CISC-102 WINTER 2016

HOMEWORK 8

Please work on these problems and be prepared to share your solutions with classmates in class next Friday. Assignments will \underline{not} be collected for grading.

READINGS

Read sections 5.6 and 5.7 of Schaum's Outline of Discrete Mathematics. Read section 2.4, 2.5 and 3.4 of Discrete Mathematics Elementary and Beyond.

Problems

(1) How many 5 card hands are there (unordered selection from a standard 52 card deck) that consist of a single pair of the same value, and three other cards of different values? Two possible examples are:

 $\{(2,\heartsuit), (2\diamondsuit), (7\clubsuit), (9\diamondsuit), (3\heartsuit)\}$ and $\{(A\heartsuit), (A\clubsuit), (7\diamondsuit), (6\diamondsuit), (3\heartsuit)\}$

(2) How many 5 card hands are there that consist of 5 different values, that are not all the same suit, and not 5 values in sequence. Two possible examples are:

 $\{(8,\heartsuit), (2\diamondsuit), (7\clubsuit), (9\diamondsuit), (3\heartsuit)\}$ and $\{(J\heartsuit), (A\clubsuit), (7\diamondsuit), (6\diamondsuit), (3\heartsuit)\}$

- (3) From 100 used cars siting on a lot, 20 are to be selected for a test designed to check safety requirements. These 20 cars will be returned to the lot, and again 20 will be selected for testing for emission standards.
 - (a) In how many ways can the cars be selected for safety requirement testing?
 - (b) In how many ways can the cars be selected for emission standards testing?
 - (c) In how many different ways can the cars be selected for both tests?
 - (d) In how many ways can the cars be selected for both tests if exactly 5 cars must be tested for safety and emission?
- (4) There are 72 students registered in CISC-102 this term. Prove that there is a month of the year in which at least 6 students from this class were born.
- (5) How many binary strings of length 13 contain precisely 4 1s, and 9 0s? For example 0010101010000 satisfies the requirement and so does 11110000000000.
- (6) (The solution to the previous question will help with this one.)You have 9 identical treats to distribute amongst 5 children.

(a) In how many different ways can the treats be distributed?

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(b) In how many different ways can the treats be distributed if each child must get at least one.