Negative Testing

Behaviorist and Psychological Background

- Peter Cathcart Wason, 1960
  - *Positive tests four times as common as negative tests.*
  - ***Confirmation Bias:*** *People tend to prioritize information that confirms their current beliefs.*
  - *Negative tests are generally required in order to conclusively falsify hypotheses.*

Negative Testing

Behaviorist and Psychological Background

- Peter Cathcart Wason, 1960
  - *Positive tests four times as common as negative tests.*
  - ***Confirmation Bias:*** *People tend to prioritize information that confirms their current beliefs.*
  - *Negative tests are generally required in order to conclusively falsify hypotheses.*
- Klayman and Ha, 1987
  - ***Positive Test Strategy:*** *People have a tendency to make tests that are consistent with the current working hypothesis.*
  - *Even positive tests can conclusively falsify hypotheses. The strategy needs to be adapted to the problem at hand.*

Negative Testing

Behaviorist and Psychological Background

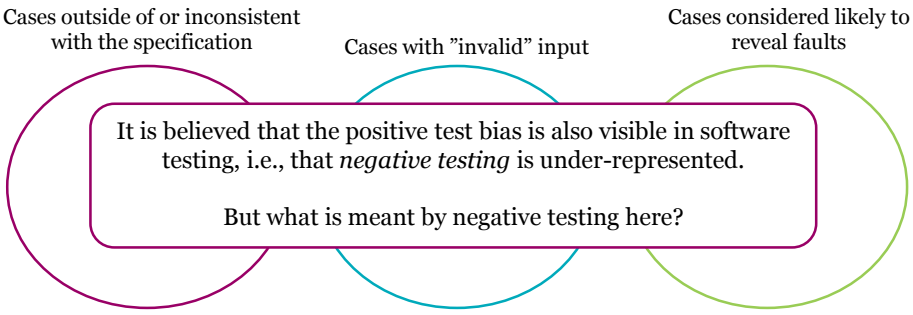
- Peter Cathcart Wason, 1960
  - *Positive tests four times as common as negative tests.*
  - ***Confirmation Bias:*** *People tend to prioritize information that confirms their current beliefs.*

Regardless, it is an inherent part of human nature to seek confirmation for existing beliefs.

  - ***Positive Test Strategy:*** *People have a tendency to make tests that are consistent with the current working hypothesis.*
  - *Even positive tests can conclusively falsify hypotheses. The strategy needs to be adapted to the problem at hand.*

Negative Testing

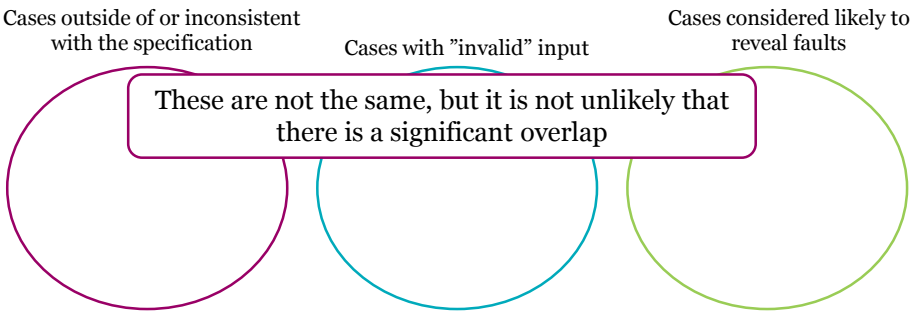
In Software Engineering



It is believed that the positive test bias is also visible in software testing, i.e., that *negative testing* is under-represented.

But what is meant by negative testing here?

Negative Testing
In Software Engineering



Positive Test Bias in Software Engineering

- Leventhal, Teasly, Rohlman and Instone, 1992-1993:
  Four studies on positive test bias in software engineering

Positive Test Bias in Software Engineering

- Leventhal, Teasly, Rohlman and Instone, 1992-1993:
  Four studies on positive test bias in software engineering

Cases defined in the specification Cases with valid input	Cases outside of or inconsistent with the specification Cases with invalid input

Positive Test Bias in Software Engineering

- Leventhal, Teasly, Rohlman and Instone, 1992-1993:
  Four studies on positive test bias in software engineering

Cases defined in the specification Cases with valid input	Cases outside of or inconsistent with the specification Cases with invalid input

Example: If a piece of software, according to the specification, is supposed to take a 5-digit area code as input, any 5-digit code would be considered a valid input...

Positive Test Bias in Software Engineering

- Leventhal, Teasly, Rohlman and Instone, 1992-1993:
  Four studies on positive test bias in software engineering

Cases defined in the specification Cases with valid input	Cases outside of or inconsistent with the specification Cases with invalid input

...and a 4- or a 7-digit code would be considered an invalid input

Positive Test Bias in Software Engineering

- Leventhal, Teasly, Rohlman and Instone, 1992-1993:
  Four studies on positive test bias in software engineering

Cases defined in the specification Cases with valid input	Cases outside of or inconsistent with the specification Cases with invalid input

Note: In the studies, no distinction is made between a case being outside the specification and one having an invalid input.

Positive Test Bias in Software Engineering

- Leventhal, Teasly, Rohlman and Instone, 1992-1993:
  Four studies on positive test bias in software engineering

Cases defined in the specification Cases with valid input	Cases outside of or inconsistent with the specification Cases with invalid input

- **Main Results:**
  - Wason's 4:1 ratio confirmed
  - Tester expertise, completeness of specification, and presence of errors may reduce positive test bias