Conditional Probability :
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Contingency table

The following table shows the numbers of red and black cards in a deck that are Aces and non-Aces:

	Red	Black	Total
Ace	2	2	4
Non Ace	24	24	48
Total	26	26	52

The total in the **Red** column is 26, which means there are 26 red cards in the deck. Of these, 2 are Aces and 24 are non-Aces. There are 52 cards in a deck. Use the values in the table to calculate some conditional probabilities.

✅ Calculate `P(Ace|Red)` .

Solution:

```
# Individual probabilities
P_Red = 26/52
P_Red_n_Ace = 4/52 * 26/52

# Conditional probability calculation
P_Ace_given_Red = P_Red_n_Ace/P_Red

print(P_Ace_given_Red)
```
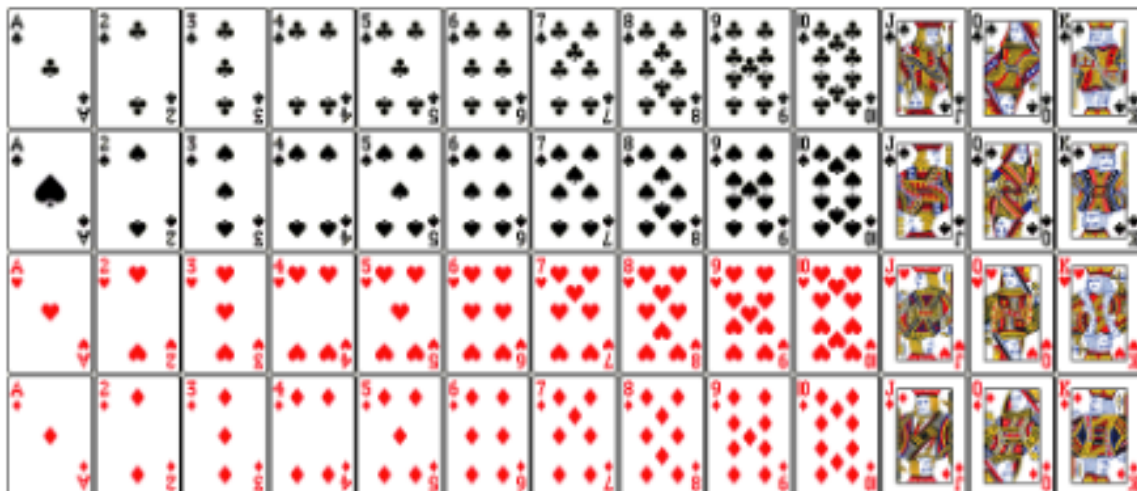
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Conditional Probability:

Now let's use the deck of cards to calculate some conditional probabilities.

✓ Calculate P(Ace|Spade) .

Solution:

```
# Needed probabilities
P_Spade = 13/52
P_Spade_n_Ace = 1/52

# Conditional probability calculation
P_Ace_given_Spade = P_Spade_n_Ace/P_Spade

print(P_Ace_given_Spade)
```
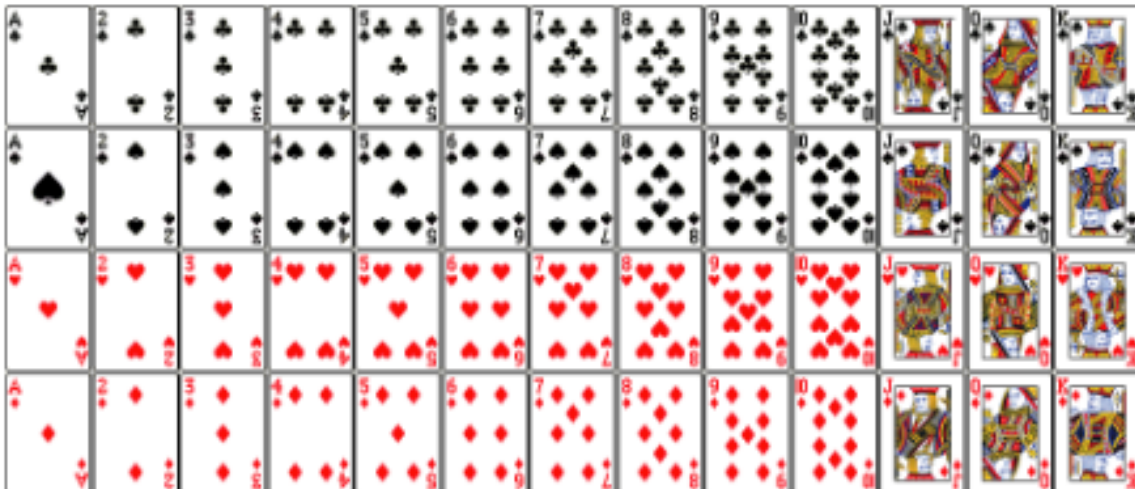
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Joint Probability :
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More cards

Now let's use the deck of cards to calculate some conditional probabilities.

✅ Calculate the probability of getting two Jacks (`P(Jack and Jack)`).

Solution:

```python
# Needed probabilities
P_first_Jack = 4/52
P_Jack_given_Jack = 3/51

# Joint probability calculation
P_two_Jacks = P_Jack_given_Jack * P_first_Jack

print(P_two_Jacks)
```

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```