

Name:

Student ID:

Quiz #1 (5% + 1% Bonus Point)

CS2336 Discrete Mathematics, Instructor: Cheng-Hsin Hsu

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3:30 - 3:50 p.m., March 3rd, 2014

This is a closed book test. Any academic dishonesty will automatically lead to zero point.

1) (2%) Answer the following questions:

- a) In how many possible ways could a student answer a 8-question true-false test?
- b) In how many ways can the student answer the above test if he/she can leave a question unanswered to avoid extra penalty for wrong answers?

Answers:

- a) With 2 choices per question, there are 2^8 ways.
- b) Two possible answers for this question,
 - 1) With 3 choices per question, there are 3^8 ways.
 - 2) Or if you consider the student can only leave one of the questions unanswered, there are $\binom{8}{1}2^7 \times 3$ ways.

2) (2%) Determine the coefficient of

- a) xyz^2 in $(x + y + 2z)^5$
- b) $w^3x^2z^2$ in $(2w - x + 3y - 2z)^7$

Answers:

- a) The coefficient of xyz^2 is 0 since xyz^2 does not exist.
- b) The coefficient of $w^3x^2z^2$ is $\binom{7}{3,2,2}2^3(-1)^2(-2)^2 = 6720$

- 3) (2%) How many different ways are there to place 16 marbles of the same size in 6 distinct jars if
- the marbles are all blue?
 - each marble is in a different color?

Answers:

- a) The number of ways equals the number of solutions to the following equation:

$$x_1 + x_2 + x_3 + x_4 + x_5 + x_6 = 16 \text{ where } x_i \geq 0 \text{ for } 1 \leq i \leq 6.$$

So there are $\binom{16+6-1}{16} = 20349$ ways.

- b) With 6 choices for each marble, there are 6^{16} ways.