EN.520.650 HW2

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1\. a) There will be $9\times8\times7\times6\times\cdots\times1 = 9!$ ways

seperate the calculate : 5^{th} move $= 8\times3!\times6\times5 = 1440$

6^{th} move $= 8\times3!\times6\times5\times4 - 6\times3!\times2\times3! = 5760-432 = 5328$

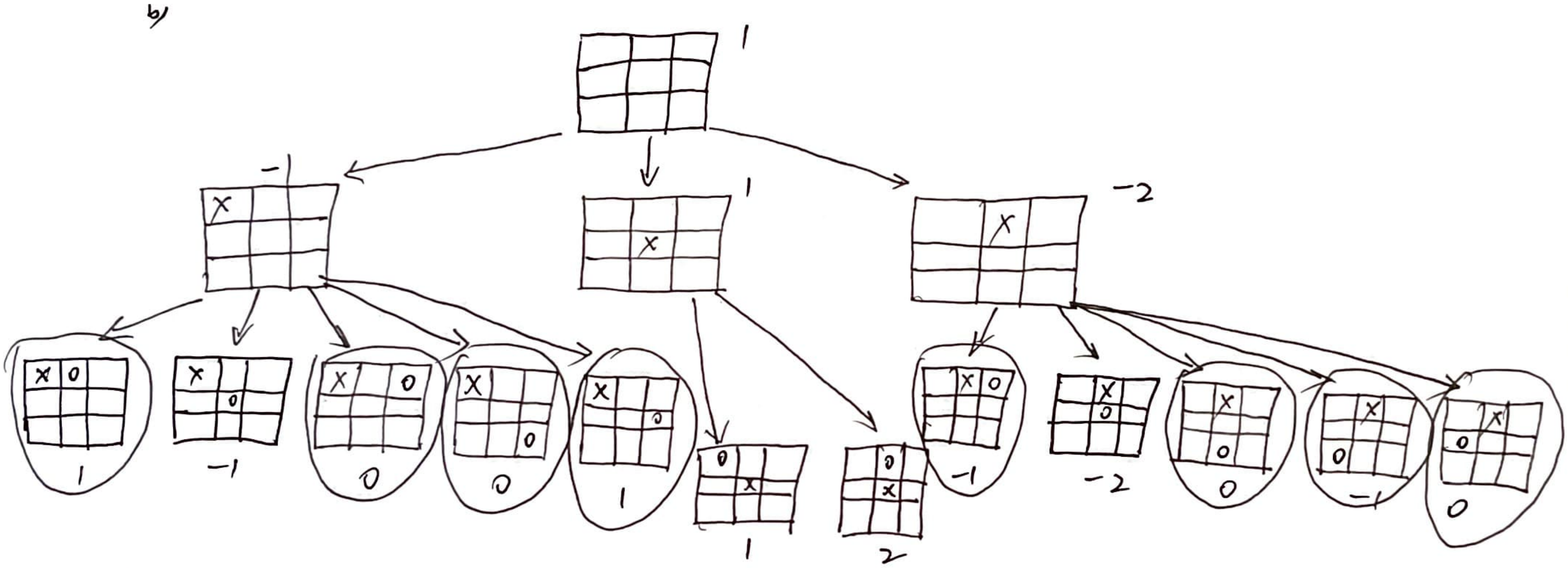
7^{th} move $= 8\times3\times6\times3!\times5\times4\times3 - 6\times3\times6\times3!\times3! = 51840-3888 = 47952$

8^{th} move $= 8\times3\times6\times3!\times5\times4\times3\times2 - 6\times3\times6\times3!\times2\times4! = 103680-31104 = 72576$

9^{th} move $= 16\times5!\times4! = 46080$

$\therefore$ total possible game $= 1440+5328+47952+72576+46080 = 255168$

b)



c) calculate by $3X_2(s)+X_1(s)-(3O_2(s)+O_1(s))$, then get the number above

d) still base on graph in ⓑ, depth 1 left $= \min\{-1,1,0,0,1\} = -1$

depth 1 mid $= \min\{1,2\} = 1$

depth 1 right: $\min\{-1,-2,0,-1,0\} = -2$

depth 0 $= \max\{-1,1,-2\} = 1$, draw on b)

so the middle node is the best move

e) circle out which didn't affect the final value on ⓑ

2\. a) True, the hill-climing with lower valve is used to help getting optimal solution

b) False, the intervening neighbour can be a local minimum and on another slope, the state may leading a local maximum

c) False. In the way, the algorithm will fall into the local optimal solution, and whether the global optimal solution can be obtained depends on the position of the initial point. If the intial point is selected near the global optimal solution, it's possible to obtain the global optimol solution.

d) True The reason for this "True" should be of course, because this algorithm is designed to find the optimal solution. The judgement given in the question is "local or global", so it's certain. The idea of the current position as the search direction. The closer the descent method to the target value, the smaller the step size and the slower the progess, until a local optimal solution is found.

e) false It can't be any start point. because sometimes the function has multiple slopes and gradient descent algorithm cannot guarantee to obtain the global minimum value, maybe obtain the local minimum value. If the start point near the global minimum value, it can be.

3: variables: Mom, Dad, Baby, Student, Teacher and Guide as X_i
X_1 X_2 X_3 X_4 X_5 X_6

domain: for position they stay $V_1, V_2, V_3, V_4, V_5, V_6$

constraints: $V_1 - V_2 = V_3$ child between Mom and Dad

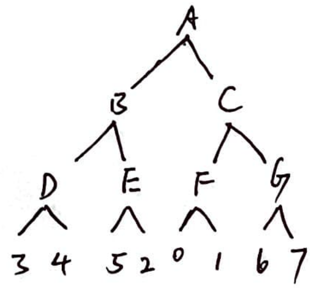
$|V_4 - V_5| = 0$ student get together with teacher

$|V_i - V_j| \neq |i-j|$ no one in same position

$V_6 = 1$ or 6 Guide in spot 1 or 6

4. best move $\alpha \geq \beta$, $\alpha > -\infty$, $\beta < \infty$

after compute : $\alpha \geq -\infty$, $\beta = \infty$



number of leaves 8

5. a) True

b) False

c) False

6. a) constraint: $A \to B$, $C \to A$, $C \to B$, $C \to D$

b) Ali = pasta , Bo = risotto , Cleo = pasta , Dallas = risotto

c) ~~elimate~~ eliminate for Bo : pasta

eliminate for Cleo : quesadillas , sushi , risotto

eliminate for Dallas : none

d) 4 conflicts and B = R will minimize the number of conflicts.