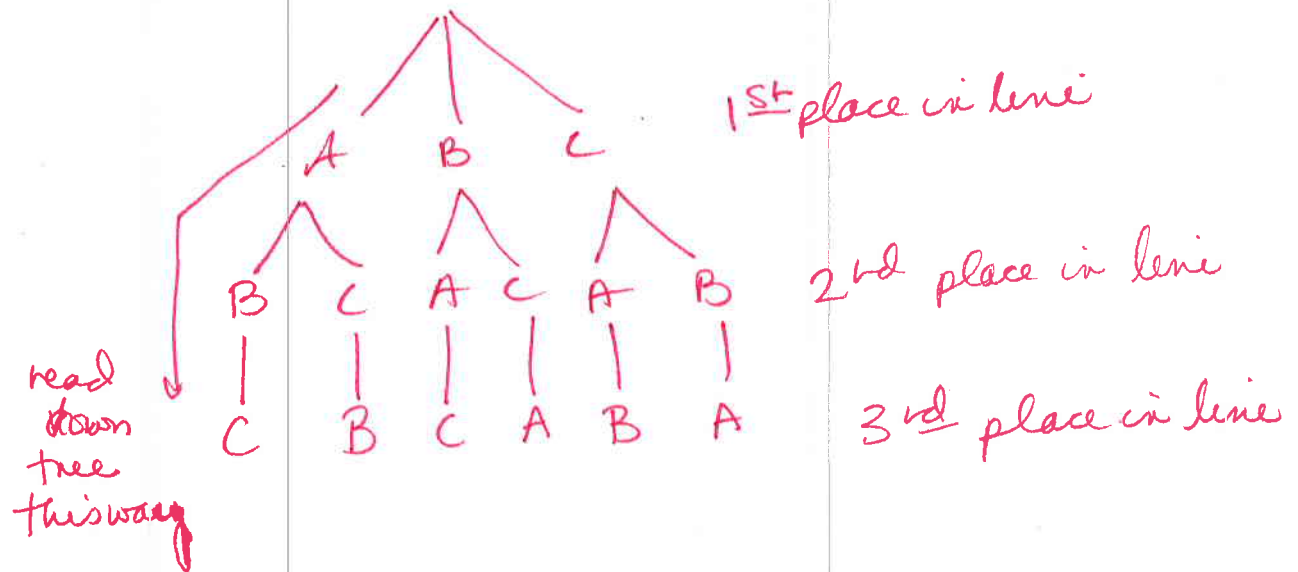


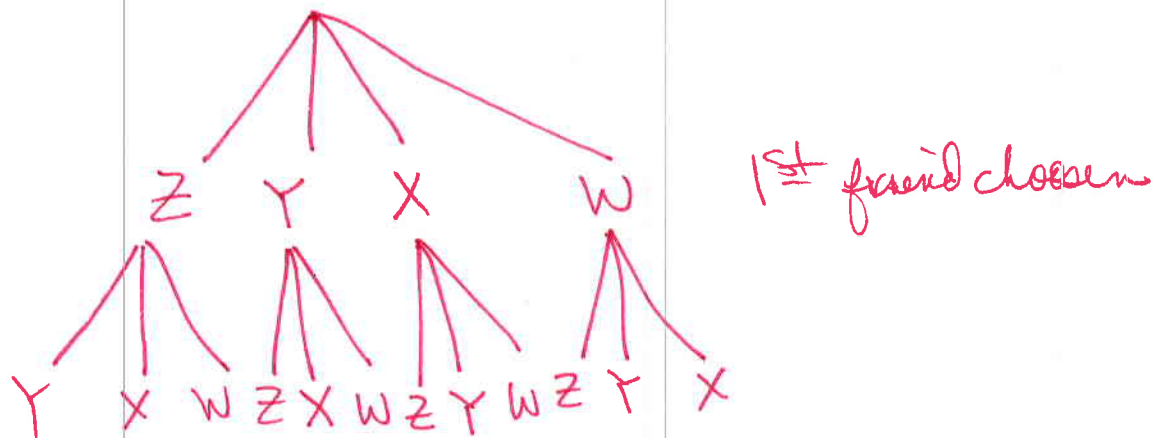
Instructions: For each of the following scenarios, draw a tree diagram to list all the different ways a combination of events can occur. List and count the events in the sample space based on the tree diagram.

- Suppose that three people are standing in line. How many different ways can Aaron, Beatrice and Caleb stand?



