→ Salad (Vegetarian) $10
→ Pizza Margherita (vegetarian) $13
→ Burger (Not vegetarian) $15

* Alice is a vegetarian
* Bob always spends more money than Charlie on food
* Charlie hates Italian food
* Alice, Bob, and Charlie never choose the same food.

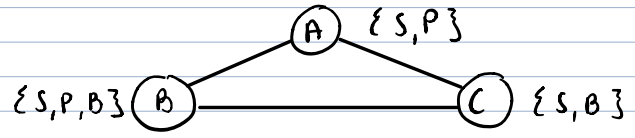
1. Variables: A, B, C (Alice, Bob, Charlie)
Domains: {S, P, B} (Salad, Pizza, Burger)
Constraints:
Implicit: A ≠ B ≠ C → All 3 must have different foods
Explicit: (A, B, C) ∈ {(S,P,B), (S,B,P), (P,S,B), (P,B,S), (B,P,S), (B,S,P)}

Implicit: Charlie hates Italian → all possibilities
Explicit: (C) ∈ {(S), (B)} no pizza

Implicit: Alice is vegetarian → all possibilities
Explicit: (A) ∈ {(S), (P)} no meat

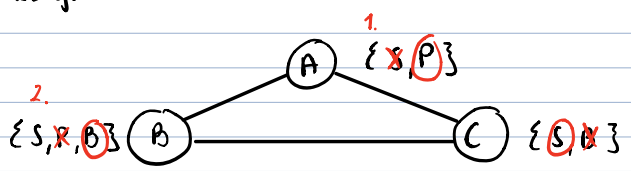
Implicit: Bob spends more than Charlie
Explicit: (B, C) ∈ {(B,P), (B,S), (P,S)} → all possibilities B > C

2.



The constraint graph depicts Alice, Bob, and Charlie to be connected. This is because the decision of one individual has the ability to affect the constraints of the other. For example, we know all 3 never choose the same food... so if Alice selects the salad, that leaves Bob with no choice but to get the pizza since Charlie hates Italian food, BUT let us not forget that is not a valid configuration because Bob always spends more than Charlie and the pizza is less expensive than the burger.

3.



* All 3 individuals start off with the domain {S, P, B} up until we apply unary constraints and then you get the updated domains seen to the left.

The variables are consistent when Alice gets the pizza, Bob gets the burger, and Charlie gets the salad. In this scenario Alice gets a vegetarian meal, Charlie gets a non-Italian meal, and Bob spends more than Charlie, satisfying all constraints.

The final domain: A = {P}, B = {B}, C = {S}