Day 1

First half assignment:- Come up with 5 problem statements based off what you learned up until now and solve the problem that was given by the instructor. Up until now they have taught probability. And PMF, CDF, density function.

Problem given by the instructor:-

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The manager of a factory claims that among his 400
employees.
¯ 312 got a pay rise last year
¯ 248 got increased pension benefits last year
¯ 173 got both pension benefits and pay rise last year
¯ 13 got neither

calculate the probability of.
a)Getting a pay rise
b)Not getting a pay rise
c)Getting both a pay rise and pension benefits
d)Getting no pay rise or benefit increase
e)Getting a pay rise or benefits
```

Answers:-

```
a) 0.78 -> 312/400
b) 0.22 -> 88/400
c) 0.4325 -> 173/400
d) 0.0325 -> 13/400
e) 0.535 -> (400 - 186)  = people who got either a payrise
or benefits, 214/400
    => Wrong, since this is an intersection. Take away 173
from 312 + 248, which would be the intersection of the 2
sets. The sum divide it by 400.
```

Problem statement 1

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In the Spanish top flight football tournament there are 20
teams.
- Top 4 teams can qualify for the champions league every
season
- Top 5 & 6 teams can qualify for europa league every season

Calculate the probability of.
a) Real madrid winning the league
b) Real madrid qualifying for champions league football
c) Real madrid qualifying for europa league football
d) Real madrid not qualifying for champions league football
```

Problem statement 2

Apple makes 300000 phones every year, which ships out with the latest operating system. And have manufactured 3000000 phones including the current year.
– Every year the older phones need to upgrade to the latest operating system.
– Every year 10% of the phones shipped in previous years need hardware repairs.

Calculate the probability of
a) A phone needing software updates
b) A phone needing hardware repairs
c) A phone requiring both software updates and hardware repairs
d) A phone requiring neither fotware updates or hardware repairs

Problem statement 3

A company has sold 100 mattresses,
– Out of which 7 were defective and need to be replaced.
– 4 had their fabric torn at manufacturing and that is why they need to be replaced
– 4 had their spring faultily installed and that is why they need to be replaced

Calculate the probability of
a) The mattress you bought needs replacement
b) The matress you bought needs replacement because of torn fabric
c) The matress you bought needs replacement because of faulty spring installation
e) The matress you doesnt have torn fabric

Problem statement 4

You visit a trampoline park, with 100 trampolines installed
– 5 trampolines make you jump super high
– 3 trampolines dampen your jump

Calculate the probability of
a) Your jump being normal

b) Your jump being super high
c) Your jump not being dampened

Problem statement 5

You have a developer in your team, in the last 12 features he created 5 of them had bugs.

Calculate the probability of
a) The next feature being buggy
b) The next feature not being buggy