ABC, ACB, BAC, BCA, CAB, CBA

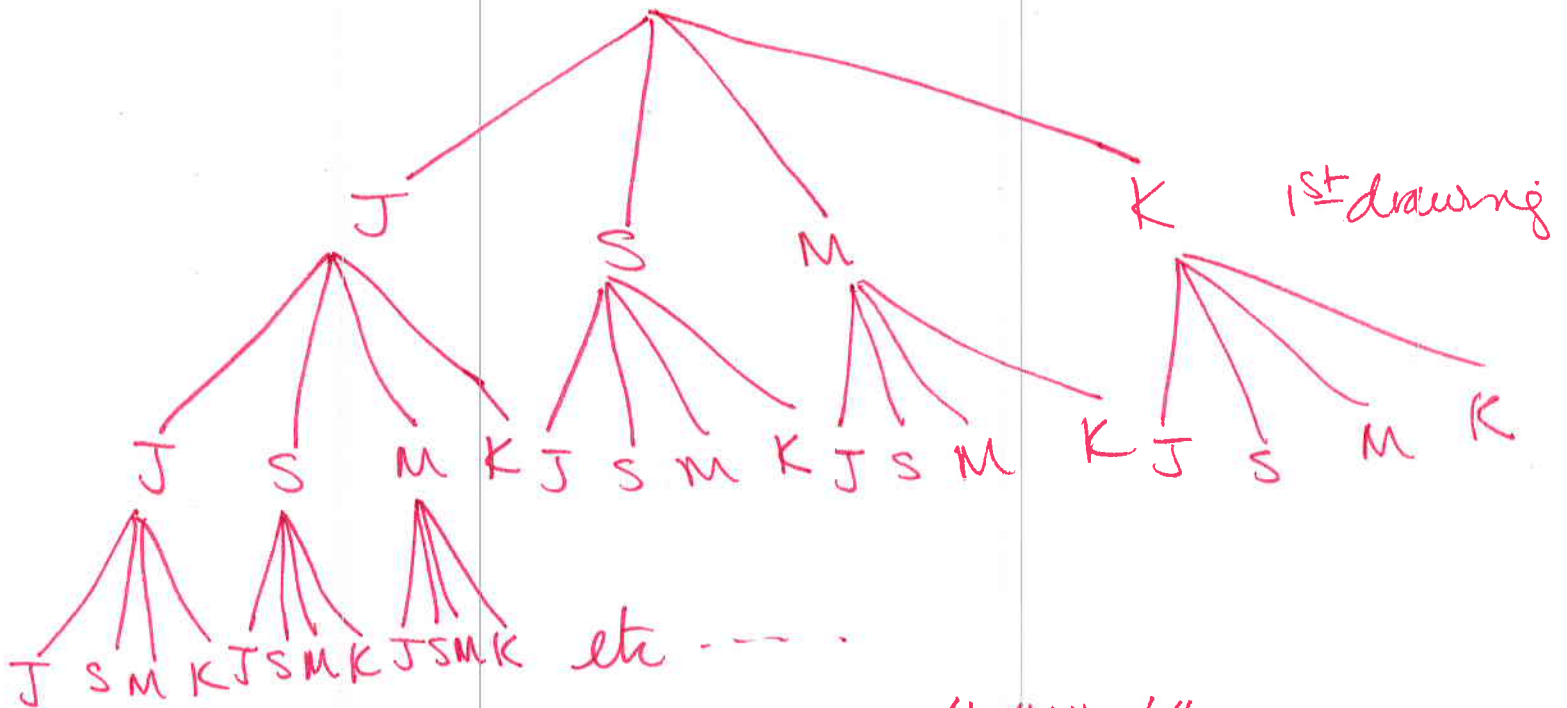
- Suppose that you have four friends and want to take two of them to dinner. What are all ways you can take two friends to dinner? Suppose your friends are named Zack, Yvette, Xavier, and Wilson.



ZY, ZX, ZW, ~~YZ~~, YX, YW, ~~YZ~~, ~~XY~~, XW, WZ, ~~WY~~, ~~WX~~

duplicates eliminated

3. Suppose that you only have enough money to give three gifts to four of your friends. You don't want the one friend to feel like you slighted them intentionally, so you decide to hold a raffle for each gift. Each of your friends Joe, Stewart, Martha and Kendra get a raffle ticket for each gift. The tickets for each gift are put into a hat and one ticket is drawn randomly. The process is then repeated for the next gift. Because of this, it's possible one friend could get all three gifts! What are all the possible ways the gifts can be distributed?



$4 * 4 * 4 = 64 \text{ ways}$

- JJJ, JJS, JJM, JJK, JSJ, JSS, JSM, JSK, JMJ, JMS, JMM, JMK, JKJ, JKS, JKM, JKK, SJJ, SJS, SJM, SJK, SSJ, SSS, SSM, SSK, SMJ, SMS, SMM, SMK, SKJ, SKS, SKM, SKK, MJJ, MJS, MJM, MJK, MSJ, MSS, MSM, MSK, MMJ, MMS, MMM, MMK, MKJ, MKS, MKM, MKK

