Basic Concepts of Probability: Complements, Union & Intersections

Basic Concepts of Probability

- Complement
- Intersection
- Union
- Additive Rule

Complement

The complement of an an event E in a sample space S , is the collection of all outcomes in S that are not elements of the set E.

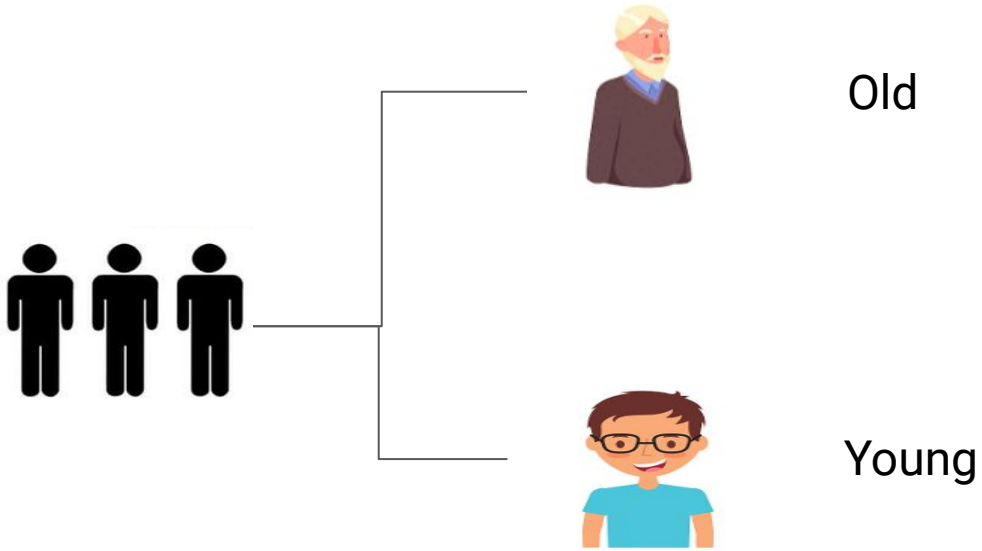
Event E : even number on rolling dice.

Event E^c : odd number on rolling dice.

$P(E^c) = 1 - P(E)$

Complement

Ex. Probability of customer being old?



	gender	age	occupation	churn
0	Male	young	salaried	0
1	Male	young	self_employed	0
2	Male	old	self_employed	0
3	Male	young	self_employed	0
4	Female	young	salaried	1
5	Male	old	salaried	0
6	Female	young	self_employed	1
7	Male	young	self_employed	0
8	Male	young	salaried	1
9	Male	young	salaried	0
10	Male	young	self_employed	1
11	Female	young	self_employed	1
12	Male	young	retired	0
13	Female	young	self_employed	0
14	Male	old	self_employed	0

Complement

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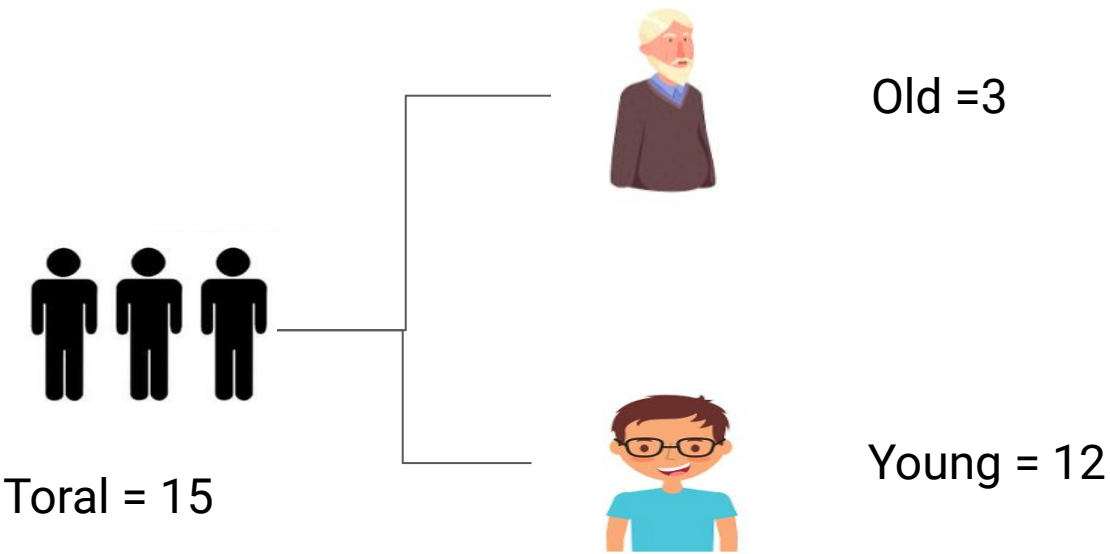

