Software Engineering Coding Standard

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IEEE Classification

- Error, mistake: erroneous human action, "slip"
- Defect, fault: anomaly present in product; in general caused by a "mistake"
- Failure: product in use that fails, i.e. does not conform to expectations; in general caused by a "defect"
- Assumes specification (establish in advance)

Economy of Defects

- The later a defect is discovered, the higher the costs: exponential growth
- Defects decrease the predictability of a project; cost (time) of localisation and repair are very variable
- It concerns risks, i.e. uncertainty; it could be defect-free at once, but defects are likely

Dealing with Defects

- Admit that people make mistakes
- Prevent them as much as possible
- Detect their presence as early as possible
- Localize them
- Repair them
- Trace them: deeper causes and consequences

Preventing Defects

- Always work neatly, also on prototypes
- Use checklists and standards
- Prevention offers the biggest gains

Detecting Defects

- Inspection: Read documents and code with the purpose of finding defects
- Testing: Try out a product systematically with the purpose of finding defects
- Inspection can be done early in life cycle
- Testing requires a working product

Localizing Defects

- Debugging: given a failure, find the underlying defect(s)
- Time consuming and unpredictable process

Coding Standard

- Restrict what program text "looks" like
- Layout: indentation, spacing, blank lines, line length; one def/decl/stat per line
- Naming: constant, variable, method, class, attribute
- Comments: file header, "contract" (assume, effect), explain variable declaration or statement

Examples

- See <http://www.win.tue.nl/~keesh/luctorwiki/doku.php?id=faq:coding_requirements>
- Imitate given luctor code
- See <http://java.sun.com/docs/codeconv/>

Style

- if (cond == true) b = true; else b = false;
- if (cond) b = true; else b = false;
- b = cond;
- Order (in sequences), structure
- Limit size of method implementation

Coding Standard Costs

- Costs extra effort and time (only initially)
- Consider it a small pre-paid insurance fee
- Also applies to inspections and testing
- Not using these techniques increases risks and unpredictability considerably

Coding Standard Benefits

- You make fewer mistakes
- If you make them, they are easier to find
- If you cannot find them yourself, then others can help you more effectively
- Assistants can switch more easily when helping multiple groups