”Implementing Metrics for Object Oriented Testing”

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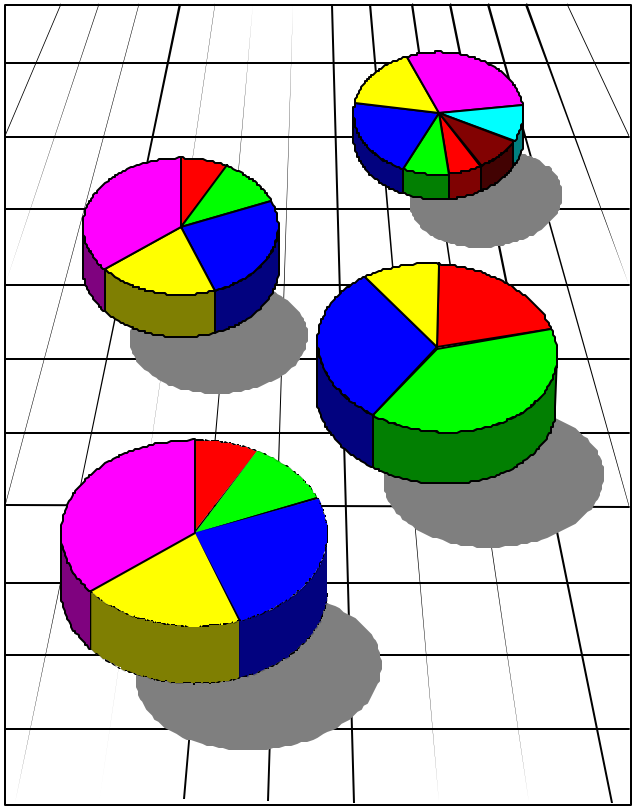
Overview



Introduction
- Risk based testing
- Software metrics

Object oriented metrics
- OO terminology
- Description
- Application / Interpretation
- User feedback

Metrics and Testing

Software Testing

Risk Based

Software Based

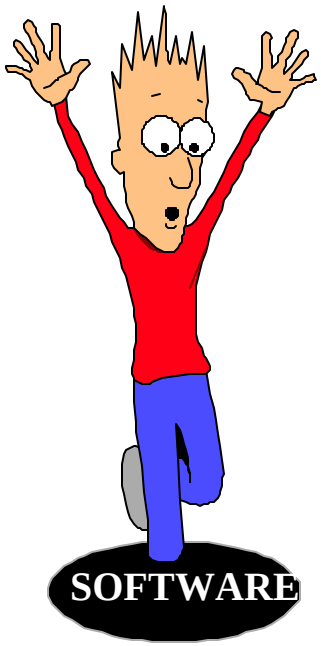
Functional

Object Oriented

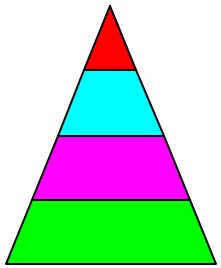
Risk - Based Testing

Define High Risk

Identify components of High Risk



Rank High Risk components



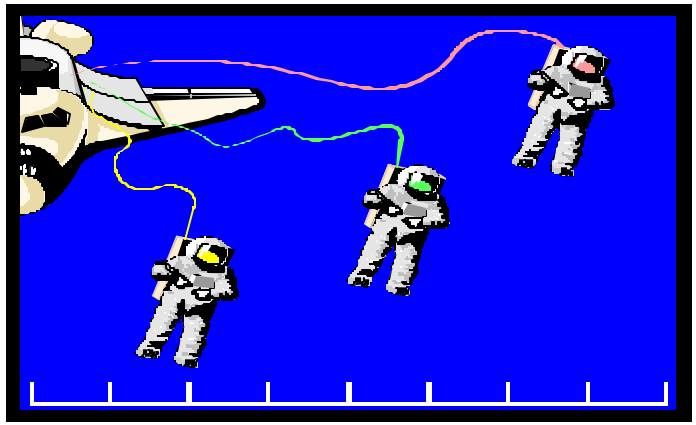
Extra Testing in High risk areas

Metrics for Risk-Based Testing

Identify appropriate metrics

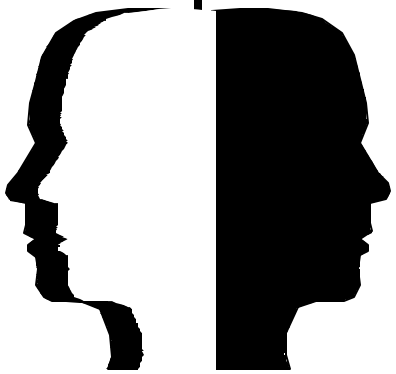
- Independent
- Technically sound (theory & research)
- Comprehensive
- Understandable

