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by Wes McKinney (Author)

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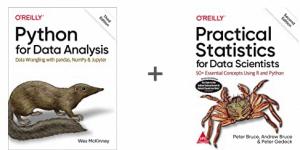
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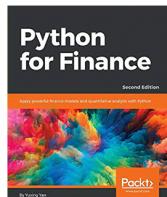
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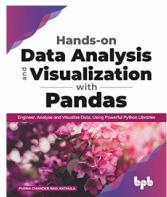
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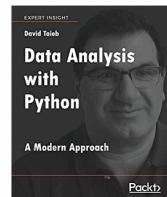
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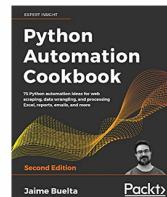
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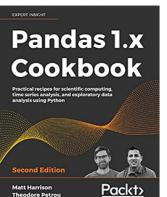
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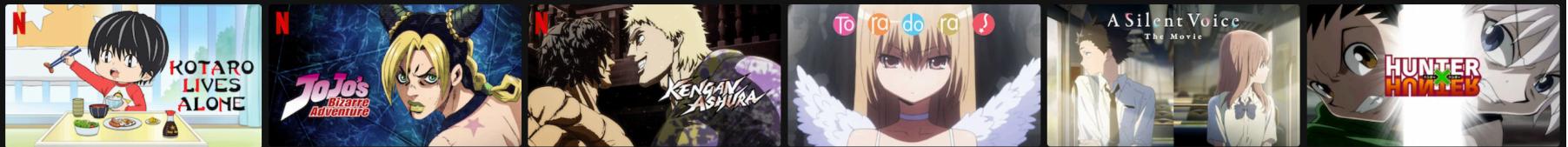
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Netflix : Customer Retention → ↑ Engagement.

The screenshot shows the Netflix homepage with a dark background. At the top, there's a navigation bar with links for Home, TV Shows, Movies, New & Popular, My List, and Browse by Languages. To the right of the navigation is a search icon and a notifications icon with a red dot containing the number 6. Below the navigation, there are three main sections of recommended content:

- Award-Winning Films:** A row of movie thumbnails including "Silver Linings Playbook", "Flight", "Queen", "Ishqiya", "The Ballad of Buster Scruggs", and "Magic Beyond Words".
- Emmy-winning US TV Comedies:** A row of TV show thumbnails including "Two and a half Men", "The Ranch", "GLOW", "Master of None", "One Day at a Time", and "Orange is the new Black".
- Critically-acclaimed US Movies:** A row of movie thumbnails including "Never Rarely Sometimes Always", "Late Night", "Pieces of a Woman", "The Meyerowitz Stories (New and Selected)", "Get Out", and "El Camino".

Because you watched DEATH NOTE



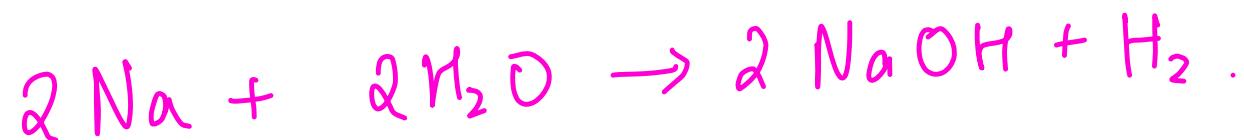
Korean TV Dramas >





Basic Terminologies:

* Experiment:



"Deterministic"

Random Experiments:

- ① Coin Toss.
- ② Ind vs. Pakistan.
- ③ MCQ q's (out of syllabus).
- ④ Dice.
- ⑤ Weather.
- ⑥ Lottery.

Experiment · Outcome · Sample space · Event ·

Dice.

Outcomes: $\{1\}, \{2\}, \{3\}, \{4\}, \{5\}, \{6\}$

Sample space: $\{\underline{1}, \underline{2}, \underline{3}, \underline{4}, \underline{5}, \underline{6}\}$.

"Set of all outcomes"

Event: $E_1 = \{\underline{1}, \underline{3}, \underline{5}\}$



The event where
you guy win.

$E_2 = \{2, 4, 6\}$



The event where
g win.

