

ARTIFICIAL INTELLIGENCE ASSIGNMENT #2

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a) Provide a formal definition

CSC101 \rightarrow S1

CSC462 \rightarrow S2

CSC452 \rightarrow S3

CSC501 \rightarrow S4

CSC502 \rightarrow S5

Dr Richard \rightarrow R

Dr John \rightarrow J

Dr Samantha \rightarrow S

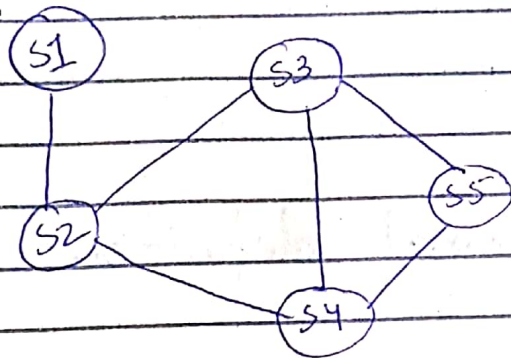
Variables = $\{ S1, S2, S3, S4, S5 \}$

Domain = $\{ R, J, S \}$

Constraints:

$\{ (S1 \neq S2), (S2 \neq S3), (S2 \neq S4), (S3 \neq S4), (S3 \neq S5), (S4 \neq S5) \}$

b. Create a graphical Representation



c. Provide final Solution

It can be shown that

S1 can be taught by S

S2 can be taught by J and S

S3 " " " by R, J and S

S4 " " " by R, J and S

S5 " " " by J and S

The time table could be

S1 \rightarrow S

S2 \rightarrow J

S3 \rightarrow S

S4 \rightarrow R

S5 \rightarrow J

hence

$\{(S1, S), (S2, J), (S3, S), (S4, R), (S5, J)\}$

d) Do a forward-Pass and show step by step manner

| S1 | S2 | S3 | S4 | S5 |
|----|------|---------|---------|------|
| S✓ | J, S | R, J, S | R, J, S | J, S |
| S | J✓ | R, J, S | R, J, S | J, S |
| S | J | R, S✓ | R, S | J, S |
| S | J | S | R✓ | J✓ |

e) In a few sentences, mention the benefits of creating tree based CSPs.

The complexity of solving a CSP is strongly related to the structure of its constraint graph. Tree-structured problems can be solved in linear time. The time complexity will be reduced as since each edge from a parent to child is arc-consistent, we know that for any value we choose for parent, there will be valid left to choose for child. This means we don't need to backtrack, we can move linearly through variables.