Q3: PAC-CORP Assignments

Q3: PAC-CORP Assignments

Your CS188 TAs have all secured jobs at PAC-CORP. Now, PAC-CORP must assign each person to exactly one team. The TAs are Alvin (A), Chelsea (C), Lisa (L), Rohin (R), Sandy (S), and Zoe (Z). We would like to formulate this as a CSP using one variable for each TA. The teams to choose from are:

Team 1: Ghostbusting
Team 2: Pellet Detection
Team 3: Capsule Vision
Team 4: Fruit Processing
Team 5: R&D
Team 6: Mobile

The TAs have the following preferences. Note that some of the teams may not receive a TA and some of the teams may receive more than one TA.

i. Alvin (A) and Chelsea (C) must be on the same team.
ii. Sandy (S) must be on an even team (2, 4, or 6).
iii. Lisa (L) must be on one of the last 3 teams.
iv. Alvin (A) and Rohin (R) must be on different teams.
v. Zoe (Z) must be on Team 1 Ghostbusting or Team 2 Pellet Detection.

vi. Chelsea's (C) team number must be greater than than Lisa's (L) team number.

vii. Lisa (L) cannot be on a team with any other TAs.

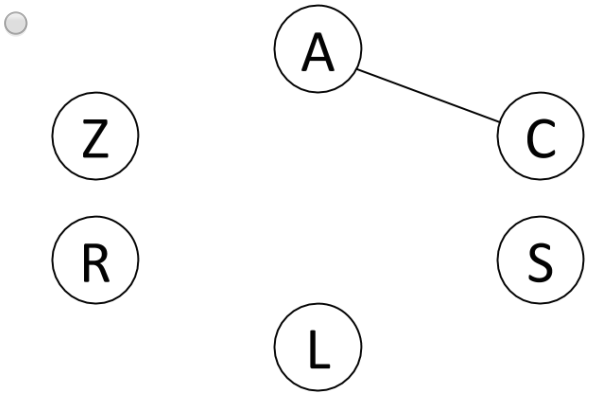
Hide Constraints

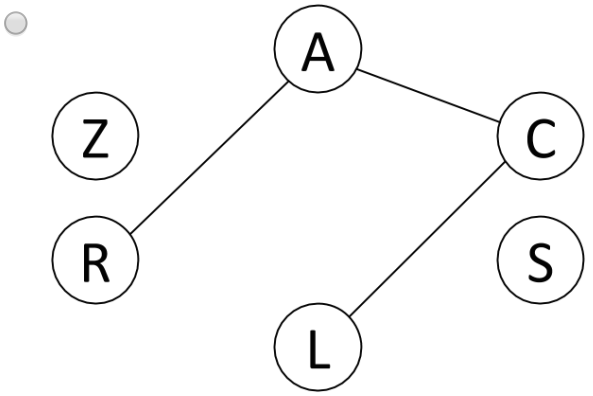
We recommend you work out the solutions to the following questions on a sheet of scratch paper, and then enter your results below.

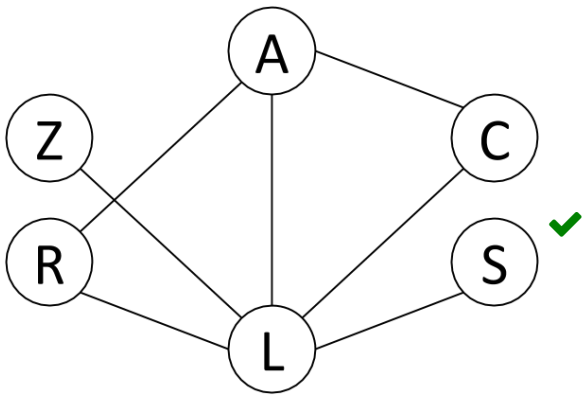
Part 1

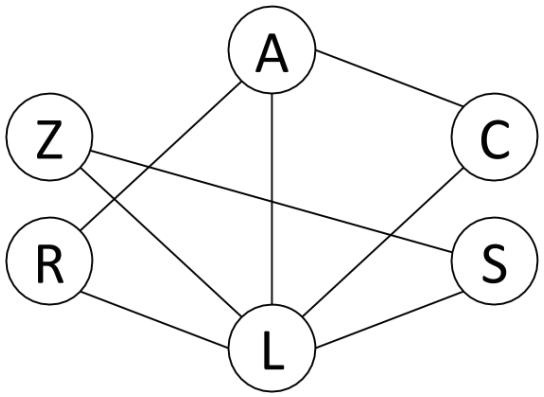
0.0/3.0 points (graded)

