Any Questions?

Status Report on Software Measurement

Shari Pfleeger, Ross Jeffrey, Bill Curtis, Barbara Kitchenham
IEEE Software March/April 97

Software Measurement: A Necessary Scientific Basis

Norman Fenton
IEEE TOSE March 94

Fenton, p204, Halstead’s Software Science

- η₁ (unique operators) and η₂ (unique operands) (η₁ and η₂)
- Length is N = N₁ + N₂
- Vocabulary is η = η₁ + η₂
- Volume is N*log₂ η
- Effort is not monotonic

Fig 1: Structural Model

Towards a Framework for Software Measurement Validation

Kitchenham, Pfleeger, and Fenton
IEEE TOSE Dec 95

Other questions about Fenton’s
Validation implications of model
- Different objects may share the same attribute
- Attributes are independent of the unit used
- Attributes can not imply a scale (see comments and reply)
- Indirect measure requires a model

Unit definition model
- By reference to standard
- By reference to a wider theory
- By reference to conversion
- By reference to a model involving several attributes

Instrumentation Models
- Direct representational model
- Indirect, theory-based instrument
- Any two units contributing to a particular value are equivalent, e.g. all lines of code are equivalent

Attribute Relationship Models
- Definition model
- Predictive model

Measurement Protocols
- How an attribute can be measured consistently on a specific entity

Entity Population Model
Measurement Validation

- The measure must not violate any necessary properties of its elements
- Each model used in the measurement process must be valid

Validation

- Theoretical
  - Does not violate any necessary properties
- Empirical
  - Corroborates that measured values are consistent with values predicted

Properties of Measures

- Must allow different entities to be distinguished
- Obey Representation condition
- Each contributing unit of an attribute is equivalent
- Different entities can have the same value

How do we use this to define and validate a measure?

What is the usefulness of this framework?

Tuesday

- For lecture, start Briand, et al. Property Based …
- During interactive session, the task will be to use Kitchenham’s framework to specify a measure