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I, bearing Roll No. 106119100, agree and acknowledge that:

1) The assesment was answered by me as per instruction applicable to each assessment, and that I have not resorted to any unfair mean. to deliberately improve my performance

2) I have neither impersonated anyone, nor have been impersonated by any person for the purpose of assessment.

Signature : RPandey

Full Name : Rajneesh Pandey

Roll No : 106119100

Sub code : CSPC54

Mobile No : 8290968008

06/12/21

AIML- Endsem

CSPC54

SET-5

10611910C

Rajneesh Pandey

Question 1

PEAS for NURSE of geriatric patient.

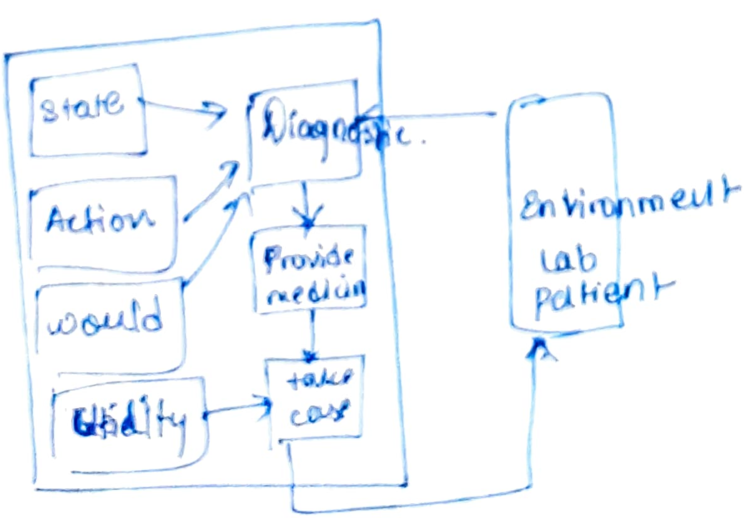
Performance : time of arrival when called, cleanness, Healthy patient, Low cost

Environment : Patient room, ~~Accessories~~, hospital bed, lab, staff, Patient

Actuators : schedule for patient, Medicines, Assessories, diagnose Report,

Sensors : Entry of symtom, Patients answer

Type of agent : Utility based.

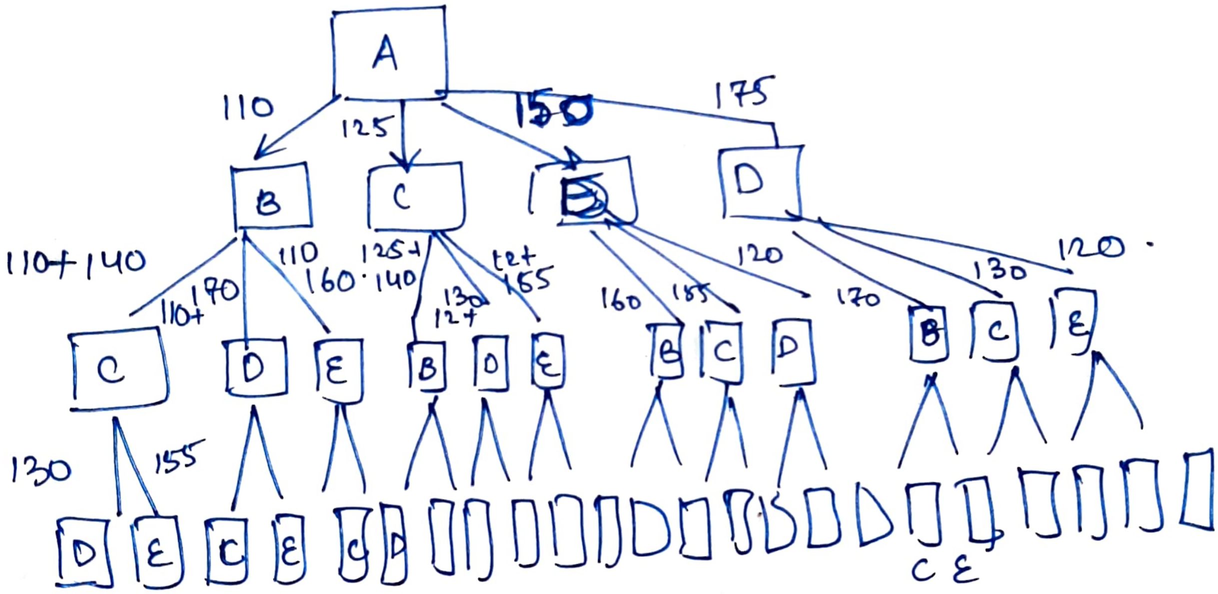


diagrammatically ..

