
Counting: Review

Rosen, Chapter 5.1-2

Midterm

- Midterm will be Friday, November 4th
 - Must have your ID to take the exam
 - CS110 lab between 8am and 4pm
 - Closed book, closed notes
 - Bring a calculator
 - We will provide scratch paper
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Week 11 Recitations

- Math review
 - Optional – no grade taken
 - May come to any recitation
 - Those that are supposed to be there have first dibs
 - After that, first come, first served.
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Iclicker Question #1

- A multiple choice test contains 10 questions. There are 4 possible answers to each question. How many ways can a student answer the questions on the test if the student answers every question.
- A. $4+10$
 - B. $10*4$
 - C. 4^{10}
 - D. 10^4
 - E. $4^{10} + 10^4$
-

IClicker Question #1 Answer

- A multiple choice test contains 10 questions. There are 4 possible answers to each question. How many ways can a student answer the questions on the test if the student answers every question.
- A. $4+10$
- B. $10*4$
- C. 4^{10} (product rule)
- D. 10^4
- E. $4^{10} + 10^4$
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IClicker Question #2

- A bit is 0 or 1. How many bit strings with 6 digits are there?



- A. 2
- B. 6
- C. $2*6$
- D. 2^6
- E. 6^2
-

IClicker Question #2 Answer

- A bit is 0 or 1. How many bit strings with 6 digits are there?



- A. 2
 - B. 6
 - C. 2^6
 - D. 2^6 (product rule)
 - E. 6^2
-

IClicker question #3

- How many 8 character passwords are there that only use lowercase English letters?



- A. 8
 - B. 2^{26}
 - C. 8×26
 - D. 8^{26}
 - E. 26^8
-

IClicker Question #3 Answer

- How many 8 character passwords are there that only use uppercase English letters?

P A S S W O R D

- A. 8
 - B. 2^{26}
 - C. 8×26
 - D. 8^{26}
 - E. 26^8 (product rule)
-

IClicker Question #4

- How many 8 character passwords are there that start with 4 lowercase English letters and end with 4 digits?

- A. $4^{26} + 4^{10}$
 - B. $4^{26} \times 4^{10}$
 - C. $26^4 \times 10^4$
 - D. $26^4 + 10^4$
 - E. $4 \times 26 + 4 \times 10$
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IClicker Question #4 Answer

- How many 8 character passwords are there that start with 4 lowercase English letters and end with 4 digits?
- A. $4^{26} + 4^{10}$
 - B. $4^{26} \times 4^{10}$
 - C. $26^4 \times 10^4$ (product and sum rule)
 - D. $26^4 + 10^4$
 - E. $4 \times 26 + 4 \times 10$
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IClicker Question #5

- How many 8 character passwords are there that use only English lowercase letters, but no letter is repeated?
- A. 8×26
 - B. $26 \times 25 \times 24 \times 23 \times 22 \times 21 \times 20 \times 19$
 - C. 8^{26}
 - D. 26^8
 - E. $26 - 8$
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IClicker Question #5 Answer

- How many 8 character passwords are there that use only English lowercase letters, but no letter is repeated?
- A. 8×26
 - B. $26!/18!$ $P(26,8)$
 - C. 8^{26}
 - D. 26^8
 - E. $26 - 8$
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IClicker Question #6

- A committee is formed consisting of 1 representative from each of the 50 states, where the representative is either the governor or one of the two senators. How many ways are there to form this committee?
- A. $3+50$
 - B. 50×3
 - C. 3^{50}
 - D. 50^3
-

IClicker Question #6 Answer

- A committee is formed consisting of 1 representative from each of the 50 states, where the representative is either the governor or one of the two senators. How many ways are there to form this committee?
- A. $3+50$
 - B. $50*3$
 - C. 3^{50} (3 choices for state 1, 3 choices for state 2, etc)
 - D. 50^3
-

IClicker Question #7

- How many 5 or 6 character passwords are there that use only digits?
- A. $10^5 + 10^6$
 - B. $10^5 \times 10^6$
 - C. $5^{10} + 6^{10}$
 - D. $5^{10} \times 6^{10}$
 - E. 10^{11}
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IClicker Question #7 Answer

- How many 5 or 6 character passwords are there that use only digits?

