FA4

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FA6 Questions

1. **A geospatial analysis system has four sensors supplying images. The percent- age of images supplied by each sensor and the percentage of images relevant to a query are shown in the following table.**

Sensor	Percentage_of_Images_Supplied	Percentage_of_Relevant_Images
1	15	50
2	20	60
3	25	80
4	40	85

What is the overall Percentage of the Relevant Images?

```
percentSupplied <- c(15, 20, 25, 40)
percentRelevant <- c(50, 60, 80, 85)

overallPercentage <- sum(percentSupplied * percentRelevant) / sum(percentSupplied)

cat("Overall percentage of the Relevant images:", overallPercentage, "%\n")
```

```
## Overall percentage of the Relevant images: 73.5 %
```

2. **A fair coin is tossed twice.** Let E be the event that both tosses have the same outcome, that is, E1 = (HH, TT). Let E2 be the event that the first toss is a head, that is, E2 = (HH, HT). Let E3 be the event that the second toss is a head, that is, E3 = (TH, HH). Show that E1, E2, and E3 are pairwise independent but not mutually independent.

	Heads	Tails
Heads	HH	HT
Tails	TH	TT

```
## E1 is the Event both results are the Same

## E2 is the Event first results are the Heads

## E1 is the Event second results are the Heads

## From the table we can see each event has 1/2 of the chance

## 0.5 0.5 0.5

## The two events E1 UNION E2 happening are the the products of its probabilities
```

```
## 0.25 Which is just the probability of HH on the table which is 1/4 and the UNION of the two events is

## We can derive that E1 UNION E3 and E2 UNION E3 will also have 1/4 probabilities
## and respectively have HH as the UNION too

## 0.25 0.25

## These prove their Pairwise Independent but now to show they are not Mutually Independent.
## We can just apply the same priciple of multiplying the Probabilities and theirs UNION's and we will s

## E1 UNION E2 UNION E3 have HH as the probability which is 1/4 but is not equal to the probability of n

## 0.125 Hence they are not Mutually Independent because E2 and E3 itself doesnt cary information or
## data to help form the probability of E1 it is still 1/2 but having the UNION of E2 and E2 will
## change the probability of E1 to happen becoming 1 means its guaranteed
```