**Name: Kulsoom Khurshid**

**Registration #: SP20-BCS-044**

**ASSIGNMENT # 2**

**Question 1)**

You are required to create a timetable for your own batch. The classes are held only three days a week namely Mondays, Wednesdays, and Fridays. On each day 5 classes can be taken, or you have 5 slots. There are three professors who will be taking these courses. While making a schedule, keep in mind that one professor can take only one class at a time. The classes are:

* CSC101 - Introduction to Computer Programming: allocated slot 8:00-9:00am.
* CSC462 - Introduction to Artificial Intelligence: allocated slot 8:30-9:30am.
* CSC452 - Natural Language Processing: allocated slot 9:00-10:00am.
* CSC501 - Computer Vision: allocated slot 9:00-10:00am.
* CSC502 - Machine Learning: allocated slot 9:30-10:30am.

The professors are:

* Dr Richard, who can teach CSC452 and CSC501.
* Dr John, who can teach CSC462, CSC452, CSC501 and CSC502.
* Dr Samantha, who can teach CSC101, CSC462, CSC452, CSC501 and CSC502.

Given this scenario, provide answers to the following:

1. Provide a formal definition.

|  |  |
| --- | --- |
| **Variables** | **Domain** |
| CSC101 | Dr Samantha |
| CSC462 | Dr John, Dr Samantha |
| CSC452 | Dr Richard, Dr John, Dr Samantha |
| CSC501 | Dr Richard, Dr John, Dr Samantha |
| CSC502 | Dr John, Dr Samantha |

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| **Constraints** |
| CSC101≠CSC462 |
| CSC452≠CSC501 |
| CSC452≠CSC501 |
| CSC501≠CSC502 |
| CSC462≠CSC501 |
| CSC462≠CSC452 |

The following constraints are based same times and same teachers:

* At 8:30, and can have the teacher as Dr. Samantha

Alldiff(CSC101, CSC462)

* Between 9:00-9:30 and can have the teacher as Dr. John and Dr. Samantha

Alldiff(CSC452, CSC462, CSC501)

* At 9:30 and can have the teacher as Dr. John and Dr. Samantha

Alldiff(CSC452, CSC501, CSC502)

1. Create a graphical representation.

Csc 101

Csc 502

Csc462

Csc 501

Csc 452

1. Provide any final solution.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CSC101**: Dr Samantha | **CSC462**: Dr John | **CSC452**: Dr Samantha | **CSC501**: Dr Richard | **CSC502**: Dr John |

1. Do a forward-pass and show in a step-by-step manner.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Initial Value** | **CSC101** | **CSC462** | **CSC452** | **CSC501** | **CSC502** |
|  | Dr Samantha | Dr Samantha, Dr John | Dr Samantha, Dr John, Dr Richard | Dr Samantha, Dr John, Dr Richard | Dr Samantha, Dr John |
| **CSC101:** Dr.Samantha | Dr Samantha | Dr John | Dr Samantha / Richard | Dr Samantha / Dr Richard | Dr John |
| **CSC452:** Dr.Richard | Dr Samantha | Dr John | Dr Samantha | Dr Richard | Dr John |
| **CSC501:** Dr.Richard | Dr Samantha | Dr John | Dr Richard | Dr Samantha | Dr John |

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

Following are the benefits of tree based CSP’s:

* You can set an ordering for tree-structured CSPs in which parent node comes before child node.
* Then you can allocate the nodes greedily in sequence and find a consistent assignment without having to backtrack.
* Tree based CSPs has no loops.