M T W T F S DATE: __/__/____

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(a)

Suppose class 1, class 2, class 3, class 4 and class 5 are equal to C_1, C_2, C_3, C_4 and C_5

Suppose,
Dr Richard to be equal to A
Dr John be equal to B
Dr Samantha be equal to C.

Variable	Domain	
C_1	$\{C\}$	A teaches C_3 and C_4
C_2	$\{B, C\}$	B teaches C_2, C_3, C_4
C_3	$\{A, B, C\}$	and C_5
C_4	$\{A, B, C\}$	C teaches C_1, C_2, C_3
C_5	$\{B, C\}$	C_4, C_5

Constraints:

We will decide constraints according to timings of classes. So timings collapsing with eachother will cause constraints.
For example, C_1 will be at 8 till 9 whereas C_2 will be from 8:30 - 9:30, so timings are collapsing where as C_3 and C_4 and C_5 will be after 9. So $C_1 \neq C_2$.
Similarly,

$C_2 \neq C_3$
$C_2 \neq C_4$
$C_3 \neq C_4$
$C_3 \neq C_5$
$C_4 \neq C_5$

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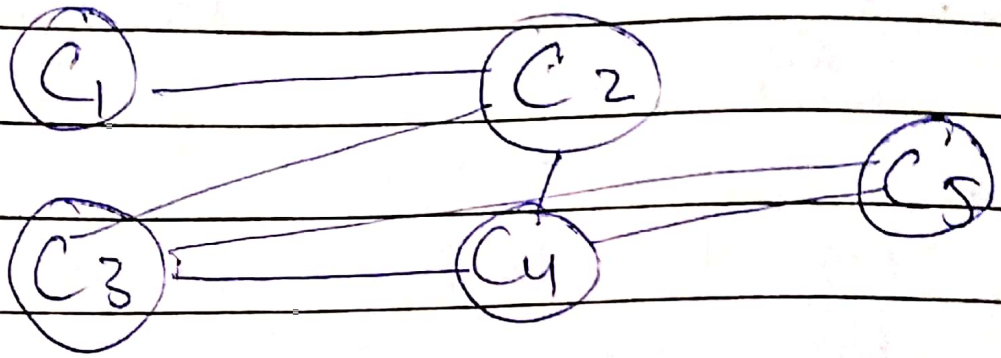
(b)



(C)

Final solution where all constraints are satisfied will be

Class 1	class 2	class 3
C	B	A

class 4	Class 5
C	B

∴ A = Dr Richard

B = Dr John

C = Dr Samantha

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(d)

Unary constraints	C	BC	ABC	ABC	BC
	C_1	C_2	C_3	C_4	C_5
initial $C_1 = C$	C	B	A, C	A, C	B, C
$C_2 = B$	C	B	A, C	A, C	B, C
$C_3 = A$	C	B	A	C	B, C
Now $C_4 = C$	C	B	A	C	B

→ Since C_1 has only C so initial value of $C_1 = C$. then B will be assigned to C_2 because $C_1 \neq C_2$.

→ Now C_1 already has C and C_2 has B so B will be removed from C_3 and C_4

→ $C_4 = C$, so C will be removed from C_5.

(e)

Tree base CSPs has less time complexity as it can be solved in $O(nd^2)$ where as general CSPs take more time in solving problem and worst case is $O(d^n)$. In tree structured, variables are attached as nodes with the preceding parents so a sequence is maintained with consistent assignments without back tracking.