Use metrics to identify potential components at risk

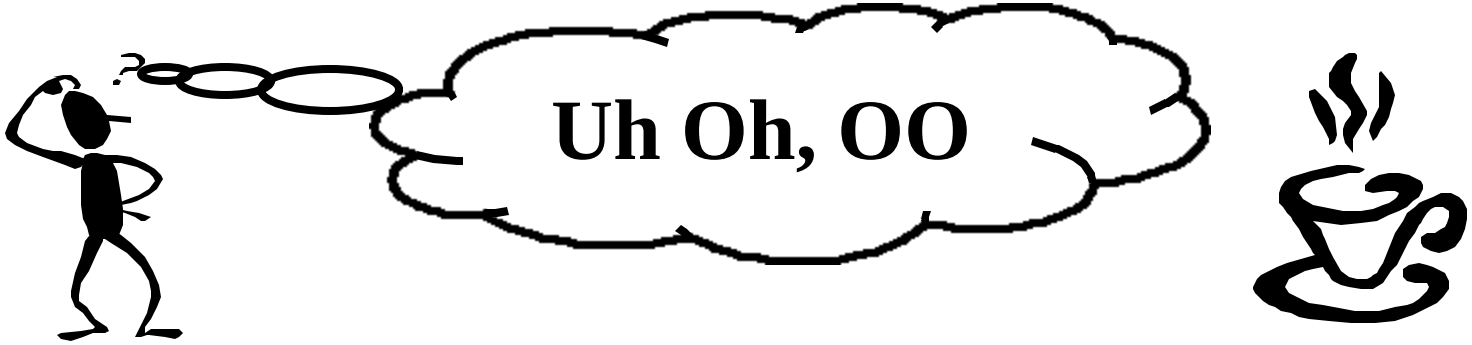


Software Development

	Functional	Object Oriented
	FORTRAN	Ada
	Assembly	Smalltalk
	C, C++	C, C++
METRICS	✓✓✓ ✖ ?	✓ ✖ ✖ ? ?



Object Oriented



- Need to assess *classes*, *objects* and *methods*, not procedures, files, subdirectories
- Complexity not simple to identify or measure
- Established rules of thumb no longer valid
- Need for new code analyzers
- Little historical data available for comparisons

What makes Object-Oriented different ?

Modularization - objects that represent the real world by mimicking external entities

Localization - placing items in close physical proximity to each other

Encapsulation - packaging (or binding together) of a collection of item

Information hiding - suppression (or hiding) of details.

Inheritance - mechanism whereby an object in a class acquires characteristics from one, or more, other classes

Abstraction - mechanism for focusing on the important (or essential) characteristics of a concept or item, while ignoring the inessential details (black boxes).

Object-Oriented Terminology

Class: A set of objects that share a common structure and common behavior manifested by a set of methods (serves as a template).

Method: An operation upon an object, defined as part of the declaration of a class.

