1. For a group of 7 people, find the probability that all 4 seasons (winter, spring, summer, fall) occur at least once each among their birthdays, assuming that all seasons are equally likely.

Ans:-

Given that seasons are equally likely and all 4 seasons (winter, spring, summer, fall) occur at least once each among their birthdays

Total outcomes: Each person is allotted a season out of 4. Hence 48 possibilities

Number of Outcomes that one or more season has no student having their birthday:

Using Inclusion and Exclusion, 4C1\*38 - 4C2\*28 + 4C3\*18  [i.e. Exclude 1 season - Exclude 2 season + exclude 3 season, also note that we can't exclude all the 4 seasons]

Probability that one or more season has no student having their birthday:

(4C1\*38 - 4C2\*28 + 4C3\*18  ) / 48 = 0.377

Required probability that all 4 seasons (winter, spring, summer, fall) occur at least once each among their birthdays:

1-0.377=0.623

1. Alice attends a small college in which each class meets only once a week. She is deciding between 30 non-overlapping classes. There are 6 classes to choose from for each day of the week, Monday through Friday. Trusting in the benevolence of randomness, Alice decides to register for 7 randomly selected classes out of the 30, with all choices equally likely. What is the probability that she will have classes every day, Monday through Friday?

Ans:-