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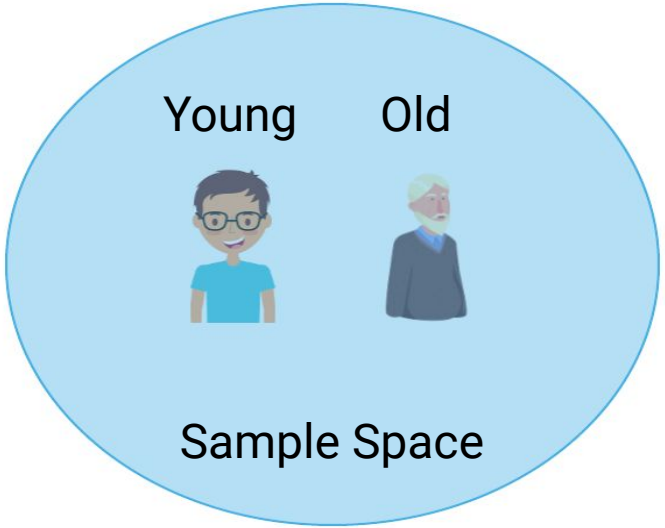
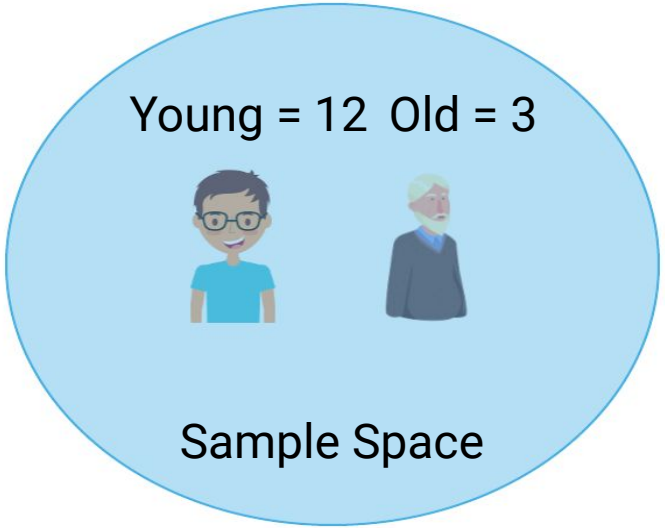


Complement

Ex. Probability of customer being old?

E : Old
E^c : Young

$P(E) = 1 - P(E^c)$
$= 1 - 12/15$
$= 3/15$
$= 1/5$



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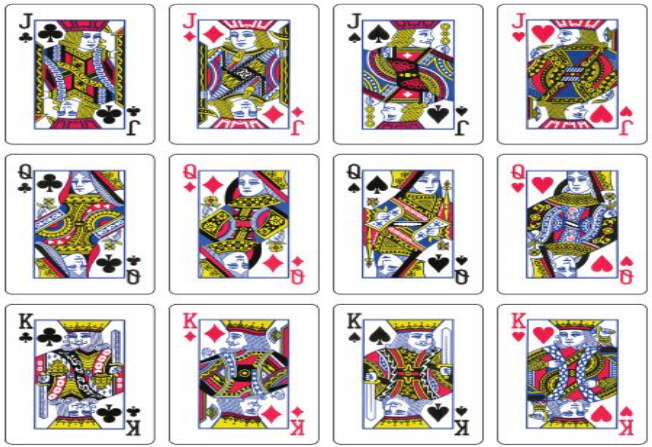
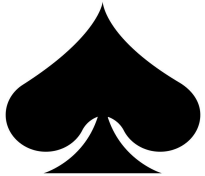
Intersection

Intersection $(\cap)$ is the collection of all outcomes that are common in events

Event A : getting a face card.



Event B : getting a spade card.



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Intersection

Intersection $(\cap)$ is the collection of all outcomes that are common in events

Event A : getting a face card.
Event B : getting a spade card.

Intersection of A and B: A face card of spade?