Question ②

	A	B	C	D	E
A	–	110	125	175	150
B	110	–	140	170	160
C	125	140	–	130	155
D	175	170	130	–	120
E	150	160	155	120	–

starting (A)
using heuristic approach to solve using BFS.
Brute First Sea



this will explore all the paths from source to destination

using A* (Greedy) dynamic prog. as heurist
we can get better result

Question (3)

(,) → represent index range tiles out of place

Initial

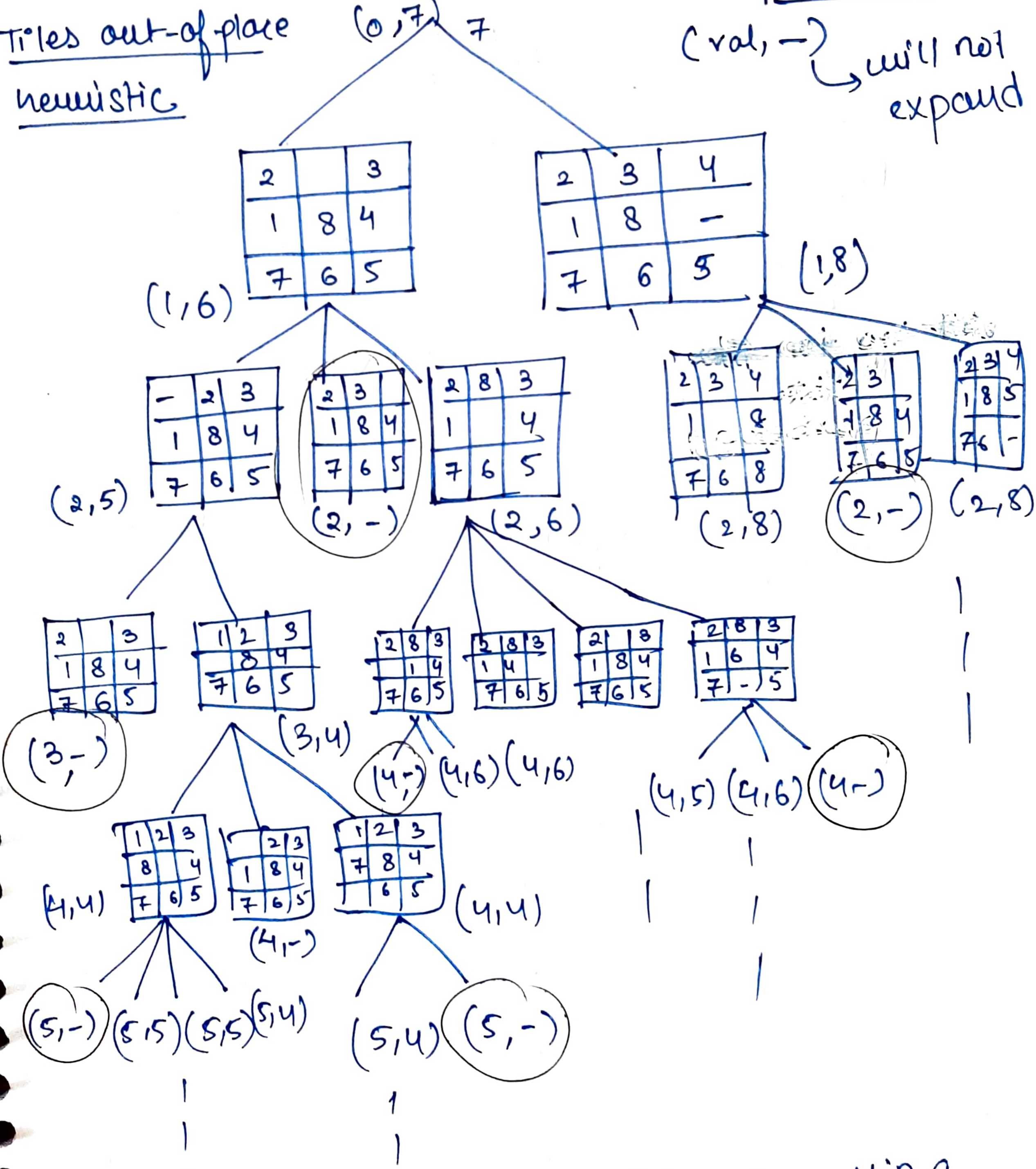
2	3	–
1	8	4
7	6	5

Goal state

1	2	3
5	–	4
8	7	6

Applying A* search with Tiles out-of-place heuristic

(val, –) ↳ will not expand



→ this will go on and will not getting the goal state due to odd inversion*

Question (4)

