The Waterfall Process

(Source: Software Engineering Economics - Boehm)
The Waterfall Process

- Entrance/advancement criteria for each phase
- Document driven ⇒ heavyweight
- Non-overlapping phases
- Product visibility only at end of process ⇒ lack of user feedback
- Brittle in the face of requirements change
Waterfall Activity Definitions - 1

- **Requirements Analysis**: determination, specification, review and update of software functional, performance, interface, and verification requirements

- **Product Design**: determination, specification, review and update of hardware-software architecture, program design, and data base design

- **Programming**: detailed design, code, unit test, and integration of individual computer program components. Includes programming personnel planning, tool acquisition, data base development, component level documentation, and intermediate level programming management

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Waterfall Activity Definitions - 2

- **Test Planning**: Specification, review, and update of product test and acceptance test plans. Acquisition of associated test drivers, test tools, and test data.

- **Verification and Validation**: Performance of independent requirements validation, design V & V, product test, and acceptance test. Acquisition of requirements and design V & V tools.

- **Project Office Functions**: Project level management functions. Includes project level planning and control, contract and subcontract management, and customer interface.
Waterfall Activity Definitions - 3

• **Configuration Management:** configuration management includes product identification, change control, status accounting, operation of program support library, development and monitoring of end item acceptance plan

• **Quality Assurance:** Quality assurance includes development and monitoring of project standards, and technical audits of software products and processes

• **Manuals:** Development and update of users' manuals, operators manuals, and maintenance manuals
## Time Spent in Various Phases of the Waterfall Process

<table>
<thead>
<tr>
<th>Phase</th>
<th>Time Spent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements analysis &amp; design</td>
<td>30 - 40%</td>
</tr>
<tr>
<td>Implementation &amp; unit test</td>
<td>15 - 20%</td>
</tr>
<tr>
<td>System (integration) test</td>
<td>30 - 50%</td>
</tr>
<tr>
<td>Operation &amp; maintenance</td>
<td>yet another 100 - 300%</td>
</tr>
</tbody>
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