"Event is a subset of the sample space"

$C = \{1, 3, 5, \boxed{7}\}$ → event? No.

Experiment · Outcome · Sample space · Event ·

Coin toss · (fair).

Outcomes: $\{ H \}$ $\{ T \}$.

→ Sample Space : $\{ H, T \}$.
"Collection of all outcomes."

Examples of events

$$A = \{ H \} \quad B = \{ H, T \}$$

$$C = \{ \} \quad D = \{ T \}.$$



The empty set is
a subset of all sets.

Experiment · Outcome · Sample Space · Event ·

Two coin tosses.

Outcomes: $\{TH\}$, $\{TT\}$, $\{HT\}$, $\{HH\}$.

Sample Space: $\{HH, HT, TH, TT\}$.

Events: "At least one Heads":

$$\tilde{E}_1 = \{HH, HT, TH\}$$

"Both tosses are the same":

$$E_2 = \{HH, TT\}.$$

Experiment · Outcome · Sample space · Event ·

1 die roll + 1 coin toss.

Outcomes: $\{(1, H)\}, \{(2, H)\} \dots \dots$
 $\{(1, T)\}, \{(2, T)\} \dots \dots$

Sample Space: $\{(1, H), (2, H), (3, H), (4, H), (5, H), (6, H)\}$
 $\{(1, T), (2, T), (3, T), (4, T), (5, T), (6, T)\}$

Events: P : Heads and odd:
 $\{(1, H), (3, H), (5, H)\}$

S : Tails and odd:
 $\{(1, T), (3, T), (5, T)\}$.

Set Operations: Union Intersection complement

Dice :

$$S = \{1, 2, 3, 4, 5, 6\}.$$

$$\checkmark A = \{1, 3, 5\}. \text{ "Dice is odd"}$$

$$B = \{4, 5, 6\}. \text{ "Dice is greater than 3"}$$

$$A \cup B = \{1, 3, 4, 5, 6\}.$$

"Dice is either
odd or greater than 3"

$$A^c = \{2, 4, 6\}.$$

$$A \cap B = \{5\}$$

"Dice is both.
odd and greater than 3"

Probability.

Probability = $\frac{\# \text{ items in the event}}{\# \text{ items in the sample space}}$.

Coin toss:

Outcomes: { H } { T }.

Sample Space: { H, T }. ←

"Collection of all outcomes."

A: Heads. { H }

B: Tails { T }

$$P(A) = \frac{1}{2} = 0.5 = P(B).$$

Probability : Dice

Outcomes: $\{1\}, \{2\}, \{3\}, \{4\}, \{5\}, \{6\}$

Sample space: $\{\underline{1}, \underline{2}, \underline{3}, \underline{4}, \underline{5}, \underline{6}\}$.

$$A: \{\underline{1}, \underline{3}, \underline{5}, \underline{6}\} \quad B = \{\underline{1}, \underline{3}, \underline{4}\}$$

$$P(A) = \frac{4}{6}$$

$$P(B) = \frac{3}{6}$$

$$P(A \cap B) = \frac{2}{6}$$

↓
and.

$$P(A \cup B) = \frac{5}{6}$$

$\overbrace{\{1, 3, 4, 5, 6\}}$

$$\left| \begin{array}{l} P(A^c) = \frac{2}{6} \\ \text{So } P(A \cup B) = P(A) + P(B)? \end{array} \right.$$

Q] How to relate $P(A \cup B)$ with $P(A)$, $P(B)$?

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

A: $\{1, 3, 5, 6\}$.

B = $\{1, 3, 4\}$

$$A \cup B = \{1, 3, 4, 5, 6\}.$$

$$A \cap B = \{1, 3\}.$$

$$P(\{1, 3, 4, 5, 6\}) = P(\{1, 3, 5, 6\}) +$$

"Probability of the union."

$$P(\{1, 3, 4\})$$

$$- P(\{1, 3\})$$

Recap:

- Sample space: Set of all outcomes.
- Event : Subset of sample space .
- Probability of union: $P(A) + P(B) - P(A \cap B)$
 $= P(A \cup B)$.

Set operations:

- Union
- Intersection
- Complement