$(A \vee \sim B) \wedge (\sim A \vee \sim C) \wedge (B \vee D) \wedge (\sim C \vee G) \wedge (\sim D \vee \sim G)$

(A)

$\rightarrow (\sim B \vee \sim C) \wedge (B \vee D) \wedge (\sim C \vee G) \wedge (\sim D \vee \sim G)$

$\rightarrow (\sim C \vee D) \wedge (\sim C \vee G) \wedge (\sim D \vee \sim G)$

$\rightarrow ((\sim C \wedge \sim C) \vee (D \wedge \sim C)) \vee ((\sim G \wedge G) \vee (D \wedge G))$
$\wedge (\sim D \vee \sim G)$

$\rightarrow (\sim C \vee D) \wedge \sim C) \vee ((\sim C \wedge G) \vee (D \wedge G))$
$\wedge (\sim D \vee \sim G)$

→ hence its not entails G.

(B)

The answer can be with or without T/F

Now, 2-CNF clause has two places to put literals.

There are 2n distinct literals, so, there are $(2n)^2 = 4n^2$ syntactically distinct clauses.

as, many of these are semantically identical.

So, we can, resolve them in a Group.

we have,

$\boxed{{}^{2n}C_2}$ clauses with two different literals without ordering

$${}^{2n}C_2 = \frac{2n(2n-1)}{2} = 2n^2 - n$$

So, all these are semantically distinct except those that are equivalent to true

so, we got $2n^2 - 2n + 1$ clauses with distinct literals.

also, $2n$ clause with repeated literals,

So, $(2n^2 - 2n + 1) + 2n$

hence we have $\boxed{2n^2 + 1}$ distinct clauses in all.

Question 5

to prove, $\boxed{10 \leq 8 + 15}$

by axiom S(7) $10 <= 15 \wedge 0 <= 8$.

$\Rightarrow 10 + 0 <= 15 + 8$.

by axiom S(6)

theta $(x_3/15), (y_3/8)$ $15 + 8 <= 8 + 15$

axiom S(4) theta $(x_4/10)$ $10 <= 10 + 0$

so,

theta $(x_2/(10+0))$, $y_2/(15+8)$, $z_2/(8+15))$

by axiom S(8) $10 + 0 <= (15+8) \wedge (8+15)$

$<= (8+15)$.

$\Rightarrow 10 + 0 <= 8 + 15$

by axiom (S(8)

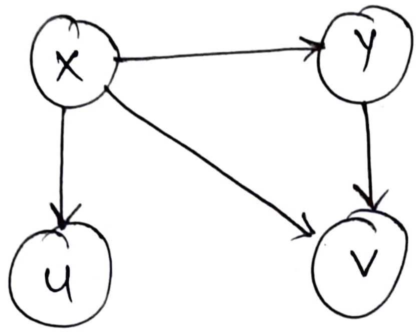
theta $((x_1/10), (y_1/(10+0)), (z_1/(8+15)))$

$10 <= (10+0) \wedge (10+0) <= (8+15)$

$\Rightarrow 10 <= 8 + 15$

hence, we got $\boxed{10 <= 8 + 15}$ Done

Question 6



$P(X) = 0.35$, $P(Y|X) = 0.25$, $P(Y|\sim X) = 0.1$

$P(U|X) = 0.55$, $P(U|\sim X) = 0.35$,

$P(V|x,Y) = 0.65$ $P(V, |X, \sim Y) = 0.25$.

$P(V|\sim X, Y) = 0.3$, $P(V|\sim X, \sim Y) = 0.2$

$$\left\{ P(X,Y,U,V) = P(V|X,Y) \times P(U|X) \times P(Y|X) \right\} \times P(X)$$

now,

v depends on x, y

U depends on X

Y dependent on X.

