CS 3310   Test 1 – Chapters 6 and 7   Rosen's 7th edition   fall 2021   NAME_____

Closed book, notes, computer, and neighbor. 1 hour, 20 minutes. Remember to turn in your homework!

1. A multiple-choice test contains 10 questions. There are four possible answers for each question. In how many unique ways can a student answer the questions on the test, assuming they answer every question? (from your homework)
   - A. 10^4
   - B. 4^{10}
   - C. P(10,4)
   - D. C(4,10)

2. How many bit strings of length 10 both begin and end with a 1? (from your homework)

3. How many strings are there of lowercase English letters of length four or less, not counting the empty string? (from other homework)

4. How many bit strings of length eight either start with a 1 bit or end with the two bits 00? (from chapter examples)

5. List all permutations of {a,b,c}. (from your homework)

6. How many possibilities are there for first, second, and third positions in a horse race with 12 horses, if all orders of finish are possible? (from your homework)

7. A group contains n men and n women. How many ways are there to arrange these people in a row, if the men and women alternate? (from your homework)

8. How many ways are there for eight men and five women to stand in line so that no two women stand next to each other? [Hint: First position the men and then consider possible positions for the women.] (from your homework)

9. A shop sells 10 kinds of doughnuts. Mom sends you to buy a dozen. You must buy at least 4 maple bars, and at most two strawberry-filled. How many ways can you do that? (there must be one of these!)

10. How many permutations of the letters in "success" are there? (from chapter examples)

11. What are the next <u>three</u> permutations in lexicographical order after "246531"? (extended from the practice test)

12. What are the next <u>eight</u> combinations in lexicographical order after "1568" given that you are choosing 4 from the set of 1 through 8? (extended from the practice test)

13. What is the coefficient of $x^{12}y^{13}$ in the expansion of $(x+y)^{25}$? (from chapter examples)

14. How many ways are there to choose eight coins from a piggy bank containing 100 identical pennies and 80 identical nickles? (from other homework)

15. A book publisher has 3000 copies of a discrete mathematics book. How many ways are there to store these books in their three warehouses if the copies of the book are indistinguishable? (from your homework)

16. How many ways are there to distribute 12 distinguishable objects into six distinguishable boxes so that two objects are placed in each box? (from your homework)

17. There are 21 questions on a discrete mathematics midterm. How many ways are there to assign values to the problems if the sum of the 21 questions must be worth 105 and each question is worth at least 2 points? (from other homework)

18. Given a loaded die where a 6 is twice as likely to appear as a 1, and 1, 2, 3, 4, and 5 have equal probability, what is the probability of two rolls adding up to 8? (list them out and count them up!)

19. In a lottery, players win a large prize when they pick four digits that match, in the correct order, four digits selected by a random mechanical process. A smaller prize is won if only three digits are matched. What is the probability that a player wins the <u>small</u> prize? (from chapter examples)

20. Find the probability that a hand of five cards in poker contains four cards of one kind? (from chapter examples)

21. What is the conditional probability that a family with two children has two boys, given they have at least one boy? (from chapter examples)