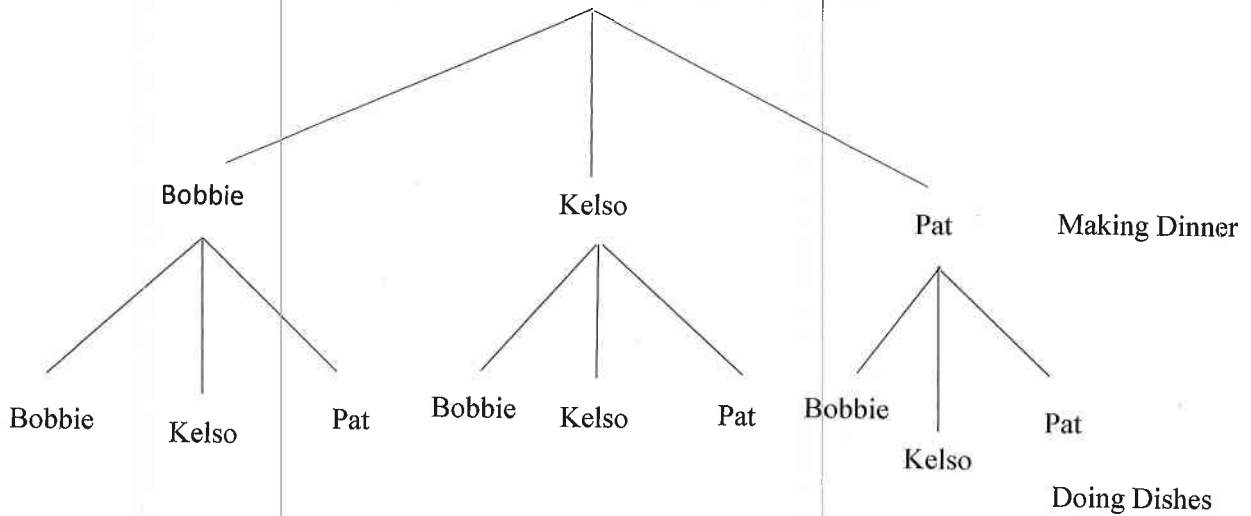
4. Use the information above to determine what are the chances that only women (Martha and Kendra) receive any gifts?

- KJJ, KJS, KJM, KJK, KSJ, KSS, KSM, KSK, KMJ, KMS, KMM, KMK, KKJ, KKS, KKM, KKK

$\frac{8}{64} = \frac{1}{8}$

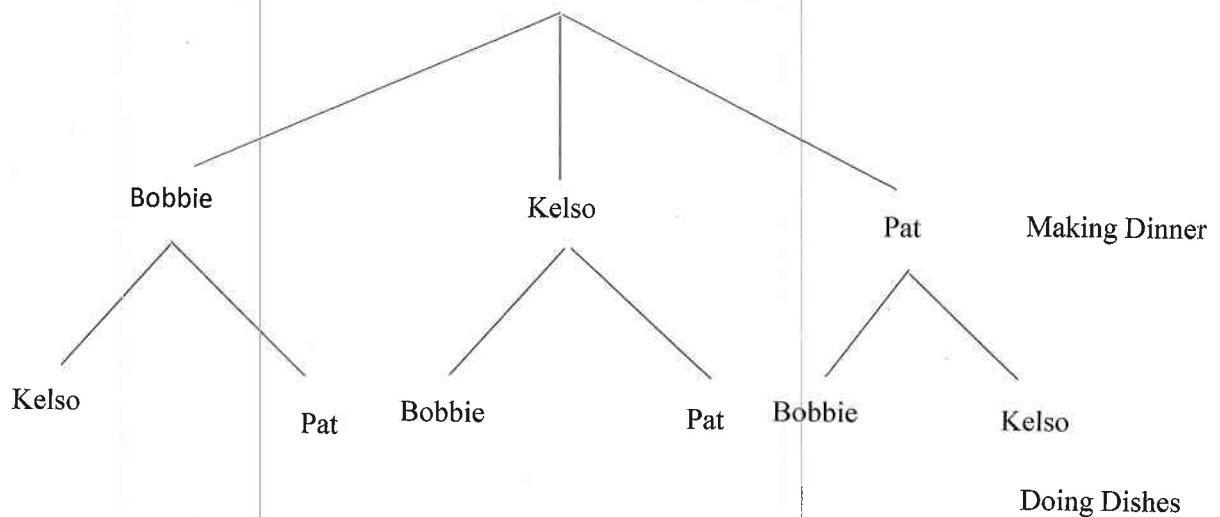
Example. Suppose that two children split the responsibilities for cooking dinner one night per week and for cleaning up afterwards. However, since there are three children Bobbie, Kelso and Pat, you decide to distribute the chores randomly each night, knowing that over the long run, it will be a fair split. How many different ways can the children be assigned dinner chores?

If we assume the same child can get both chores, it looks like this in a tree:



Thus the possible outcomes are: BB, BK, BP, KB, KK, KP, PB, PK, PP.

If no child could be assigned the same chore, it would look like this:



In this case, the outcomes are: BK, BP, KB, KP, PB, PK.

In this case, the order matters because the chores are different. But if it doesn't matter, you can still construct the tree the same way, and eliminate any "duplicates" where only the order is different like BK and KB would be the same, so they should only be counted once. Be sure to ask yourself on each question: Can the people in the set be used twice? Does the order of selection matter? (In the example above, could someone like making dinner, but not like doing dishes?)