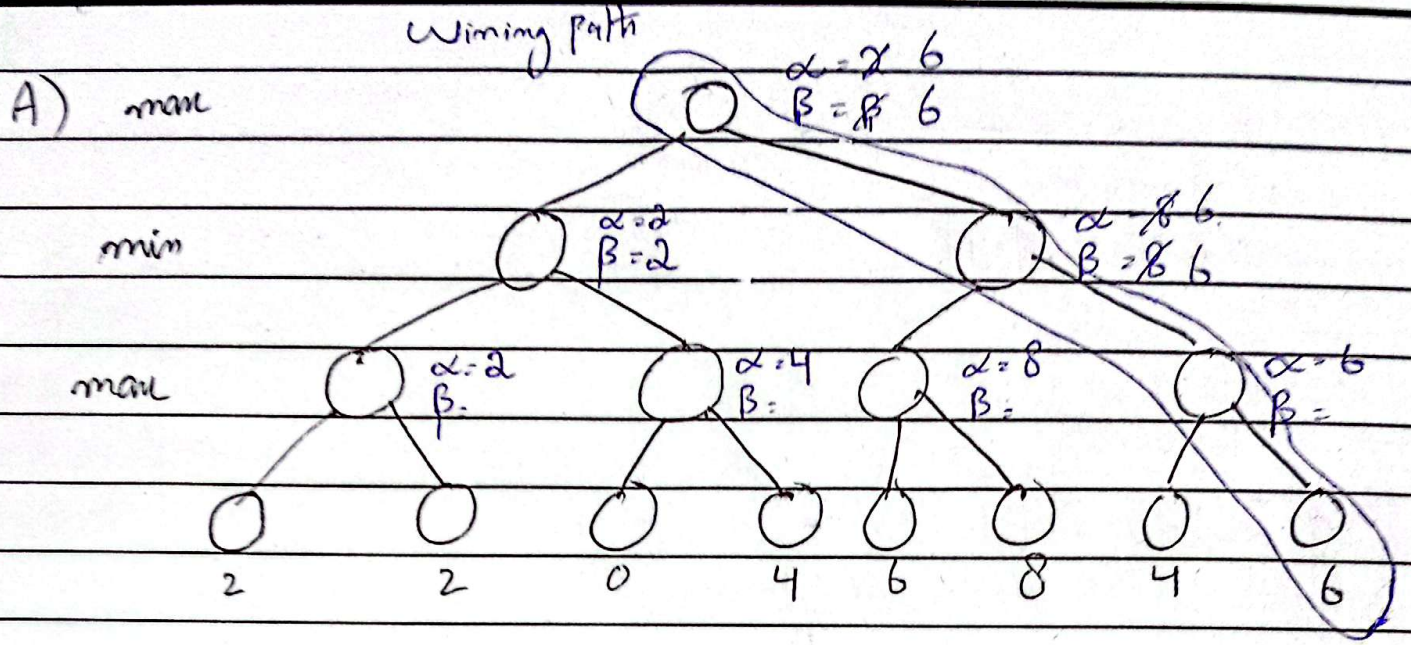
Q:5

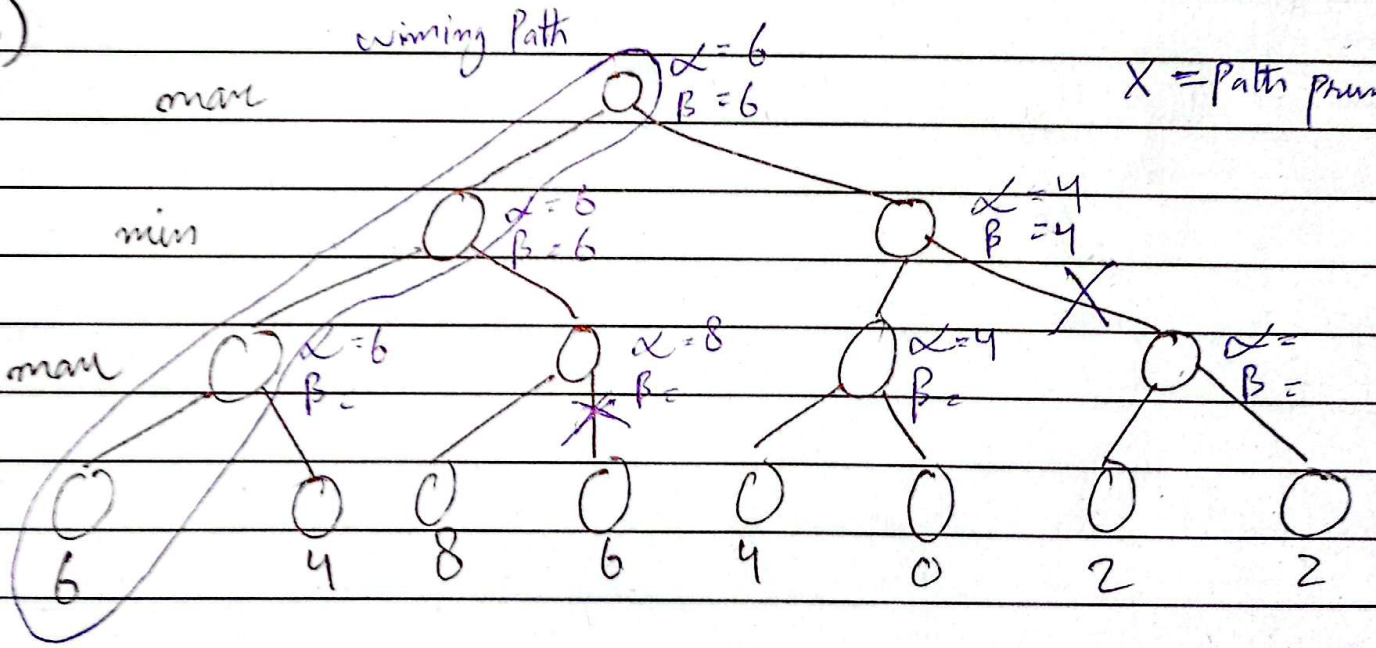
Date _____

A)



None part of the tree are cutoff.

B)



Strike out/pruned values = {6, 4, 8, 6, 4, 0, 2, 2}

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Q:6

Date

a) 1. Defender: Aims to maximize their security & size
Attacker: Seeks to maximize their attack effectiveness against the system

2. • Each player chooses a move to force their adversary into a suboptimal position.
• The defender tries to grow their advantage while minimizing the attacker's success.
• The attacker may perform checks to exploit poor defender moves.

3. • In deterministic settings, the defender relies on a fixed strategy
• With stochastic elements, the defender may track probabilities & consider multiple strategies.

d) 1. Formula: $-50 \times 0.5 + 45 \times 0.5 = -2.5$
Using pstate: $-60 \times 0.5 + (-100) \times 0.5 = -80$
Using ignore: $-80 \times 0.5 + (-20) \times 0.5) = -50$

2. The defender uses expected value as a terminal node to guide decisions, treating it as a standard evaluation metric rather than an intermediate step.

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:- All costs are assumption based