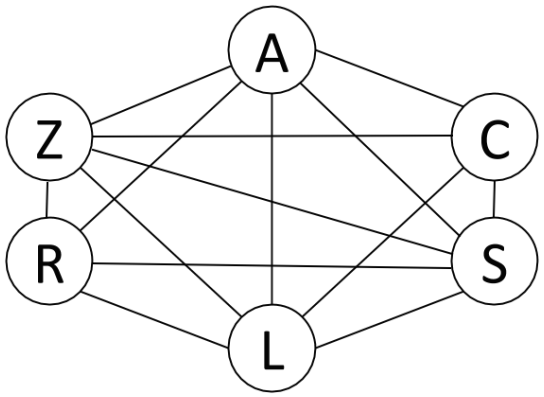
Choose the correct constraint graph for this CSP (note that doing so only involves the binary constraints).











Explanation
Binary constraints are 1, 4, 6, and 7. Constraint 1 connects A and C. Constraint 4 connects A and R. Constraint 6 connects C and L. Constraint 7 connects L with all other variables.

Submit

You have used 0 of 1 attempt

Answers are displayed within the problem

Part 2

0.0/2.0 points (graded)

On the grid below, select the values that are **not** removed from the domains after enforcing all unary constraints.

A	C	S	L	R	Z
☑ 1 ✔	☑ 1 ✔	☐ 1	☐ 1	☑ 1 ✔	☑ 1 ✔
☑ 2 ✔	☑ 2 ✔	☑ 2 ✔	☐ 2	☑ 2 ✔	☑ 2 ✔
☑ 3 ✔	☑ 3 ✔	☐ 3	☐ 3	☑ 3 ✔	☐ 3
☑ 4 ✔	☑ 4 ✔	☑ 4 ✔	☑ 4 ✔	☑ 4 ✔	☐ 4
☑ 5 ✔	☑ 5 ✔	☐ 5	☑ 5 ✔	☑ 5 ✔	☐ 5
☑ 6 ✔	☑ 6 ✔	☑ 6 ✔	☑ 6 ✔	☑ 6 ✔	☐ 6

Unary constraints are constraint 2, 3, and 5. Constraint 2 removes 1, 3, and 5 from the domain of S. Constraint 3 removes 1, 2, and 3 from the domain of L. Constraint 5 removes 3, 4, and 5 from the domain of Z.

Submit

You have used 0 of 2 attempts

Answers are displayed within the problem

Part 3

0.0/2.0 points (graded)

Consider the filtered domains obtained in Part 2 from enforcing the unary constraints. According to Minimum Remaining Values (MRV), which variable should be selected?

- ○ A
- ○ C
- ○ S
- ○ L
- ○ R
- ◉ Z ✔

Explanation
Z has the fewest values remaining in it's domain, so it will be assigned first by MRV.

Submit You have used 0 of 1 attempt

ℹ Answers are displayed within the problem

Part 4

0.0/3.0 points (graded)
Assume a current set of filtered domains as shown below. Select the values that are **not** eliminated by enforcing arc consistency at this stage. You should *only* enforce binary constraints.

A	C	S	L	R	Z
☐ 1	☐ 1	☑ 4 ✔	☑ 2 ✔	☑ 1 ✔	☑ 1 ✔
☐ 2	☑ 4 ✔		☑ 3 ✔	☐ 4	☑ 2 ✔

- [ ] 3
- [x] 4
- [ ] 5
- [ ] 6

- [ ] 4
- [ ] 5
- [ ] 6

- [x] 5
- [x] 6

- [x] 3
- [x] 4
- [x] 5
- [x] 6

The arcs that prune values are below.
C-L: Constraint 6 removes 1 from C.
A-C: Constraint 1 removes 1, 2, 3, 5 and 6 from A.
R-A: Constraint 4 removes 4 from R.
L-C: Constraint 1 removes 4, 5, and 6 from C.

Submit

You have used 0 of 2 attempts

Answers are displayed within the problem