

Problem 6.1 Scheduling CS Classes as a CSP

Answer:

According to the problem description,

Variables \Rightarrow One variable per class

Domain \Rightarrow Professors available for that class

Constraints \Rightarrow In this binary CSP problem, two classes which has time clash could not have same professor

1. Formulating the problem as a Binary CSP problem:

Set of Variables & Domain are as follows,

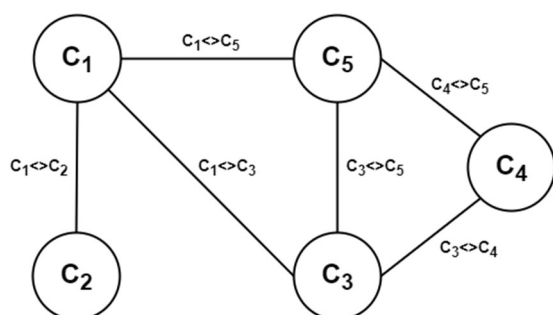
Class Name	Class	Class Time	Variables	Domains
Intro to Artificial Intelligence	Class 1	08:30 – 09:30 am	C_1	$D_{C_1} = \{A\}$
Intro to Programming	Class 2	08:00 – 09:00 am	C_2	$D_{C_2} = \{A, C\}$
Natural Language Processing	Class 3	09:00 – 10:00 am	C_3	$D_{C_3} = \{A, B, C\}$
Machine Learning	Class 4	09:30 – 10:30 am	C_4	$D_{C_4} = \{A, B, C\}$
Computer Vision	Class 5	09:00 – 10:00 am	C_5	$D_{C_5} = \{A, C\}$

Possible combination of binary constraints $\left[C_2^5 = \frac{5!}{2! (5-2)!} = 10 \right]$, and their suitability according to the class time are as follows,

$C_1 \neq C_2$	\sqrt	$C_2 \neq C_3$	\times	$C_3 \neq C_4$	\sqrt	$C_4 \neq C_5$	\sqrt
$C_1 \neq C_3$	\sqrt	$C_2 \neq C_4$	\times	$C_3 \neq C_5$	\sqrt	-	
$C_1 \neq C_4$	\times	$C_2 \neq C_5$	\times	-		-	
$C_1 \neq C_5$	\sqrt	-		-		-	

Therefore, Constraints: $C_1 \neq C_2, C_1 \neq C_3, C_1 \neq C_5, C_3 \neq C_4, C_3 \neq C_5, C_4 \neq C_5$

2. Constraint Graph:



3. A Total Inconsistent Assignment: $C_1 = A, C_2 = C, C_3 = B, C_4 = A, C_5 = A$

A Solution: $C_1 = A, C_2 = C, C_3 = B, C_4 = A, C_5 = C$