# Confidence Interval

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- An interval for some unknown characteristic of the population data

**Example**:

Predicting the actual share of votes of a particular candidate in the US presidential election.

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**Example**: US Presidential Election

- Only two candidates, *A* and *B*

- Wish to predict vote percentage for candidate *A*

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- Wish to predict vote percentage for candidate *A*

- A random selection of 500 potential voters surveyed

- 300 voters will vote for *A* and 200 for **B**

- That is, 60% of surveyed voters will vote for *A*

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**Example**: US Presidential Election

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- Wish to predict vote percentage for candidate **A**

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- 300 voters will vote for **A** and 200 for **B**

- That is, 60% of surveyed voters will vote for **A**

**Will candidate A get 60% of all votes in the actual election?**

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Example: US Presidential Election

A 95% confidence interval for the vote share of candidate **A**,

**[55.7%, 64.3%]**

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- 95% of similarly constructed confidence intervals likely to have the actual vote share for **A**

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A 95% confidence interval for the vote share of candidate **A**,

**[55.7%, 64.3%]**

- 95% of similarly constructed confidence intervals likely to have the actual vote share for **A**

- there is a 0.95 probability that the actual vote share for **A** will be between 55.7% and 64.3%

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[55.7% ←-------------------→ 64.3%]

**60%**

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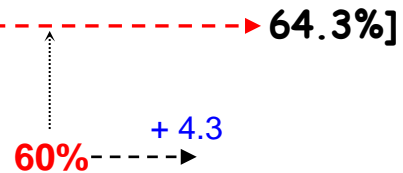
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Example: US Presidential Election

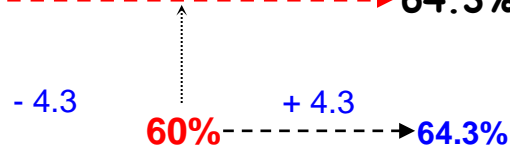A 95% confidence interval for the vote share of candidate **A**,

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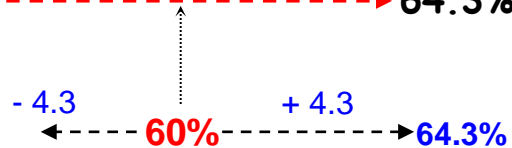
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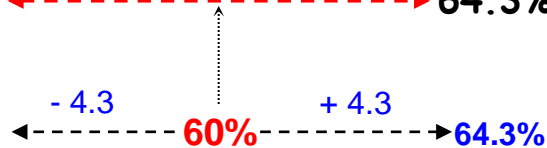A 95% confidence interval for the vote share of candidate **A**,

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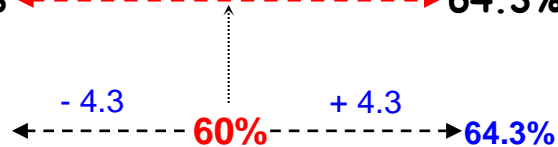A 95% confidence interval for the vote share of candidate **A**,

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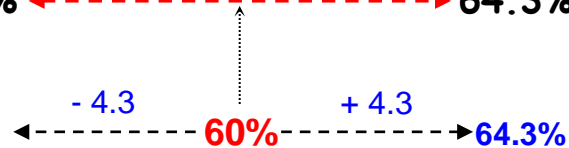# Confidence Interval

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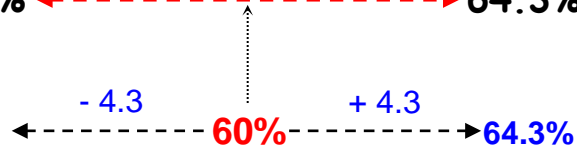**[55.7%** ← — — — — — — — — — → **64.3%]**

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**+/- 4.3% is the 'Margin of Error'**

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What is the average starting salary of **_all business students_**
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What is the average starting salary of **all business students**
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**Population**

all students in New York City who finished their business education last year

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all students in New York
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**Mean = $\mu$**
**Std = $\sigma$**

# Confidence Interval

What is the average starting salary of **all business students** who graduated last year in New York city?

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all students in New York City who finished their business education last year ➡️ We wish to find out $\mu$

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# Confidence Interval

What is the average starting salary of **all business students** who graduated last year in New York city?

**Population**

all students in New York City who finished their business education last year

Mean = $\mu$
Std = $\sigma$

**Sample**

random sample of 100 students

Mean = $\bar{x}$ = 61,400$
Std = $s$ = some number

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[ lower limit < $\mu$ < upper limit ]

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$$[ \text{ lower limit } < \mu < \text{ upper limit } ]$$

$$\bar{x} - \text{ margin of error} \qquad \bar{x} + \text{ margin of error}$$