Phases of software development:

- requirements

- specification (internal and external)

- design

- implementation (coding and testing)

- integration

- maintenance

- retirement

Phases of software development:

- requirements (2%)

- specification (5%)

- design (6%)

- implementation (12% -- 5% coding, 7% testing)

- integration (8%)

- maintenance (67%)

- retirement (0%)

source: Schach

Cost of errors by phase

- errors can be introduced at every phase

- errors introduced within the requirements, specification, and design phases tend to be the most costly

- the earlier an error is detected and corrected, the less it is likely to cost

  - for the IBM AS/400, the average cost to fix an error was

    - $30, if fixed during the specification phase

    - $40, if fixed during the design phase

    - $3680, if not fixed until the maintenance phase

ISO/IEC 12207

- specifies software life-cycle processes

- identifies and names:

    - 23 processes

    - 95 activities

    - 325 tasks

    - 224 outcomes

ISO/IEC 12207 engineering activities

System Requirements Analysis
System Architectural Design
Software Requirements Analysis
Software Architectural Design
Software Detailed Design
Software Coding and Testing
Software Integration
Software Qualification Testing
System Integration
System Qualification Testing
Software Installation
Software Acceptance Support

Requirements versus specifications

Requirements versus specifications

Avoid premature commitment to details

Examples of technical specifications

standard gauge
USB 1.1, 2.0, 3.0, A-plug, B-plug
IEEE 802.11b, 802.11g, 802.11n (WLAN)
IEEE 754-2008 (binary floating point arithmetic)
IEEE 1178-1990 (Scheme)
ANS X3.226 (Common Lisp)
ISO/IEC 16262 (ECMAscript)
XML Schema (W3C)
XHTML 1.0
ISO/IEC 10646 (Unicode)
RIFF (Resource Interchange File Format)
ISO/IEC 11172-3 (MPEG-2 Audio Layer III)