DISCRETE STRUCTURES (CS21001)
AUTUMN, 2018-2019

Prof. Dipanwita Roy Chowdhury
Department of Computer Science & Engineering
Indian Institute of Technology Kharagpur
West Bengal 721302, India

TUTORIAL: 9
DATE: 31ST OCTOBER 2018

Determine the number of positive integers n, $1 \leq n \leq 2000$, that are
a) not divisible by 2, 3, or 5
b) not divisible by 2, 3, or 5, but are divisible by 7

QUESTION : 2

Determine the number of integers x where $x \le$ 9999999 and the sum of the digits in x equals 31.

How many ways are there to travel in *xyz* space from the origin (0, 0, 0) to the point (4, 3, 5) by taking steps one unit in the positive *x* direction, one unit in the positive *y* direction, or one unit in the positive *z* direction? (Moving in the negative *x, y,* or *z* direction is prohibited, so that no backtracking is allowed.)

QUESTION : 4

How many ways can n books be placed on k distinguishable shelves
a) if the books are indistinguishable copies of the same title?
b) if no two books are the same, and the positions of the books on the shelves matter?

How many ways are there to distribute five balls into three boxes if each box must have at least one ball in it if

a) both the balls and boxes are labeled?

b) the balls are labeled, but the boxes are unlabeled?

c) the balls are unlabeled, but the boxes are labeled?

d) both the balls and boxes are unlabeled?

In how many ways can the integers 1, 2, 3, …, *n* be arranged in a line so that none of the patterns 12, 23, 34, …, *(n-1)n* occurs?