 - A. $10^5 + 10^6$ (product and sum rule)
 - B. $10^5 \times 10^6$
 - C. $5^{10} + 6^{10}$
 - D. $5^{10} \times 6^{10}$
 - E. 10^{11}
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IClicker Question #8

- How many passwords are there of length at least one and at most 6 characters, where each character is a digit?

 - A. $10 \times 9 \times 8 \times 7 \times 6 \times 5$
 - B. $10 + 10^2 + 10^3 + 10^4 + 10^5 + 10^6$
 - C. $10 \times 10^2 \times 10^3 \times 10^4 \times 10^5 \times 10^6$
 - D. $1 \times 2 \times 3 \times 4 \times 5 \times 6$
 - E. $1 + 2 + 3 + 4 + 5 + 6$
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IClicker Question #8 Answer

- How many passwords are there of length at least one and at most 6 characters, where each character is a digit?
- A. $10 \times 9 \times 8 \times 7 \times 6 \times 5$
 - B. $10 + 10^2 + 10^3 + 10^4 + 10^5 + 10^6$ (Product and sum rule)
 - C. $10 \times 10^2 \times 10^3 \times 10^4 \times 10^5 \times 10^6$
 - D. $1 \times 2 \times 3 \times 4 \times 5 \times 6$
 - ~~E. $1 + 2 + 3 + 4 + 5 + 6$~~

IClicker Question #9

- How many license plates can be made using either two or three uppercase letters followed by two or three digits?
- A. $2 \cdot 3 + 2 \cdot 3$
 - B. $(26^2 \cdot 10^2) + (26^2 \cdot 10^3) + (26^3 \cdot 10^2) + (26^3 \cdot 10^3)$
 - C. $(26^2 + 10^2) \cdot (26^2 + 10^3) \cdot (26^3 + 10^2) \cdot (26^3 + 10^3)$
 - D. $(26^2 \cdot 10^3) + (26^2 \cdot 10^3) + (26^3 \cdot 10^2) + (26^3 \cdot 10^2)$
 - E. $(26^2 + 10^3) \cdot (26^2 + 10^3) \cdot (26^3 + 10^2) \cdot (26^3 + 10^2)$

IClicker Question #9 Answer

- How many license plates can be made using either two or three uppercase letters followed by two or three digits?
 - A. 2^3+2^3
 - B. $(26^2 \cdot 10^2) + (26^2 \cdot 10^3) + (26^3 \cdot 10^2) + (26^3 \cdot 10^3)$
 - A. Product and sum rule
 - C. $(26^2+10^2) \cdot (26^2+10^3) \cdot (26^3+10^2) \cdot (26^3+10^3)$
 - D. $(26^2 \cdot 10^3) + (26^2 \cdot 10^3) + (26^3 \cdot 10^2) + (26^3 \cdot 10^2)$
 - E. $(26^2+10^3) \cdot (26^2+10^3) \cdot (26^3+10^2) \cdot (26^3+10^2)$

IClicker Question #10

- How many passwords of 6 characters, where each character is a lowercase letter, start with one a or ends with two b's?
 - A. $26 + 26^2 - 26^3$
 - B. $5^{26} + 4^{26} - 1^{26}$
 - C. $26^5 + 26^4 - 26^3$
 - D. 26
 - E. $1^{26} + 2^{26} - 3^{26}$

IClicker Question #10 Answer

- How many passwords of 6 characters, where each character is a lowercase letter, start with one a or ends with two b's?
- A. $26 + 26^2 - 26^3$
- B. $5^{26} + 4^{26} - 1^{26}$
- C. $26^5 + 26^4 - 26^3$ (inclusion/exclusion)
- D. 26
- E. $1^{26} + 2^{26} - 3^{26}$
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IClicker Question #11

