

# Software Engineering Experimentation

## Software Metrics

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## Software Metrics

- Metrics are very closely related to software experimentation
- Uses many of the same terms
- Why measure software?
  - Quality evaluation
  - Planning for change
  - Resource estimation
  - Improvements in software and process
  - Guide to design and implementation methods

## Terms

- Factor: A quality that we wish to base a decision on but that cannot be measured directly
  - Maintainability, complexity, usability
- Metric: Something that can be measured
  - Height, age, size, coupling, time to learn

It is easy to get factor and metric confused. We use metrics to estimate factors. We often use the same term at different levels.

## Measuring Metrics

- Measurement: A specific way to evaluate a metric. A measurement has units.
  - Number of inches/cm/feet, years, lines, ...
- Validation: A metric is validated if it tells us something useful ... that is, if it has been shown to accurately estimate a factor
  - Coupling has been shown to be correlated with maintainability and reliability

## Correlation and Prediction

- Correlation: if A happens, then B happens
  - Brake lights and car slowing down
- Causality: if A happens, then it causes B to happen
  - Pressing brake slows the car down
- Predictability: if A happens, I can predict that B will happen

We do not need to show causality to have predictability