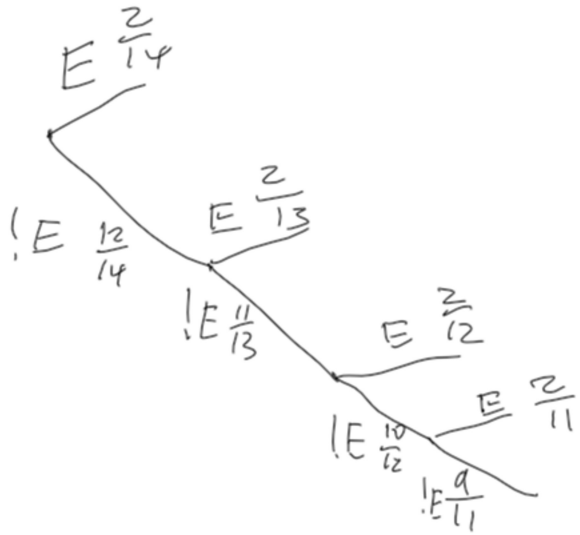
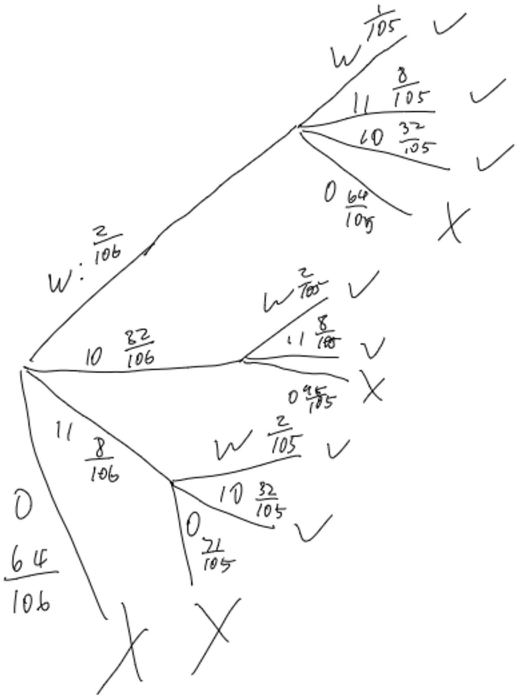
Assignment #3

Thursday, October 6, 2022 11:30 AM

1. 3 purple, 3 red, 2 yellow, 2 green, and 1 blue, sample with replacement
   a. Population: 11 tiles, Sample: smaller set of the tiles that are chosen, Sample size: 2
   b. 25 ordered: PP, RR, YY, GG, BB, PR, RP, PY, YP, PG, GP, PB, BP, RY, YR, RG, GR, RB, BR, YG, GY, YB, BY, GB, BG
   c. 15 unordered, less than ordered: PP, RR, YY, GG, BB, PR, PY, PG, PB, RY, RG, RB, YG, YB, GB
   d. $R, G, B\ (ordered)$: $\frac{3}{11} * \frac{2}{11} * \frac{1}{11} = \frac{6}{1331}$
   e. $R, G, B\ (unordered)$: $\frac{3}{11} * \frac{2}{11} * \frac{1}{11} * 6 = \frac{36}{1331}$
      i. Higher because there are more ways of drawing it, 6 different ways to be exact
   f. $3\ draws\ R\ or\ B$: $\frac{4}{11} * \frac{4}{11} * \frac{4}{11} = \frac{64}{1331}$
2. Emerald Sound conference, 14 teams, random invitational tournament
   a. Population: 14 teams, Sample: set of teams that were invited, Sample size: 4
   b. Without replacement because a team cannot be invited twice
   c. $nPr(14, 4) = 24024, 14 * 13 * 12 * 11 = 24024$
   d. $nCr(14, 4) = 1001, \frac{14 * 13 * 12 * 11}{4 * 3 * 2} = 1001$
   e. Part d, because choose function is for combinations where order doesn't matter
3. Continuing off problem 2
   a. Chance that either eagle gets chosen
      i. $\frac{2}{14} + \frac{12}{14} * \frac{2}{13} + \frac{12}{14} * \frac{11}{13} * \frac{2}{12} + \frac{12}{14} * \frac{11}{13} * \frac{10}{12} * \frac{2}{11} = 0.51$
   b. 

4. 2 x 52 card decks + 2 joker wild cards (1 to 11), 106 cards total. J, Q, K are 10, A is 11
   a. You would need a 10/wildcard and a 11/wildcard combo to get to 21 w/ 2 cards
      i. $P(sum = 21) = \frac{32}{106} * \frac{10}{105} + \frac{2}{106} * \frac{41}{105} + \frac{8}{106} * \frac{34}{105} \approx 0.0606$

b.



   i. O is other and W is wildcard

5. 6 ice cream flavors: cookie dough, cookies and cream, melted chocolate, salted caramel, strawberry, and yeti
   a. $\frac{(6+3-1)!}{3!\,(6-1)!} = \frac{8!}{3!\,5!} = \frac{8*7*6}{3*2} = 56 \text{ combos} = 21+15+10+6+3+1$
      i. 111, 112, 113, 114, 115, 116, 122, 123, 124, 125, 126, 133, 134, 135, 136, 144, 145, 146, 155, 156, 166
      ii. 222, 223, 224, 225, 226, 233, 234, 235, 236, 244, 245, 246, 255, 256, 266
      iii. 333, 334, 335, 336, 344, 345, 346, 355, 356, 366
      iv. 444, 445, 446, 455, 456, 466
      v. 555, 556, 566
      vi. 666
   b. Combos w/o cookie dough and melted chocolate: 4^3=64, combos with cookie dough or melted chocolate: 216-64=152. 152/216=0.7037
   c. 56 - 6 = 50 combos
   d. 6^3=216 combos
   e. 56 * 4 * 3 = 672 combos