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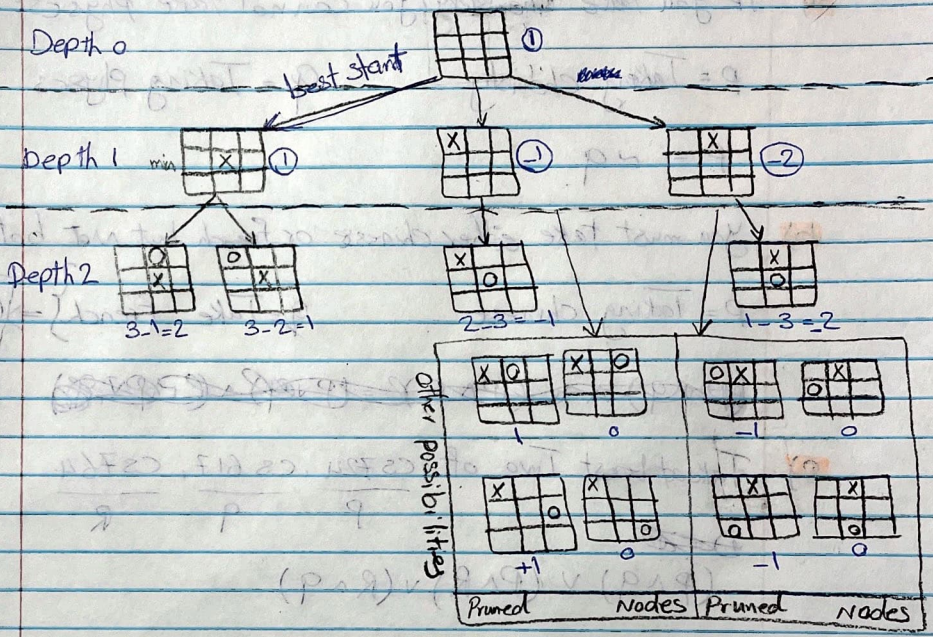
Question 1

a)



b) The evaluation is marked up by the given formular on Depth 2.

c) backed up values using minimax algorithm is marked on the tree.
The best move is marked on the tree.

Question 2

a) If you take chemistry, you cannot take physics:

p = Taking chemistry q = Taking physics

$p \rightarrow \sim q$

b) You must take either chinese or French but not both

p = Taking chinese q = Take French $\Rightarrow (p \wedge \sim q) \vee (\sim p \wedge q)$

~~$(p \wedge q) \wedge (p \wedge q) \equiv (p \vee p) \wedge (q \wedge q)$~~

c) Take at least Two of CS724 (p), CS617 (q), CS764 (R)

~~$p \wedge q$~~

$(p \wedge q) \vee (p \wedge R) \vee (R \wedge q)$

b) p = Chines, q = French $\Rightarrow (p \wedge \sim q) \vee (\sim p \wedge q)$

Question 3

a. $(P \to q) \wedge (P \to \neg q)$

P	q	P→q	P→¬q	
1	1	1	0	0
1	0	0	1	0
0	1	1	1	1
0	0	1	1	1

satisfiable

b. $(P \to q) \wedge (P \to R) \wedge (\neg q \wedge \neg R) \wedge P$

P	q	R	P→q	P→R		
1	0	1	0	1	0	0
1	1	1	1	1	0	0
0	1	1	1	1	0	0
0	0	1	1	1	0	0
1	0	0	0	0	1	0
1	1	0	1	0	0	0
0	1	0	1	1	0	0
0	0	0	1	1	1	0

unsatisfiable

C) $(P \to q) \vee (q \to P)$

P	q	P→q	q→P	
1	1	1	1	1
1	0	0	1	1
0	1	1	0	1
0	0	1	1	1

Valid

D) $(P \to q) \to (q \to R) \longleftrightarrow (P \to R)$

P	q	R	P→q	q→R		P→R	
1	1	1	1	1	1	1	1
1	0	1	0	1	1	1	1
0	1	1	1	1	1	1	1
0	0	1	1	1	1	1	1
1	1	0	1	0	0	0	0
1	0	0	0	1	0	0	0
0	1	0	1	0	0	1	0
0	0	0	1	1	0	1	0

Satisfiable

Question 4

1) $P \wedge Q \to R$
2) $\sim X \vee \sim Y \vee R \;,\; (X, Y)$ } R
3) $Q \wedge Y \to W$
4) Q
5) $\sim(\sim X)$ } $X, Y, Q \to (Q \wedge Y)$
6) Y
7) $R \wedge W$

$(Q \wedge Y) \Rightarrow W \;,\; (Q \wedge Y)$ / W

from (4)(5)(6) → $X, Y, Q \to Q \wedge Y$

from (3) and (↓) → $(Q \wedge Y) \to W \;,\; (Q \wedge Y)$ / W

From (2) → $\sim X \vee \sim Y \vee R \;,\; (X, Y)$ / R

So far → X, Y, Q, W, R

Therfor → $R \wedge W$ ✓

Question 5

a) $(P \rightarrow Q) \wedge (X \rightarrow Y)$

$\rightarrow (\neg P \vee Q) \wedge (\neg X \vee Y)$ → Conjuction of Disconjuction

b) $(P \wedge Q \rightarrow Z) \vee (X \wedge Y)$

$\rightarrow (\neg P \vee \neg Q \vee Z) \vee (X \wedge Y) = (\neg P \vee \neg Q \vee Z \vee X) \wedge (\neg P \vee \neg Q \vee Z \vee Y)$