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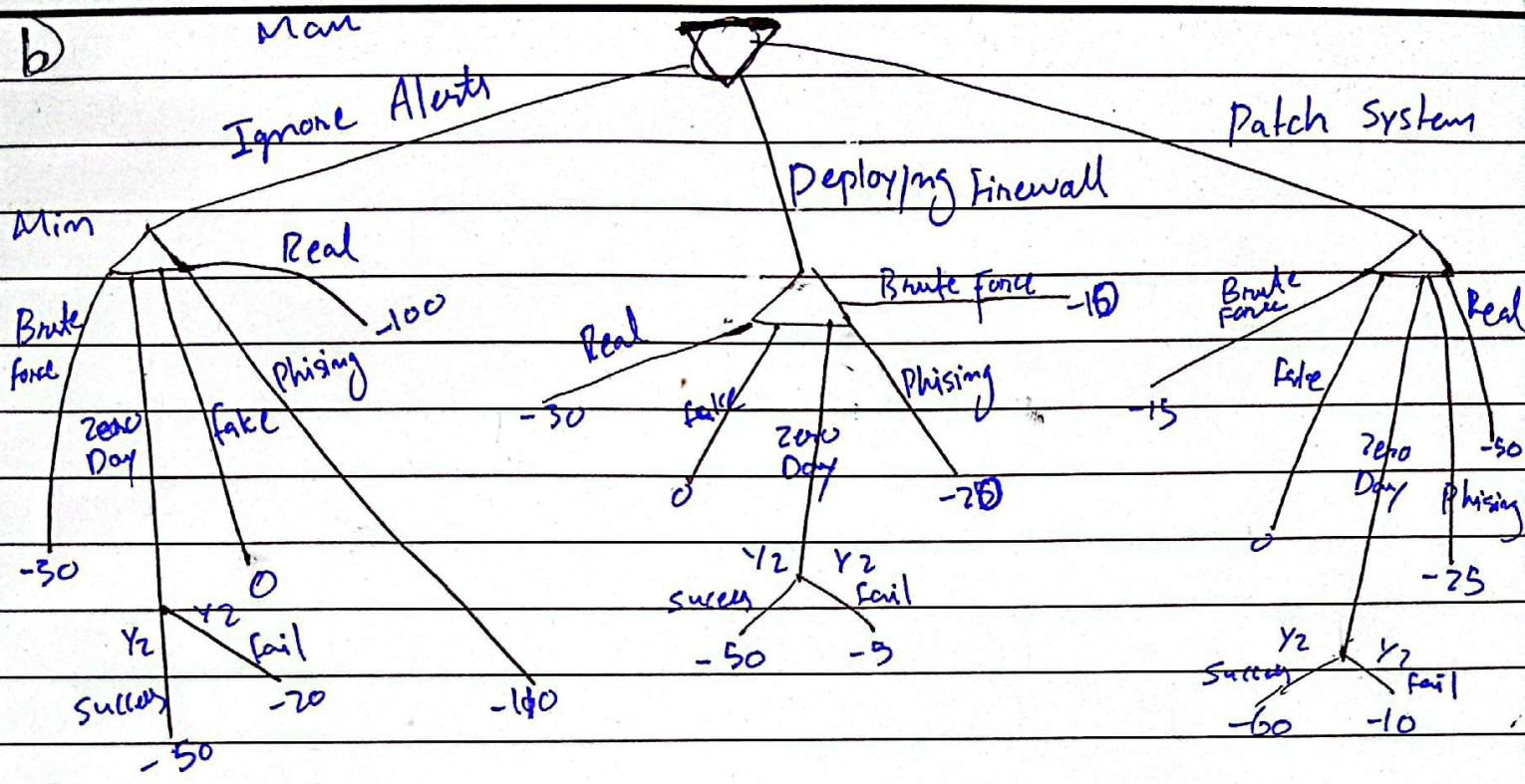
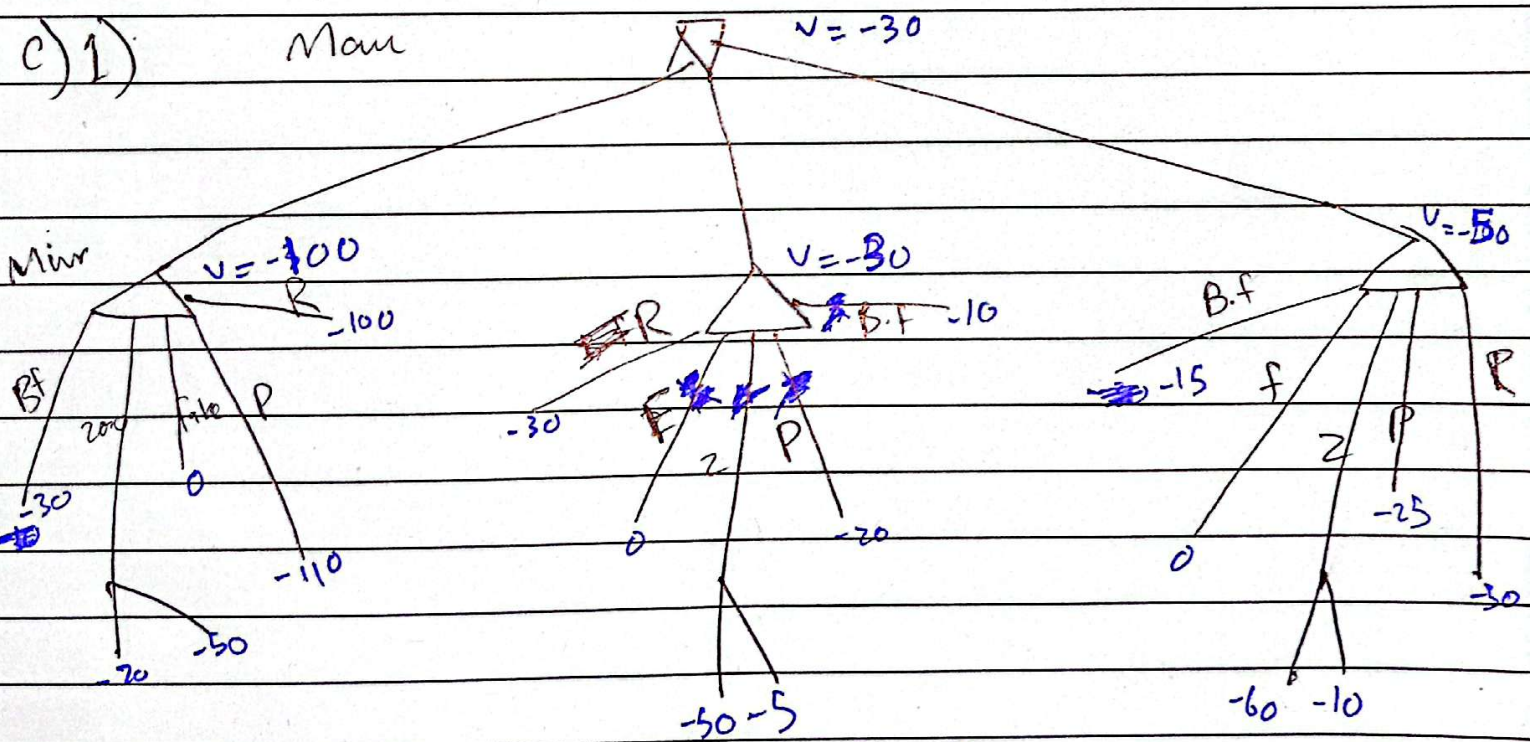
b)



c) 1)



2) Real Attack cause the higher amount of damage after evaluating tree and remaining options are very low therefore all other attacks proved.