Substitute value.

$$\boxed{\begin{aligned} P(X,Y,U,V) &= 0.6 \times 0.55 \times 0.25 \times 0.35 \\ &= 0.0313 \end{aligned}}$$

now,

for $P(X|Y)$

we, have

$$P(Y|X) = \frac{P(X|Y) \times P(Y)}{P(X)}$$

$$0.25 = \frac{P(X|Y) \times P(y)}{0.35} \quad \text{— (eq. 1)}$$

$$P(y) = P(Y|X) \times P(X) + P(Y|\sim X) \times P(\sim Y)$$

$$= 0.25 \times 0.35 + 0.1 * 0.65$$

$$=$$

now, $P(Y) = 0.0875 + 0.065$

$$= 0.1525$$

substituting, this in eq. ①

$$0.25 = \frac{P(X|Y) \times 0.1525}{0.35}$$

hence,

$$P(X|Y) = \frac{\overset{5}{\cancel{25}} \times \overset{7}{\cancel{35}}}{\underset{\underset{61}{\cancel{305}}}{15\cancel{25}}} = \frac{35}{61}$$

$$\boxed{P(X|Y) = 0.573}$$

Question (7)

$A_1 = (12, 18, 15)$ $\quad$ $A_4 = (19, 8, 12)$

$A_2 = (20, 15, 21)$ $\quad$ $A_5 = (17, 15, 1)$

$A_3 = (16, 14, 21)$ $\quad$ $A_6 = (16, 4, 12)$

$A_7 = (11, 2, 14)$ $\quad$ $A_8 = (14, 9, 12)$

complete link HAC,

considering lower Δ for Euclidean dist.

	A_1	A_2	A_3	A_4	A_5	A_6	A_7	A_8
A_1	0							
A_2	10.44	0	minimum					
A_3	8.246	4.123	0					
A_4	12.569	11.44	11.22	0				
A_5	15.165	20.22	20.04	13.19	0			
A_6	14.86	14.76	13.45	5.0	15.58	0		
A_7	16.06	17.2	14.76	10.19	19.33	5.74	0	
A_8	9.69	12.36	10.48	5.09	12.88	5.38	7.87	0

as, we have complet link merge

merging will be based upon

$\boxed{\min sim(x, y) \Rightarrow \max dist}$

→ min dist we got $\boxed{A_2 A_3}$

	A_1	$\boxed{A_2 A_3}$	A_4	A_5	A_6	A_7	A_8
A_1	0						
$\boxed{A_2 A_3}$	10.44	0					
A_4	12.569	11.44	0				
A_5	15.165	20.22	13.19	0			
A_6	14.86	14.76	5	15.58	0		
A_7	16.08	17.29	10.19	19.3	5.7	0	
A_8	9.6.	12.36	5.09	12.8.	5.3	7.8	0

→ min

→ merge $A_4 A_6$.

	A_1	$A_2 A_3$	$A_4 A_6$	A_5	A_7	A_8
A_1	0					
$A_2 A_3$	10.44	0				
$A_4 A_6$	14.866	14.7	0			
A_5	15.165	20.2	15.5	0		
A_7	16.062	17.2	10.1	19.3.	0.	
A_8	9.692	12.3	5.38	12.8	7.8	0

→ min.

→ merge $A_4 A_6 A_8$

	A_1	$A_2 A_3$	$A_4 A_6 A_8$	A_5	A_7
A_1	0				
$A_2 A_3$.	10.44	0			
$A_4 A_6 A_8$	14.86	14.7	0		
A_5	15.16.	20.2	15.5	0	
A_7	16.0.	17.2	10.19	19.3	0.

→ min.

→ merge $A_4 A_6 A_7 A_8$.

	A_1	$A_2 A_3$	$A_4 A_6 A_7 A_8$	A_5
A_1	0	min		
$A_2 A_3$	10.4	0		
$A_4 A_6 A_7 A_8$	16.0	17.2	0	
A_5	15.16	20.2	19.3	0

→ merge $A_1 A_2 A_3$

	$A_1 A_2 A_3$	$A_4 A_6 A_7 A_8$	A_5
$A_1 A_2 A_3$	0	min	
$A_4 A_6 A_7 A_8$	17.2	0	
A_5	20.2	19.3	0

→ merge $A_1 A_2 A_3$, A_4, A_6, A_7, A_8.

	$A_1 A_2 A_3 A_4 A_6 A_7 A_8$	A_5
$A_1 A_2 A_3 A_4 A_6 A_7 A_8$.	0	
A_5	20.22	0

Now,

→ we merge,

A_5 with $A_1 A_2 A_3 A_4 A_6 A_7 A_8$

$\boxed{\text{total No. of epochs} = 7}$

Dendogram

A1 A2 A3 A4 A6 A8 A7 A5