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Artificial Intelligence / Data Visualization and Communication CA

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# Introduction

**Tasks for Artificial Intelligence**

Ciara is looking for employees for her new company, which develops and provides AI based logistic software for retailers. Ciara has determined that she needs: 2 Python Programmers, 2 AI Engineers, 1 Web Designer, 1 Database Admin, and 1 Systems Engineer. Assume that if a person has two abilities, he or she can take on two roles in the company.

Using any CSP (Constraint Satisfaction Problem) framework (using variables, value domains, and constraints), discover if the above problems can be solved and if so, detail who would be in hired**.**

Discuss in detail how using Constraint Satisfaction finds an answer or finds no solution to the problems in Tasks for Artificial Intelligence part 1. How does this differ from standard algorithmic solutions?

These problems be solved using several other algorithm’s we have studied in the module. Choose one of these algorithms and discuss your answer in detail including a proof of your hypothesis in code**.**

**Tasks for Data Visualisation**

Use appropriate visualisations to help communicate the CSP scenario and the corresponding solutions, if any, to the appropriate stakeholders.

Create interactive visualisation(s) to allow a user to explore alternate constraint scenarios.

Create GUI(s) to allow a user to explore alternate constraint scenarios.

Include in your report a section for a theoretical AI “team” you are part of, explaining the visualisation processes and rationalising your visualisation decisions (e.g., chart choice, colour, layout etc).

# Report

# **Artificial Intelligence**

*Scenario 1*

*Variables*

The variables for this scenario are all the names involved. {Peter, Juan, Jim, Jane, Mary, Bruce, Anita}.

*Value Domain:*

Value Domain for this scenario are the variables with the abilities they have.

{Peter Python and AI

Juan Web and AI

Jim AI and Systems

Jane Python and Database

Mary Web and Systems

Bruce Systems and Python

Anita Web and AI}

*Constraints*

Constraints for this scenario are the numbers of hires they can have, 2 Python Programmers, 2 AI Engineers, 1 Web Designer, 1 Database Admin, and 1 Systems Engineer,

and that Ciara knows Python.

*Result*

Scenario 2

*Variables*

The variables for this scenario are all the names involved. {Peter, Juan, Jim, Jane, Mary, Bruce, Anita}.

*Value Domain*

Value Domain for this scenario are the variables with the abilities they have.

{Peter Python and AI

Juan Web and AI

Jim AI and Systems

Jane Python and Database

Mary Web and Systems

Bruce Systems and Python

Anita Web and AI}

*Constraints*

Constraints for this scenario are the numbers of hires they can have, 2 Python Programmers, 2 AI Engineers, 1 Web Designer, 1 Database Admin, and 1 Systems Engineer,

# *Result*

# *CSP Framework for Solving Problems*

Constraint Satisfaction Problem is the method used to find a solution to a one or more constraints within a problem, finding values for a group of variables that will satisfy the requirements. CSP has three components: Variables, Value Domain and Constraints.

Variables: Values that need to be determined are known as variable, they need to be assigned to satisfy a set of constraints. In our case the variables were the name of each person.

Value Domain: The value that each variable can have or hold is known as value domain. In our case, each variable, name, hold one or two values, the abilities and those abilities were the Value Domain.

Constraints:

How CSP finds an answer for scenario 1:

How CSP finds an answer for scenario 2:

*CSP Vs Standard Algorithms*

CSP stands for Constraints Satisfaction Problem and those constraints have requirements that need to be met to be completed. Is very used to solve problems where it is needed to assign values to variables in a way where all restrictions are satisfied. To solve CSP all is needed is to define what are the variables, domain value and constraints of our problem, apply the algorithm and look for the optimal solution that satisfies all constraints.

Standard Algorithms

*Alternative Framework for Solving Problems*

# **Data Visualization and Communication**

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# Conclusion

# References

https://www.geeksforgeeks.org/constraint-satisfaction-problems-csp-in-artificial-intelligence/