

SOFTWARE QUALITY ASSURANCE

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Psychology & Economics

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Psychology & Economics of Program Testing

- **Definitions & Orientation**
- **Economics**
- **Testing Principles**

Definitions & Orientation

- Trying to *find* errors
- NOT trying to show there are no errors
- *Successful* test finds errors
- Problems of language and psychology

Economics of Testing

- **Costs of errors**
 - roughly 10x increase at every level of development
 - analysis, design, coding, implementation
- **Costs of finding errors**
 - must balance cost of error vs cost of finding error
 - possible test cases usually infinite
 - impossible to locate all errors
 - unnecessary to locate all errors: just significant ones

Economics of Testing

- **Black-Box Testing**
 - derive test data from specifications only
 - use exhaustive input testing
 - but include all possible wrong inputs too
 - time and money constraints make it impossible to test everything
- **White-Box Testing**
 - try to execute all possible execution paths
 - but astronomically high # paths
 - and have to multiply by # of inputs

Some Principles of Testing

- **Define expected values**
- **Use independent testers**
- **Pay attention to every result**
- **Include invalid and unusual inputs**
- **Look for forbidden results**
- **Record test cases for re-use**
- **Errors bespeak more errors**
- **80/20 rule (Pareto Principle)**