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.

Seasons={Winter, spring, summer, fall}

Number of people=7

X be a variable such that it denotes the number of seasons which consists of birthdays of all 7 people,

All seasons are equally likely,

P(Winter)=P(spring)=P(Summer)=P(Fall)=1/4

*Using Inclusion and Exclusion, 4C1\*37 - 4C2\*27 + 4C3\*17 [i.e. Exclude 1 season - Exclude 2 season + exclude 3 season, also note that we can't exclude all the 4 seasons]*

P{X=i} is probability of birthdays occurring in i seasons,

P{X=4}= 1−(P{X=3}−P{X=2}+P{X=1})

P{X=4}= 1- **(4\*37 - 4\*27 +4\*1)/47**

P{X=4}= 1−0.502= 0.497

2. 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?

Answer:

for 2 days when she has 2 classes & then

Select 2 classes on those days and

1 class for other days

P = ((5 C2 \* 6C22 \*63) + (5C16C3 \*64))/30C7

=30%