Intersection

Intersection $(\cap)$ is the collection of all outcomes that are common in events

Ex: Among all the customers who are not going to churn, Probability of one being a Self Employed Male person ?

Intersection

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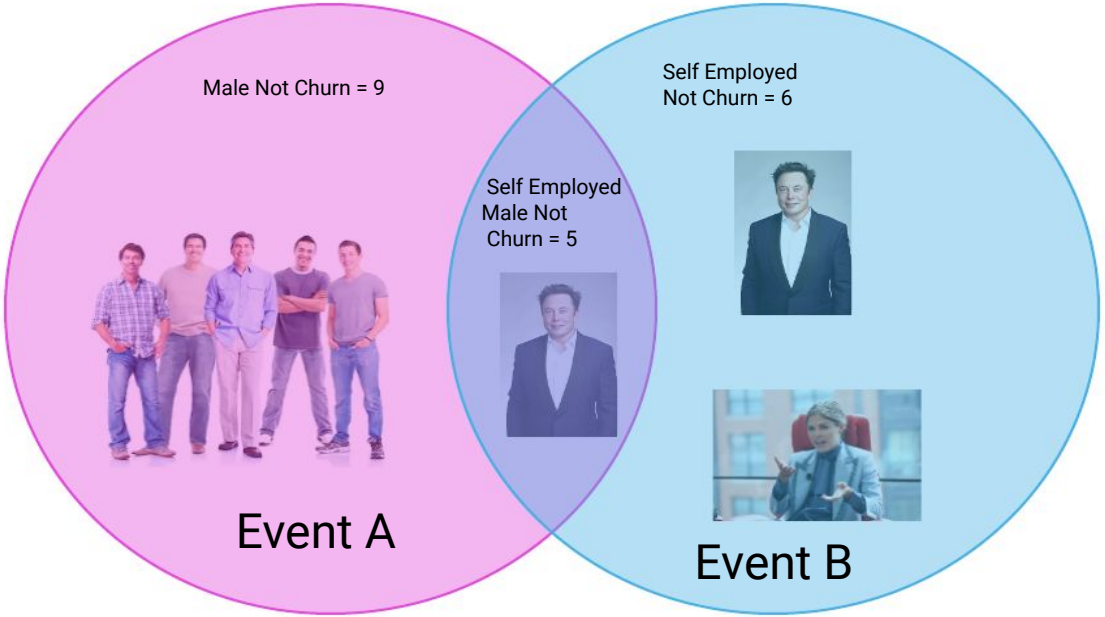

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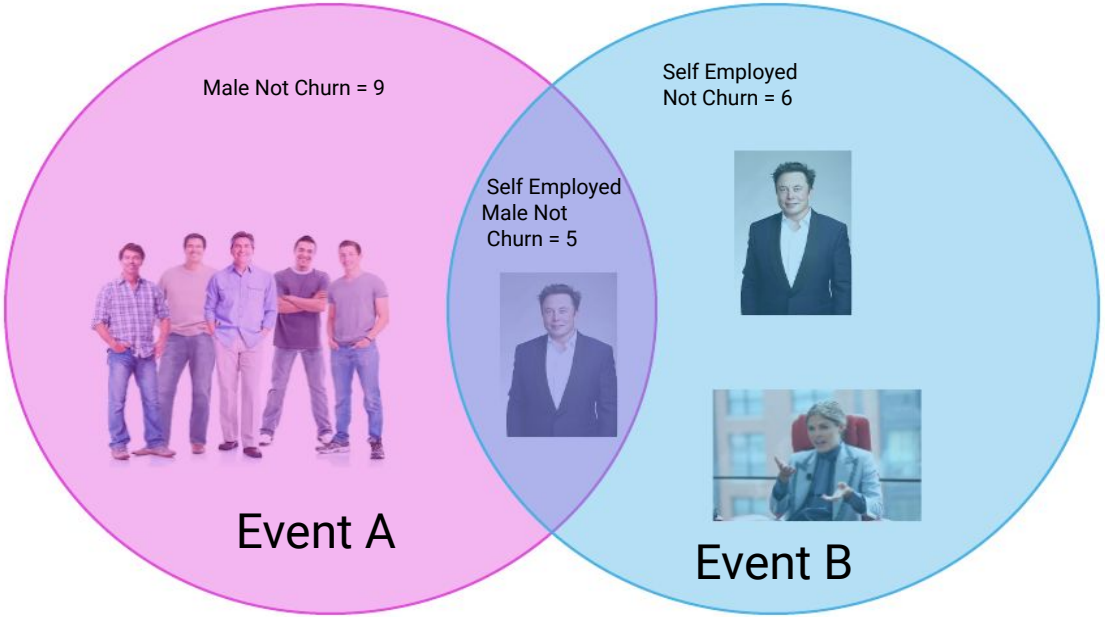

