REVIEW EXERCISE 04

Question 1. You are designing a menu for a special event. The menu includes four dishes, each of which is a variable: **(A)**ppetizer, **(B)**everage, main **(C)**ourse, and **(D)**essert.
The domains of the variables are as follows:

A: (v)eggies, **(e)**scargot
B: (w)ater, **(s)**oda, **(m)**ilk
C: (f)ish, **(b)**eef, **(p)**asta
D: (a)pple pie, **(i)**ce cream, **(ch)**eese

Because all of your guests get the same menu, it must obey the following dietary constraints:

(i) Vegetarian options: If you serve the veggies, you must avoid everything made of meat (red meat, poultry, seafood, etc.)
(ii) Dairy products lover: You must serve at least one of milk, ice cream, or cheese.
(iii) Digestible: The main course must be fish, or the beverage must be water or soda.

Formulate the problem as a CSP, stating the variables and corresponding domains.

Variables	A	B	C	D
Domains	v, e	w, s, m	f, b, p	a, i, ch

Binary constraints:

A and C	B and D	C-B

Draw the constraint graph associated with your CSP, in which each node represents a variable and an edge connecting two nodes represents the relation between the two variables denoted by these nodes.

A - C, - B - D

Again, imagine we first assign A=v. Cross out eliminated values to show the domains of the variables after arc consistency has been enforced.

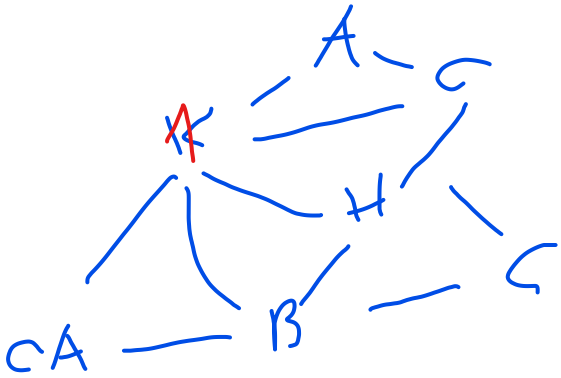
Variables	A	B	C	D
Domains	v	w, s	p	i, ch

Give a solution for this CSP or state that none exists.

Question 2. You are a map-coloring robot assigned to color the given map. Adjacent regions must be colored a different color (R=Red, B=Blue, G=Green).

Map of south-west of Vietnam

a) Draw the constraint graph



b) Find a solution by using backtracking search with appropriate heuristics (MRV, DH, and LCV). Justify your answer.

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