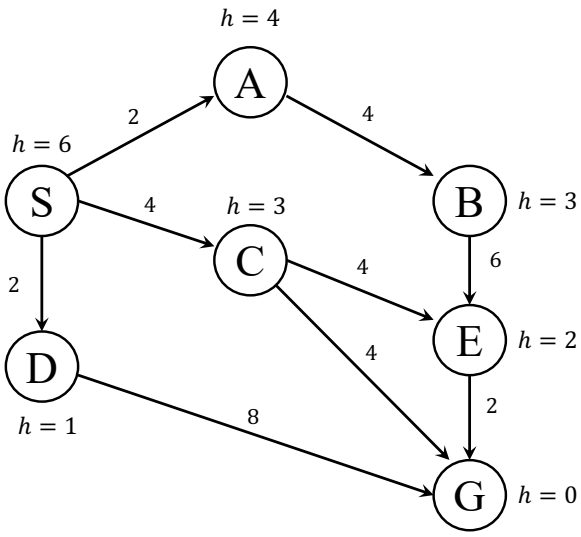
Informed Search

Given the graph below, suppose you want to go from start state "S" to goal state "G", write down the order in which the states are *visited* and the path found by the following search algorithms. Ties (e.g., which child to first explore in depth-first search) should be resolved alphabetically (i.e., prefer A before Z). Remember to include the start and goal states in your answer. Assume that algorithms execute the goal check when nodes are visited, not when their parent is expanded to create them as children. *If a state is visited more than once, write it each time*.



(a) Iterative deepening depth first search:

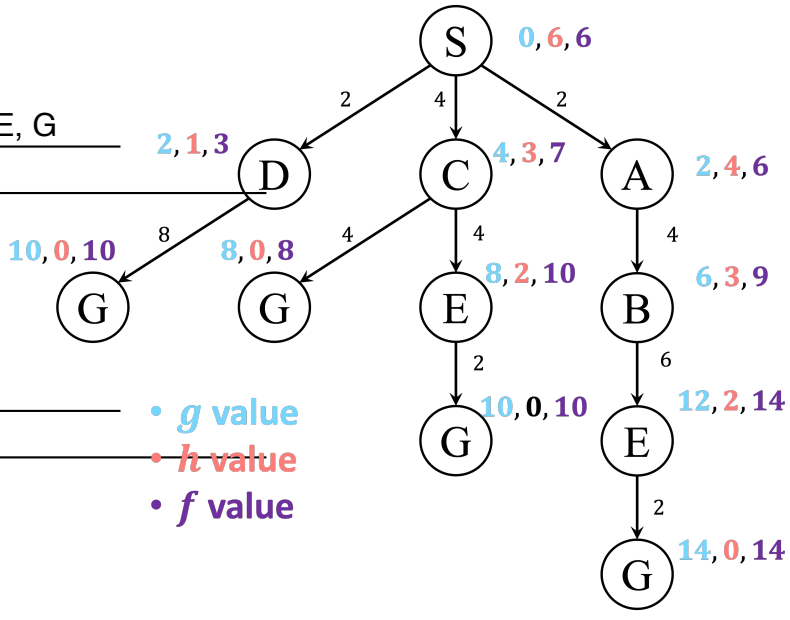
Visited order: S, S, A, C, D, S, A, B, C, E, G

Solution (path length: 8): S, C, G

(b) Uniform Cost Search:

Visited order: S, A, D, C, B, E, G

Solution (path length: 8): S, C, G



(c) A* Search (assume $f(n) = g(n) + h(n)$):

Visited order: S, D, A, C, G

Solution (path length: 8): S, C, G

Course Scheduling

You are in charge of scheduling electrical engineering classes that meet on Mondays, Wednesdays, and Fridays. There are 5 classes that meet on these days and 3 professors who will be teaching these classes. You are constrained by the fact that each professor can only teach one class at a time.

The classes are:

1. Class 1 - Circuits and Systems: meets from 8:00 - 9:00 am
2. Class 2 - Digital Logic Fundamentals: meets from 8:30 - 9:30 am
3. Class 3 - Electromagnetic Fields and Waves: meets from 9:00 - 10:00 am
4. Class 4 - Control Systems: meets from 9:00 - 10:00 am
5. Class 5 - Microprocessors and Digital Systems: meets from 9:30 - 10:30 am

The professors are:

1. Professor A, who is qualified to teach Classes 3 and 4.
2. Professor B, who is qualified to teach Classes 2, 3, 4, and 5.
3. Professor C, who is qualified to teach Classes 1, 2, 3, 4, and 5.

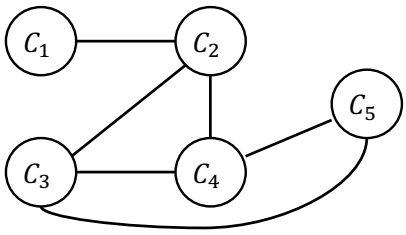
(a) Formulate this problem as a CSP problem in which there is one variable per class, stating the domains, and constraints. Constraints should be specified formally and precisely, but may be implicit rather than explicit.

Variables	Domains
C_1	{C}
C_2	{B, C}
C_3	{A, B, C}
C_4	{A, B, C}
C_5	{B, C}

Constraints

$C_1 \neq C_2$
$C_2 \neq C_3$
$C_2 \neq C_4$
$C_3 \neq C_4$
$C_3 \neq C_5$
$C_4 \neq C_5$

(b) Draw the constraint graph associated with your CSP.



(c) Give one solution to this CSP (i.e., a solution that satisfies all constraints).

$C_1 = C, C_2 = B, C_3 = C, C_4 = A, C_5 = B.$
One other solution: $C_1 = C, C_2 = B, C_3 = A, C_4 = C, C_5 = B.$