Total Retaining Customers = 10

$P(A \cap B) = 5/10 \rightarrow 0.5$

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Union

Union ($\cup$) is the collection of all outcomes that are elements of **any** of the events

Ex: Among all the customers going to churn,
One being a Female or a Self employed person?

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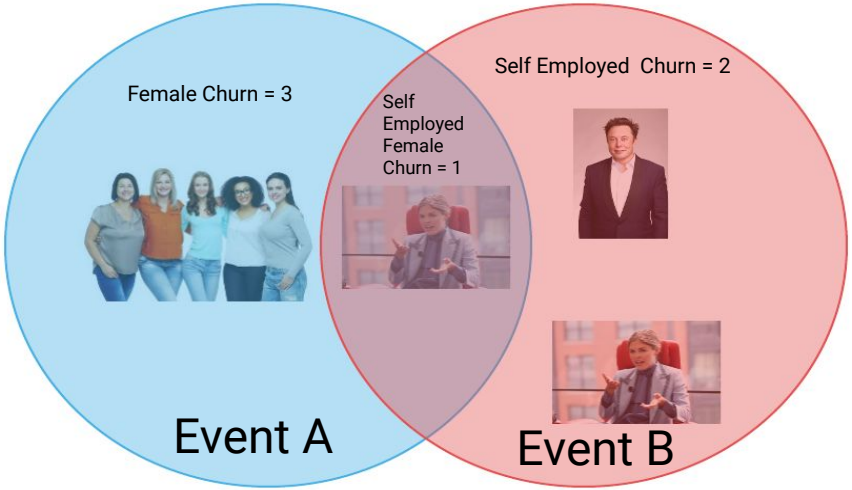

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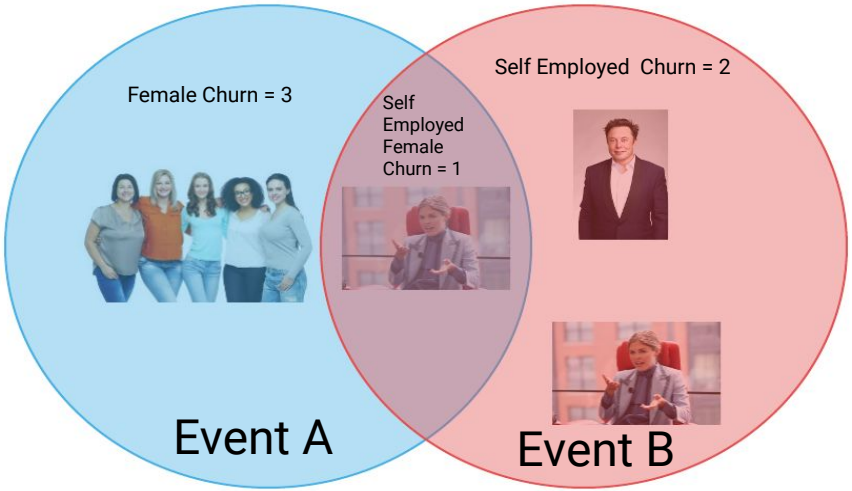

Total Customers reducing interaction = 5

$P(A \cup B) = \frac{4}{5} \rightarrow 0.8$

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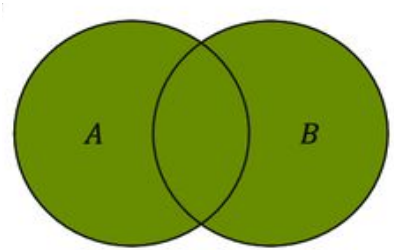
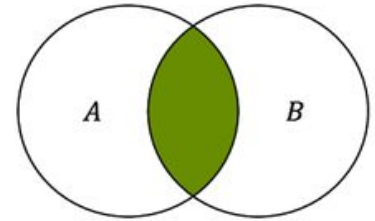
Additive Rule



Union



Intersection

Additive rule of Probability :-

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

Thank You!