Software Development Models

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http://spoke.compose.cs.cmu.edu/ser01/

Pro-forma abstract for Royce

XH: Experience and/or Heuristic

Based on my experience with large software development, I observe that projects are more likely to deliver operational results on time and on budget if they explicitly provide for specific stages of development and if they provide adequate (extensive) documentation.

• Question: Method -- What's a good way to develop software?
• Result: Qualitative model -- waterfall software development
  Technique -- approach to managing software project
• Validation: Persuasion, chiefly appeal to experience

The argument of the paper

• This is the source of the waterfall model
• Waterfall model
  > New idea is about paying explicit attention to more than just analysis and coding
  > Iteration is included in the model
  » cycling between stages is included
  » delivering second system is in the paper, but widely forgotten
• Documentation
  > Extensive documentation of many kinds

Pro-forma abstract for Boehm

EM: Enhanced model

Existing process models are deficient in dealing with more efficient processes such as prototyping and reuse. An enhanced process model is described, with a risk-driven rather than a document-driven approach. It is capable of providing more precise control of software development and is tunable for project needs. The model has been used in practice with substantial productivity improvements.

• Question
  > Characterization: What are reasonable process models, and how are they related?
  > Method: How can risk analysis guide software development?
• Result
  > Unifying model that specializes in different ways
• Validation
  > Allusion to 50-100% productivity gain in some of 25 projects
Software process models

<table>
<thead>
<tr>
<th>Software product</th>
<th>Code and fix</th>
<th>Waterfall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirement</td>
<td>Analysis</td>
<td>Requirement Analysis</td>
</tr>
<tr>
<td>Test</td>
<td>Test</td>
<td>Test</td>
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</tbody>
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Evolutionary

<table>
<thead>
<tr>
<th>Software product</th>
<th>Code and fix</th>
<th>Spiral</th>
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</tbody>
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Accrued Cost vs Committed Cost

Waterfall

Spiral

$\text{committed}$

$\text{actual}$

$time$

$\text{committed}$

$\text{actual}$

$time$