Object: An entity, role or data structure; an instantiation of some class**.**

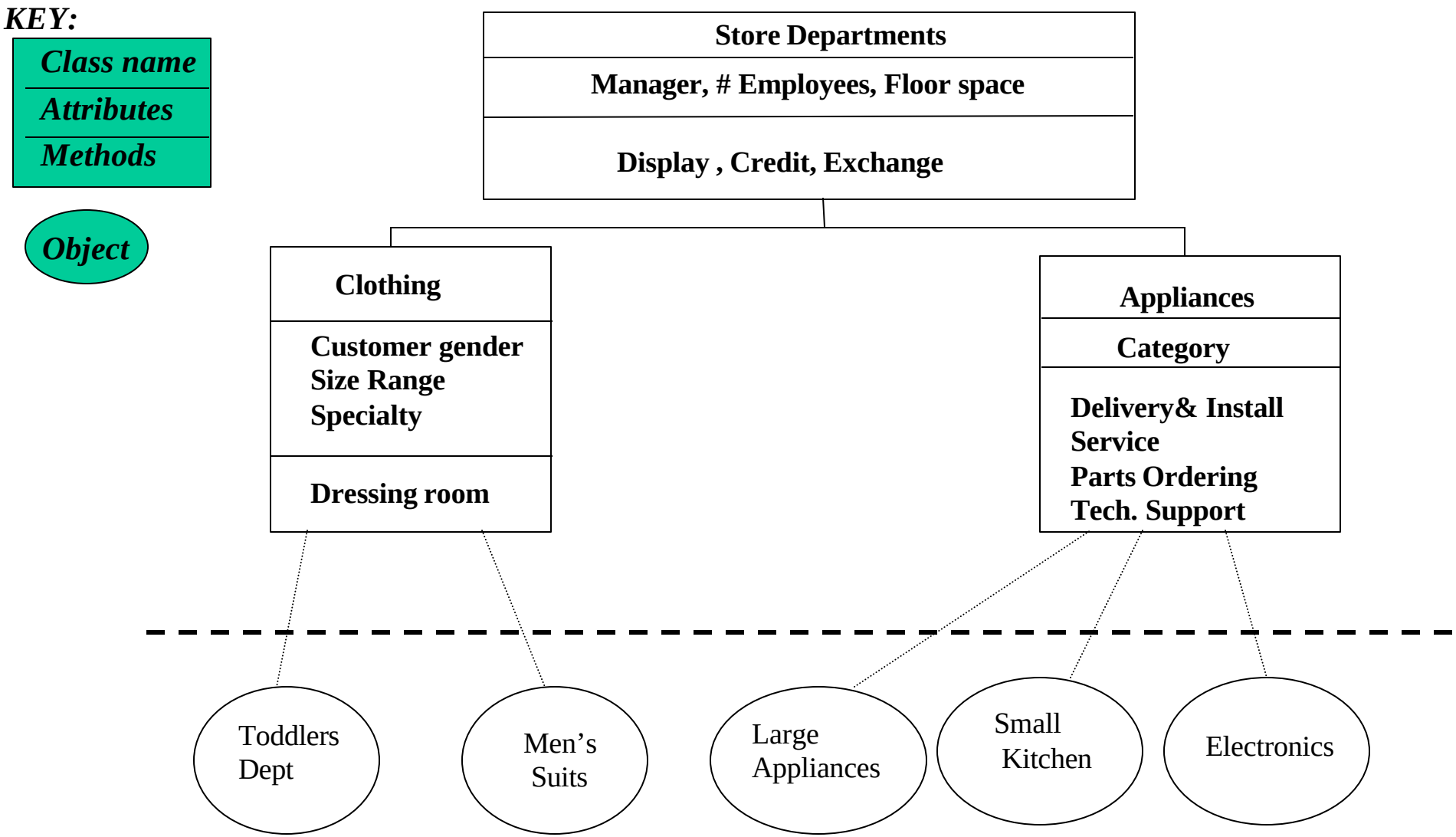
Message: A request that an object makes of another object to perform an operation.

Cohesion: The degree to which the methods within a class are related to one another.

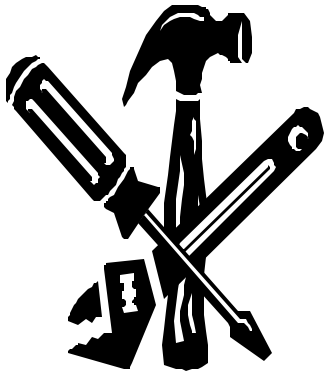
Coupling: Object X is coupled to object Y if and only if X sends a message to Y.

Inheritance: A relationship among classes, wherein one class shares the structure or methods defined in one or more other classes.

Object Oriented Design



Finding the Right Metrics for OO



- **Keep it Simple**
- **Supported by current literature**
- **Evaluate basic object oriented concepts**
- **Support the goals of OO implementation**
  - **portability and long-term reusability**
  - **identify high-risk classes for short-term remediation**