Set: distinguishable collection.
Element: distinguishable object in the set

Element x is in set A:
$x \in A$

==
Cardinality is the number of element which the set has

$A = \{1, 2, 3\}$
$|A| = \mathrm{card}(A) = 3$

==
Union of two sets A and B
$A \cup B$

Intersection of two sets A and B
$A \cap B$

==
If set A is sub set of set B:
$A \subset B$

$A \subset A$ is true

If cardinality of A is smaller than B,
A is proper subset of B

==
Difference set
$A - B$

==
Complement set against entire set Ω
A^C

$A^C = \Omega - A$

==
Null set ϕ has none element

$\phi \subset$ all sets

Following is true
$A \cap \phi = \phi$
$A \cup \phi = A$

$A \cap A^C = \phi$

==

$A = \{1, 2\}$ has 4 number of sub sets

$A_1 = \phi$
$A_2 = \{1\}$
$A_3 = \{2\}$
$A_4 = \{1, 2\}$

==

If set A has N number of elements,
A has 2^N number of sub sets

==

Following is true as distribution law
$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$

==

afafaf Probabilistic sample(or random sample, sample):
One realizable phenomenon from the probabilistic problem you want to solve
Or one sampled case

Sample space Ω:
Set which contains all possible samples

Task of defining sample sapce:
Define which phenomenon is possible to occur
and which phenomenon is impossible to occur

==

Sample space when you toss the coin
$\Omega = \{H, T\}$

==

Some cases has set of entire real numbers as sample space
$\Omega = \mathbf{R}$

==

Possible events: possible sub sets of sample space Ω

Sample space $\Omega = \{H, T\}$
Possible events: $\phi, \{H\}, \{T\}, \{H, T\}$

==
Probability is function which takes all events
and which outputs number

$P(A) = 0.1$
P() is function P
A is event
0.1 is probability value

==
Kolmogorov's axioms

1. $P(\text{all\_events}) \geq 0$
2. $P(\Omega) = 1$
3. If $A \cap B = \phi$, then $P(A \cup B) = P(A) + P(B)$

==
Interpretion about probability value:
1. Frequentist
2. Baysian

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