



Probability

using models or causes
to predict data

fair coin ^{Head Tail}
50%  50%

loaded coin 1  0

$$P(H) + P(T) = 1$$

$$P(A) = 1 - P(\neg A)$$

NA

Statistics


using data to analyse
it and use the right model

- Two flips

{H, H}

$$P(H) = 0.5$$

$$P(H, H) = 0.25$$

H = 

+ H

tree

or by truth table

$$P(H, H) = P(H) \cdot P(H)$$

$$\{H, T\} \quad P(H) = 0.6 \\ P(T) = 0.4$$

$$P(H, H) = P(H) \cdot P(H) = 0.36$$

$$\{H, T\} \quad P(H) = 1 \\ P(T) = 0$$

$$P(H, H) = 1$$

truth table

H	H
H	T
T	H
T	T

one head

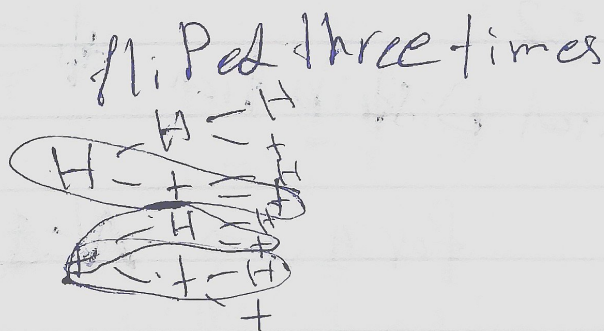
flipped twice $P(H) = 0.5$

$$P(\text{Exactly once head}) = 0.5 + 0.25 = 0.5$$

$$P(\text{Exactly once head})$$

$$= (0.5 \times 0.5 \times 0.5) \times 3$$

$$= 0.125 \times 3 = \boxed{0.375}$$



$$\text{for } P(H) = 0.6 \\ P(T) = 0.4$$

$$P(\text{Exactly once head in three flips}) = (0.6 \times 0.4 \times 0.4) + (0.4 \times 0.6 \times 0.4) + (0.4 \times 0.4 \times 0.6) = 0.288$$

$$P(\text{even}) = \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = 0.5$$

the same number

$$P(\text{Double}) = \frac{1}{6} + \frac{1}{6} + 6$$

twice

$$\boxed{\frac{1}{6}}$$

1
2
3
4
5
6

$$P(\text{ok}) = \frac{1}{6}$$

Summary:-

► Probability of event
 P

► " " of opposite event
 $1 - P$

► " " composite event
 $P = P + P + \dots + P$