BITS Pilani, Dubai Campus

Dubai International Academic City, Dubai

I Semester 2020-21

CS F222 Discrete Structures for Computer Science

Assignment - II

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Section No: 2

Ques No: 21

Ques Statement: Write a program that generates all combinations of the elements {1, · · · , n}.

Input:

Example 1:

Find the number of ways to distribute 20 chocolates among 5 children such that each child gets at least 1 chocolate.

Ans Let the 5 children be x1, x2, x3, x4 and x5.

x1 + x2 + x3 + x4 + x5 = 20 xi ≥ 1

x1 + x2 + x3 + x4 + x5 = 20 – 5 xi ≥ 0

x1 + x2 + x3 + x4 + x5 = 15

∴ n = 5, r = 15

Using the formula C(n+r-1, r) → C(5+15-1, 15) → C(19, 15) = 3876 ways

Example 2:

Harry has six different colored shirts. In how many ways can he hang the four shirts in the cupboard?

Ans Let 4 shirts be x1, x2, x3 and x4.

x1 + x2 + x3 + x4 = 6 xi ≥ 0

∴ n = 6, r = 4

Using the formula C(n+r-1, r) → C(6+4-1, 4) → C(9, 4) = 126 ways