- How many passwords of 6 characters, where each character is a lowercase letter, start with two a's and end with three b's?
- A. $26^2 + 26^3 - 26^5$
- B. $2^{26} + 3^{26} - 5^{26}$
- C. $4^{26} + 3^{26} - 1^{26}$
- D. $26^4 + 26^3 - 26$
- E. 26
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IClicker Question #11 Answer

- How many passwords of 6 characters, where each character is a lowercase letter, start with two a's **and** end with three b's?
- A. $26^2 + 26^3 - 26^5$
 - B. $2^{26} + 3^{26} - 5^{26}$
 - C. $4^{26} + 3^{26} - 1^{26}$
 - D. $26^4 + 26^3 - 26$
 - E. **26**
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IClicker Question #12

- How many functions are there from a set of 10 elements to a set of 4 elements
- A. 10^4
 - B. 4^{10}
 - C. 10×4
 - D. $10 \times 9 \times 8 \times 7 = 5040$
 - E. $5040 / 4 = 1260$
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IClicker Question #12 Answer

- How many functions are there from a set of 10 elements to a set of 4 elements

A. 10^4

B. 4^{10}

Each of the 10 elements can associate with any of 4 elements in the codomain

C. 10×4

D. $10 \times 9 \times 8 \times 7 = 5040$

E. $5040 / 4 = 1260$

IClicker Question #13

- How many cards must you draw to ensure you are guaranteed to have two clubs and two hearts?

A. 2

B. 14

C. 28

D. 30

E. 41

IClicker Question #13 Answer

- How many cards must you draw to ensure you are guaranteed to have two clubs and two hearts?
- A. 2
 - B. 14
 - C. 28
 - D. 30
 - E. 41 (can deal out all of 3 suits ($3 \cdot 13$) + the 2 remaining clubs or hearts)
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IClicker Question #14

- How many cards must you draw to ensure you are guaranteed to have three jacks?
- A. 3
 - B. 7
 - C. 14
 - D. 50
 - E. 51
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IClicker Question #14

- How many cards must you draw to ensure you are guaranteed to have three jacks?
 - A. 3
 - B. 7
 - C. 14
 - D. 50
 - E. 51 every card other than jacks, the 3 jacks
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IClicker Question #15

- How many cards must you draw to guarantee you have 4 of a kind?
 - A. 4
 - B. 9
 - C. 28
 - D. 40
 - E. 51
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IClicker Question #15 Answer

- How many cards must you draw to guarantee you have 4 of a kind?
 - A. 4
 - B. 9
 - C. 28
 - D. 40 (3 sets of 13 + 1)
 - E. 51
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IClicker Question #16

- There are 38 different time periods during which classes at a university can be scheduled. If there are 677 different classes, how many different rooms will be needed?
 - A. $677 \cdot 38$
 - B. $677 + 38$
 - C. floor ($677/38$)
 - D. ceiling ($677/38$)
 - E. 677^{38}
-

IClicker Question #16 Answer

- There are 38 different time periods during which classes at a university can be scheduled. If there are 677 different classes, how many different rooms will be needed?
- A. $677 \cdot 38$
 - B. $677 + 38$
 - C. floor ($677/38$)
 - D. ceiling ($677/38$) (must handle the extra folks)
 - E. 677^{38}
-

IClicker Question #17

- Assume that the people in a room are between 25 and 35 years old inclusive. How many people must be in the room to ensure two people are 34?
- A. 9
 - B. 10
 - C. 11
 - D. 12
 - E. None of the above.
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IClicker Question #17

- Assume that the people in a room are between 25 and 35 years old inclusive. How many people must be in the room to ensure two people are 34?
- A. 9
 - B. 10
 - C. 11
 - D. 12
 - E. **None of the above.**
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