RADHIKA PATWARI
18CS10062

PAGE NO
DATE: 25/9/2021

Class Test-2 [CS60045][AI]

1.

(a) Variables = {1, 2, 3, 4, 5, 6, 7, 8}

Domains (D_i for ith variable)

D_1 = { style, stain, onset, apple, store, stone, entry, after, otter, other}

D_2 = { style, stain, onset, apple, store, stone, entry, after, otter, other}

D_3 = { exit, rare, dart, nerd, stay, star, ante}

D_4 = { exit, rare, dart, nerd, stay, star, ante}

$D_5 = D_4$

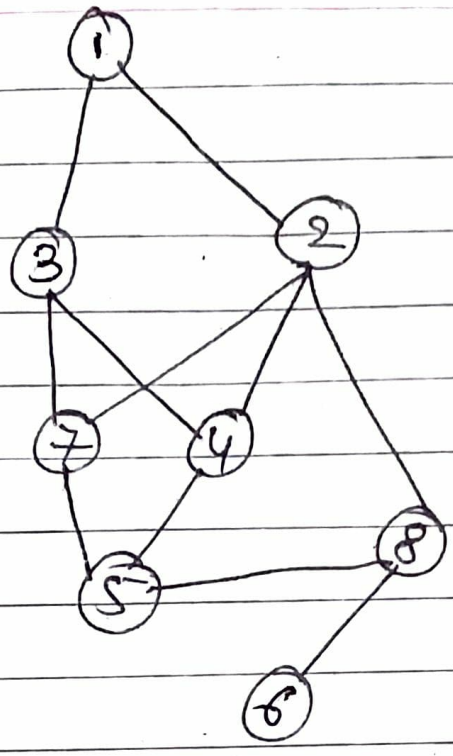
D_6 = { are, end, art, add, rod}

$D_7 = D_6$

$D_8 = D_4$

PAGE NO
DATE: / /

CSP Graph



Arc Consistency

(b) D_1 = { style, stain, onset, apple, store, stone, entry, after, other, other }

D_2 = { style, stain, onset, apple, store, stone, entry, after, other, other }

D_3 = { exit, rare, dark, nerd, stay, star, ante }

D_4 = { exit, rare, dark, nerd, stay, star, ante }

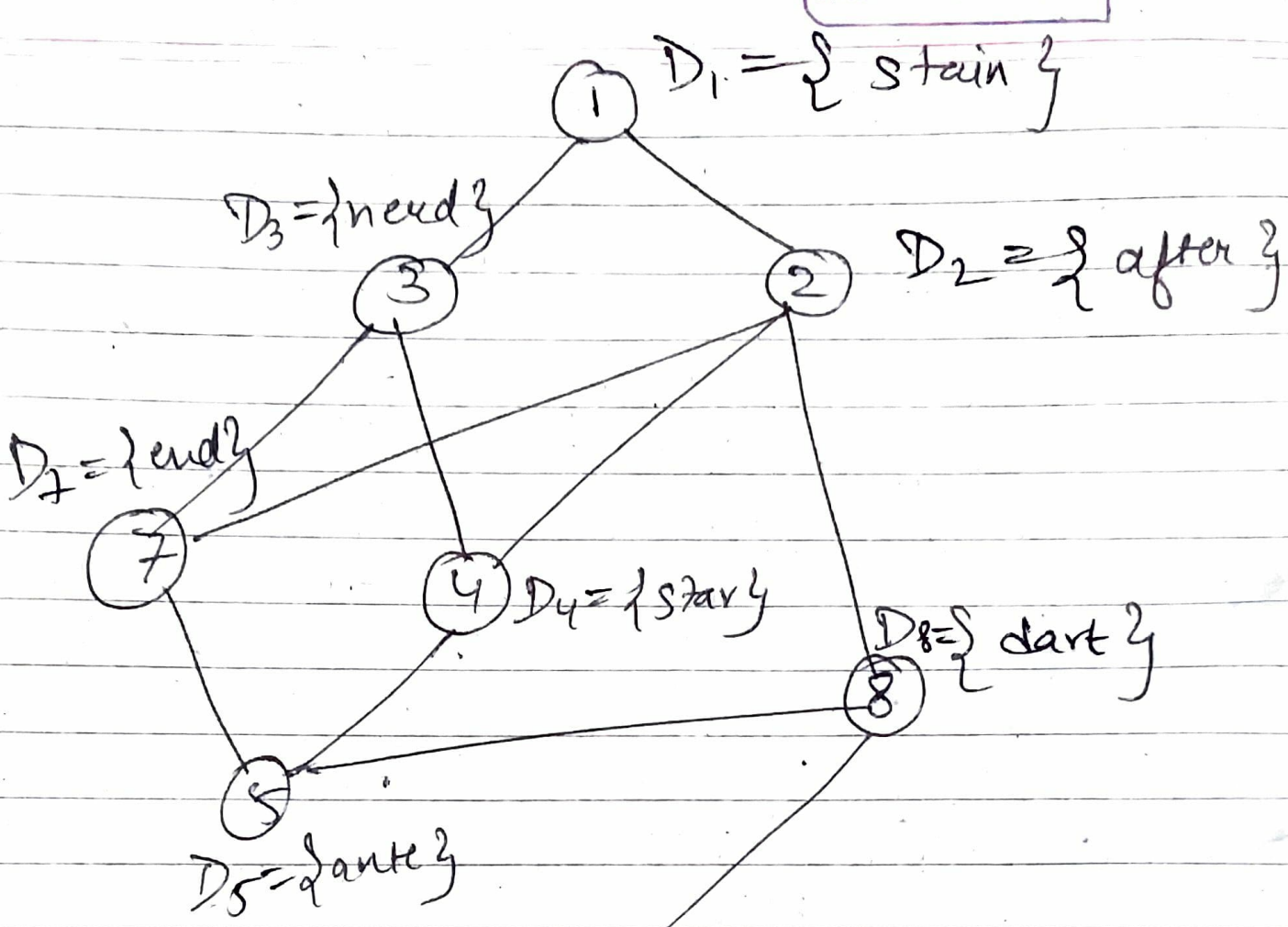
D_5 = { exit, rare, dark, nerd, stay, star, ante }

