1- Binomial
Binomial Distribution
2- coin flip #H = #T
H H
H T
T H → [2]
T T

3- 4 coin #H = #T
HHHH THHH [6]
HTTT HTTT

5- 5 coin #H = #T
Todd [0] zero

7- 5 coin flip 1 HEAD
[5]
2 HEADs
[10]

5 2 TA 3 HEADs
[10]

10 coins flip 4 HEADs
$\frac{10 \cdot 9 \cdot 8 \cdot 7}{4 \cdot 3 \cdot 2 \cdot 1} = \frac{5040}{24}$ [210]

10 coins 5 HEADs
$\frac{10 \cdot 9 \cdot 8 \cdot 7 \cdot 6}{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = \frac{30240}{120}$ [252]
n k

Factorial : $n! = n.(n-1).(n-2) \cdot 1$
• $n!$ • $\frac{n!}{k! \cdot k!}$ • $\frac{n!}{k!(n-k)!}$
• $\frac{n!}{k!}$

$\frac{10!}{5! * (10-5)!} = 252$

17 - Arrangement

125 coins 3 HEADs
n k
$\frac{n!}{k!(n-k)!} = \frac{125 \cdot 124 \cdot 123 \cdot 122!}{122! \cdot 3!}$ [317,750]

Probabilities P(HEADs) = 0,5
Flip coin 5 time P(#HE) = 1
$\frac{5!}{4!1} = 5$, $2^5 = 32$
$\frac{5}{32}$ [0,1563]

5 Time P(H) = 3
$\frac{5!}{(5-3)!3!} = 10$ $2^5 = 32$
$\frac{10}{32}$ [0,3125]

P(Hen) = 0,8
P(#H) = 1
coin 3 time
H H H T H H
H T H T H T
H T H T T H
H T T T T T
0,8 . 0,2 . 0,2 = 0,032
[0,096]

2022

19 Wednesday January

جماد آخر ١٤٤٣ هـ

١ طوبـة ١٧٣٨ ق

08:00 $P(H) = 0,8$

Cor 5 Tin $P(NH = 4)$ 1T

09:00 $\frac{5!}{4!.1!} = 5 \cdot (0,8)^4 \cdot (0,2)^1$

$= \boxed{0,4096}$

10:00

$P(NH = 3)$

11:00 $\frac{5!}{3!2!} = 10 \cdot (0,8)^3 \cdot (0,2)^2$

$= \boxed{0,2048}$

12:00

Fin = 12 Tin $P(NH = 9)$

01:00 $P(H) = 0,8$

$\frac{12!}{(12-9)! \cdot 9!} = 220 \times (0,8)^9 \cdot (1-0,8)^3$

02:00

$\boxed{0,236}$

03:00

Descriptive statistics

* Continuous Data
- Quantitive
  - Discrete
  - Continuous
- Categorical
  - Ordinal
  - Nominal

Center, Spread
Shape, Outlier

1) Center
- mean = Sum / # Items
- med = middle val
- Mode = most common

* Notation: Common math language used to communicate

* Histogram
5 Number Summary
min Q_1 Q_2 Q_3 max
med

range = max - min

IQR = $Q_3 - Q_1$

Standard Diviation:
= $\sqrt{\text{Variance}}$

Variance =
$$\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2$$

* Distribution
left skew, symetric, Right skewed

* Outliers:
Points far from Rest Values

* Probability Vs Statistics
Probabil → Data → Events
Model → Cause
Statistics

* Fair coin: P(Heads) = 0.5
P(Tails) = 0.5

* Loaded chain:
P(H) = 1, P(T) = 0 ; P(H) = 0.75, P(T) = 0.25
P(H) + P(T) = 1
P(A) = 1 - P(¬A) (not)

Arrangement & Factorial
$$\frac{n!}{k!(n-k)!}$$