

Assignment 1: CS 215

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Question 1

(a) The situation is equivalent to distributing n books to n people. The total number of ways of doing that is $n!$. There is only 1 way in which everyone gets his book back. So the probability of it happening is $\boxed{1/n!}$

(b) There is only 1 way of distributing m books to their respective m owners. And for this way there are $(n - m)!$ ways of distributing the left $n - m$ books among left $n - m$ people for a total of $1 \times (n - m)! = (n - m)!$ ways. So the probability of it happening is $\boxed{(n - m)!/n!}$

(c) There are $m!$ way of distributing the m books belonging to the last m people to the first m people. And for each such way there are $(n - m)!$ ways of distributing the left $n - m$ books among left $n - m$ people for a total of $m! \times (n - m)! = m!(n - m)!$ ways. So the probability of it happening is $\boxed{m!(n - m)!/n!}$

(d)

Question 2

Question 3

Question 4

Question 5

a. $P(C_1|Z_1) = 1/3$

$$P(C_2|Z_1) = 1/3$$

$$P(C_3|Z_1) = 1/3$$

Question 6

