15-344 Combinatorics on Nov 3, hours 22-23: Basic Enumeration

Tuesday, November 3, 2015 6:29 AM

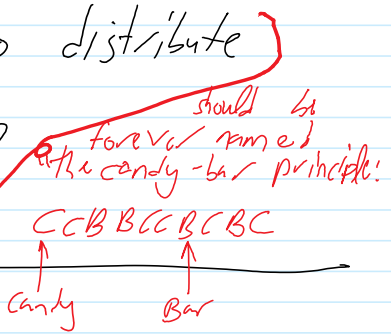
Read Along: 5.1 & 5.2

Exam discussion & return @ 4:45.

Go over questions 1-8:

2 min: quiet discussion
2 mins: convince your friend.
Then class discussion.
} each question.

Extra Q: How many way are there to distribute 8 identical Halloween candies between Asif, Beth, Chin, Dilip, Emma.



TT discussion:

Results

160 students took the exam, and 14 asked for medical exemptions (a record). The full list of results, before appeals, was (median underlined):

100 100 100 100 100 100 99 99 98 98 98 98 98 98 98 98 98 98 98 98 98 97 97 97 97 97 97 97 96 96 96 96 96 96 96 96 96 96 95 95 95 95 95 95 95 94 94 93 93 93 93 93 92 92 91 91 91 91 91 90 89 89 89 89 89 88 88 88 88 88 87 87 87 87 87 87 86 86 85 85 85 83 83 83 83 82 82 82 81 81 81 81 81 80 80 80 80 79 79 78 78 77 77 76 75 75 75 74 73 73 72 72 71 71 70 69 68 67 67 65 65 63 63 63 62 62 62 61 60 60 59 59 57 57 56 54 51 51 50 48 48 46 44 42 42 40 39 38 34 34 34 24 23 22 20 18 14 10 5

The exams will be returned in class on Tuesday November 3.

Appeals.

Remember! We try hard yet grading is a difficult process and mistakes **always** happen - solutions get misread, parts are forgotten, grades are not added up correctly. You **must** read your exam and make sure that you understand how it was graded. If you disagree with anything, don't hesitate to complain! (Though first consider very carefully the possibility that the mistake is actually yours). Your first stop should be the person who graded the problem in question, and only if you can't agree with him you should appeal to Dror.

Dror graded problem number 4 and did the data entry. Gaurav Patil graded everything else.

The deadline to start the appeal process is Thursday November 12 at 1PM. Once you've started the process by talking to Dror or to Gaurav, it ends when a final decision is made, with no deadline.

From <http://drorbn.net/index.php?title=15-344/Term_Test>

Less than 90: do better!
50: you should be deeply concerned!

(not on web)
Dror Bar-Natan: Classes: 2015-16: MAT 344 Combinatorics:

Basic Enumeration

Example 1: Rolling Dice

1 Two dice are rolled, one green and one red. Each die has faces numbered 1 through 6.

(a) How many different outcomes of this procedure are there?

(b) What is the probability that there are no doubles (not the same value on both dice)?

Example 2: Arranging Books

2 There are five different Spanish books, six different French books, and eight different Transylvanian books. How many ways are there to pick an (unordered) pair of two books not both in the same language?

Example 3: Sequences of Letters

3 How many ways are there to form a three-letter sequence using the letters a, b, c, d, e, f **(a)** with repetition of letters allowed? **(b)** without repetition of any letter? **(c)** without repetition and containing the letter e? **(d)** with repetition and containing e?

Example 4: Nonempty Collections

How many nonempty different collections can be formed from five (identical) apples and eight (identical) oranges?

Example 1: Ranking Wizards

4 How many ways are there to rank n candidates for the job of chief wizard? If the ranking is made at random (each ranking is equally likely), what is the probability that the fifth candidate, Gandalf, is in second place?

Example 2: Arrangements with Repeated Letters

5 How many ways are there to arrange the seven letters in the word SYSTEMS? In how many of these arrangements do the three Ss appear consecutively?

Example 3: Binary Sequences

6 How many different 8-digit binary sequences are there with six 1s and two 0s?

Example 4: Poker Probabilities

7 **(a)** How many 5-card hands (subsets) can be formed from a standard 52-card deck?

(b) If a 5-card hand is chosen at random, what is the probability of obtaining a flush (all five cards in the hand are in the same suit)?

(c) What is the probability of obtaining three, but not four, Aces?

Example 5: Forming Committees

A committee of k people is to be chosen from a set of seven women and four men. How many ways are there to form the committee if

(a) The committee consists of three women and two men?

(b) The committee can be any positive size but must have equal numbers of women and men?

(c) The committee has four people and one of them must be Mr. Baggins?

(d) The committee has four people and at least two are women?

(e) The committee has four people, two of each sex, and Mr. and Mrs. Baggins cannot both be on the committee?

Example 2: (continued) Arrangements with Repetitions

How many arrangements of the seven letters in the word SYSTEMS have the E occurring somewhere before the M? How many arrangements have the E somewhere before the M and the three Ss grouped consecutively?

Example 6: Counting Defective Products

A manufacturing plant produces ovens. At the last stage, an inspector marks the ovens A (acceptable) or U (unacceptable). How many different sequences of 15 As and Us are possible in which the third U appears as the twelfth letter in the sequence?

Example 7: Probability of Repeated Digits

8 What is the probability that a 4-digit campus telephone number has one or more repeated digits?

skipped for lack of interest.

All done!