D_6 = { are, end, art, add, rod }

D_7 = { are, end, art, add, rod }

D_8 = { exit, rare, dark, nerd, stay, star, ante }

PAGE NO.
DATE: / /



(c) Only 1 consistent solution is obtained

1 s	t	2 a	i	3 n
–	–	f	–	e
–	4 s	t	5 a	r
6 a	–	7 e	n	d
8 d	a	r	t	–
d	–	–	e	–

2. Sound implies

deduction logic is valid for all interpretations

Complete implies

deduction logic is provable to be true

For propositional logic, reduction reputation terminates and proves that deduction logic is valid

→ Thus, it is sound & complete.

PAGE NO
DATE: / /

3.

(a) play(x,y) : x play for team y

captain(x,y) : x is captain of team y

friend(x,y) : x is friend of y

dislike(x,y) : x dislikes y

betray(x,y) : x betrays y

(b) F1 : play(Pritam, BigTeam)

F2 : captain(Mahan, BigTeam)

F3 : $\forall x$ (play(x, BigTeam) $\rightarrow$ (friend(x, Mahan) $\vee$ dislike(x, Mahan)))

F4 : $\forall x \forall y$ (friend(x,y) $\rightarrow \neg$ betray(x,y))

F5 : $\forall x \forall y$ (betray(x,y) $\rightarrow \neg$ friend(x,y))

F6 : betray(Pritam, Mahan)

b1 : $\forall x \forall y$ (play(Pritam, x) $\wedge$ dislike(Pritam, y) $\wedge$

Captain (y, x))

(C) C_1 = play (Pritam, Big Team)

C_2 = Captain (Mahan, Big Team)

F_3: $\forall x$ (¬play (x, BigTeam) V friend (x, Mahan) V dislike (x, Mahan)

C_3 = ¬play (x, BigTeam) V friend (x, Mahan) V dislike (x, Mahan)

F_4 = $\forall x \forall y$ (friend (x, y) → ¬ betray (x, y))
= $\forall x \forall y$ (¬friend (x, y) V ¬ betray (x, y)

C_4 = ¬ friend (x, y) V ¬ betray (x, y)

F_5 = $\forall x \forall y$ (betray (x, y) → ¬ friend (x, y))
= $\forall x \forall y$ (¬betray (x, y) V ¬ friend (x, y))

C_5 = ¬ betray (x, y) V ¬ friend (x, y)

C_6 = betray (Pritam, Mahan)

¬ G_1 = C_7 = ¬play (Pritam, x) V dislike (Pritam, y) V Captain (y, x)

PAGE NO.
DATE: / /

$C_1, C_2 \ldots C_7$ are the clauses

Form = $(C_1 \wedge C_2 \wedge C_3 \wedge C_4 \wedge C_5 \wedge C_6 \wedge C_7)$

(d) Goal cannot be logically concluded

C_5 & $C_6 \rightarrow C_8 \rightarrow \neg$ friend (Pritam, Mohan)

C_8 & $C_3 \rightarrow C_9 \rightarrow \neg$ play (Pritam, BigTeam)
$\vee$ dislike (Pritam, Mohan)

C_9 & $C_4 \rightarrow C_{10} \rightarrow$ dislike (Pritam, Mohan)

C_{10} & $C_7 \rightarrow C_{11} \rightarrow \neg$ play (Pritam, x)
$\vee$ Captain (Mohan, x)

$C_2 \rightarrow$ Captain (Mohan, BigTeam)

Now this cannot be further reduced.
Hence cannot be solved