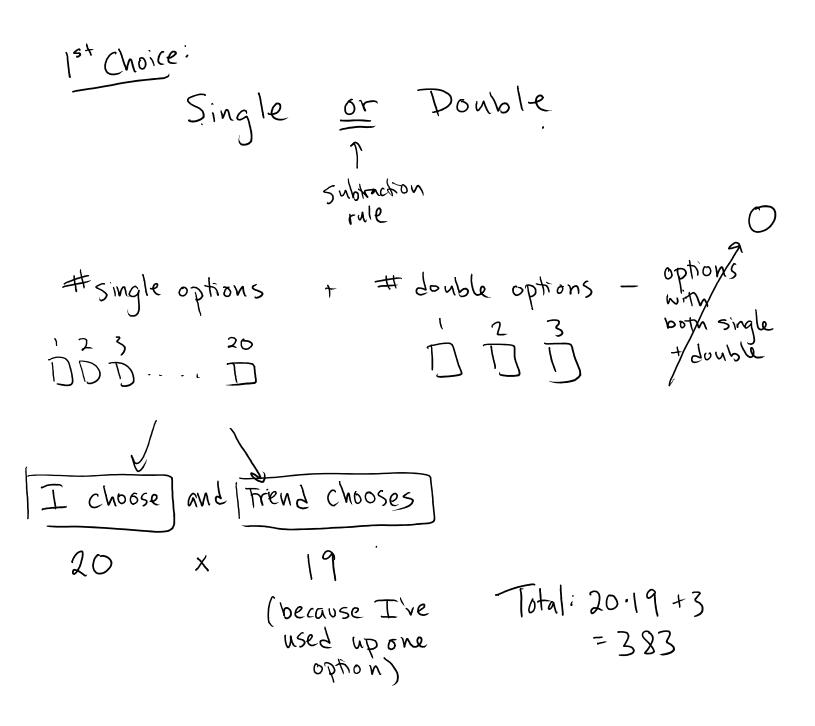
S.KIMMEL

Goal: Use counting rules to solve problems

Lounting Q: Why is counting important in Computer Science? · Security: count # of possible passwords A: • Alg : · count steps of algorithm · count space (memory) used by algorithm · count time of algorithm · Network: count connections in a network · Architecture: count ways of distributing tasks to processors If a procedure can be Froduct Kule: broken down into two tasks, with n, ways to do the first task and m ways to do the second Then there are N, XN2 ways to do the procedure. (If k tasks, Multiply ways to do first by ways to do second by ways to do 3rd up to K. Subtraction Rule If you can do a task n, ways or no ways, then the total number of ways to do a task is N, +NZ minus the number of ways common to the two approaches.

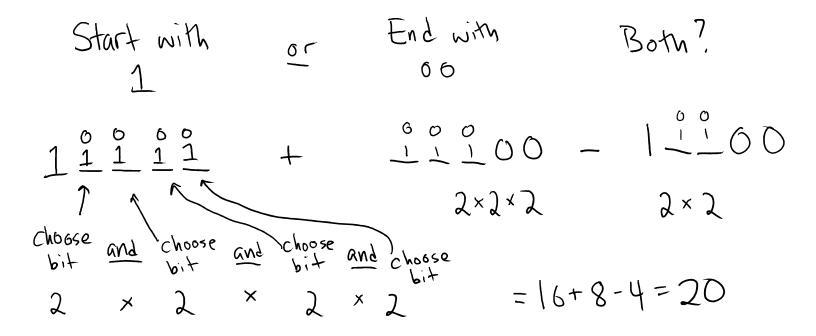
Q: Suppose you and you best friend are picking into Coffrin house. There are 20 singles left and 3 doubles. If you both choose singles or both share a double, how many options of room choices 7 do you have.



Counting Page 2

See slides for problems without solutions

Q: How many 5-bit strings start with 1 or end with 0007



Q: Suppose you are the track coach and you want to test different options for the 4 person relay team. You have S runners: A, B, C, D, and E. If A is on the team, you want her in one of the first 2 positions If B is on the team, you want her in one of the last 2 positions. How many options will you need to test to find The optimal order! or Both A B last (no A) 2 A first 2 (NO B) or = (Bin 3) or (Bin 4) Pick A's Pick ang Position Remaining (no both) 3.2.1 Positions and A___ Pick Pick A and 1 option _ A - - _ other × 3 options Joptions B's position Positions (D,E) 3.2.1 Pick A and Pick B (2 × 2) 1st remaining 2 remainly + (6+6) + 4×6 = 48 options (3x 2) = 2.6