Objectives

- Analyze common definitions of software quality
- Contrast QA’s traditional negative measures of quality with laypeople’s often positive measures
- Explore some ways to more workably define, quantify, and compare both positive and negative aspects of software quality
Some Common Definitions of Quality

- Customer satisfaction
- Meets or exceeds customer expectations
- Optimization, value
- Conformance to requirements (Philip Crosby)
- Percent of (a sample of) products passing inspection for defects; lack of defects (~Deming)
- Minimal variation within specification (Six Sigma)
- Fitness for use (Joseph Juran)

Any problems with these definitions? Relation to systems?

What We Mean By System Quality

- Fits system specs
- Runs efficiently
- Doesn’t blow up
- Follows standards
- Current technology
- Modern techniques
- Easily modified
  - without code change
  - when code changes
What Others Mean By System Quality

- Does what needs to be done correctly
- Performs adequately
- Reliable/consistent
- Easy to use
- Supported quickly and correctly
- On-time, in budget

Until We Share a Common Definition of System Quality...

✓ Users, managers, developers, and Quality professionals will continue to disappoint each other
✓ Each has a different idea of what to deliver and how to tell whether it has been delivered adequately
✓ Each thinks the others don’t care about Quality
QA/Testing Equates Software Quality to (Lack of) Categorized Defects

- Criticality
  - Showstopper
  - Injury, damage
  - Failure to function
  - Impeded effectiveness
  - Cosmetic
- Nature of problem, e.g.,
  - Hardware
  - Communications
  - User error
- System, module, screen
- Symptom, e.g., lockup, miscalculation, no space
- Impact on business, breadth and depth
  - Cost, effort, risk to fix
  - Priority--likelihood, workaround

Are two software products with equal defect densities equal in quality?

Is a software product with lower defect density necessarily higher quality than a software product with higher defect density?

For comparable uses?
For different uses?
Who has higher quality food? Why?

What Makes Chef Mario Batali’s Food Higher Quality than Burger King’s?

• Both consistently produce defect-free dishes
The J.D. Power and Associates Automotive Performance, Execution and Layout (APEAL) Study examines what consumers like about their new vehicles after 90 days of ownership. Often referred to as "things gone right," APEAL is based on eight categories of vehicle performance and design:

- engine/transmission
- ride, handling and braking
- comfort/convenience
- seats
- cockpit/instrument panel
- heating, ventilation and cooling
- sound system
- styling/exterior

http://autos.jdpower.com/ratings/performance.htm

2013 Initial Quality Study (IQS) of owner-reported problems in the first 90 days of new-vehicle ownership
Who has higher quality? Why?

Windows 8.1

iPad Air

What Makes Apple iPad Air Higher Quality than Microsoft Windows 8.1?

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Besides defects
Defining Quality in Positive Terms

Quality Dimension: Quality of Design *(What’s it need to do)*
- Required functions, capabilities, and performance levels defined appropriately
  - needs of all stakeholders identified
  - definitions accurate and complete
  - meaningful common understanding
- Design suitably meets requirements
- Costs/benefits/schedules are accurate
- Trade-offs based on adequate information

Quality Dimension: Quality of Conformance *(How it’s produced)*
- Products conform to design
- Products apply standards/conventions
- Workers use expected skill and care
- Workers apply defined methods, tools
- Management uses appropriate practices
- Product is delivered on-time, in-budget
Quality Dimension: Quality of Performance (How it’s delivered)

- Product is available as needed for use
- Product works in intended manner
- Product works reliably and accurately
- Product handles workload adequately
- Product is supported and maintained responsively

Addressing Quality Factors

Factors:
- Exterior
- Interior
- Future
Our Working Definition of Quality

A system’s quality is the extent to which it meets weighted stated and implied exterior, interior, and future requirements of all affected internal and external stakeholders consistent with standards of design, workmanship, and performance.

The more of the relevant requirements which are met, and the more demanding the standards are with respect to meeting those requirements, the higher the quality.

Quality is absolute. The amount of quality one receives is governed by available resources, priorities, and other constraints.

Value is the perceived benefit of quality received relative to the costs of producing and receiving it.
### Engineered Deliverable Quality™

#### How Much

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<th>Deliverable Capability</th>
<th>Deliverable Weight/Priority</th>
<th>Minimum</th>
<th>Desirable</th>
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#### How Well

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### What Requirements/Quality Levels Distinguish Batali from Burger King?

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What Requirements/Quality Levels Distinguish iPad Air from Windows 8.1?

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• President of Go Pro Management, Inc. consultancy since 1982, working directly with and training professionals in business engineering, requirements analysis, software acquisition, project management, quality and testing.
• Partner with ProveIT.net in REAL ROI™ and ROI Value Modeling™.
• Previously a developer, systems programmer/DBA/QA, and project leader with the City of Cleveland, leading financial institutions, and a “Big 4” consulting firm.
• Degrees: Kenyon College, A.B.; Pennsylvania State University, M.S. in Psychology; Suffolk University, J.D.; Boston University, LL.M. in Tax Law.
• Published author and frequent speaker at leading professional conferences.
• Formerly International Vice President of the Association for Systems Management and Executive Editor of the Journal of Systems Management.
• Founding Chairman of the New England Center for Organizational Effectiveness.
• Member of the Boston SPIN and SEPG’95 Planning and Program Committees.
• Attendee Networking Coordinator for STAR, Better Software, and Test Automation Conferences.
• Chair of record-setting attendance BOSCON 2000 and 2001, ASQ Boston Section’s Annual Quality Conferences.
• Member IEEE Std. 829 for Software Test Documentation Standard Revision Committee.
• Member IEEE P1805 working group to develop a standard for Requirements Capture Language (RCL).
• Member IEEE P730 standard for Software Quality Assurance Revision Committee.
• International Institute of Business Analysis (IIBA) Business Analysis Body of Knowledge (BABOK) subject expert.
• TechTarget SearchSoftwareQuality.com requirements and testing expert.
• Admitted to the Massachusetts Bar and licensed to practice law in Massachusetts.
• Author of book: Discovering REAL Business Requirements for Software Project Success

Go Pro Management, Inc. Seminars/Consulting--Relation to Life Cycle

Systems QA  Software Quality Effectiveness Maturity Model
Credibly Managing Projects and Processes with Metrics

Software, Test Process Measurement & Improvement

Feasibility
Analysis

Defining and Managing Business Requirements

Writing Testable SW Requirements

Risk Analysis

Managing Software Acquisition and Outsourcing:

> Purchasing Software and Services

> Controlling an Existing Vendor’s Performance

Making You a Leader

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