The Software Lifecycle

PSU CS 300 Lecture 1-2

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How we build things

- Figure out what is wanted
- Figure out how to build it
- Build it
- Make sure it was built properly and works right
What we call these steps

- Requirements
- Design
- Implementation
- Verification and Validation (V&V)
In SE, we say

- The “Software Lifecycle”
  - Requirements Gathering
  - Specification
  - Architecture
  - Detailed Design
  - Implementation
  - V&V
Lifecycle is a stupid name

- There's no “circle of life”
- In fact, dead software is least likely to be absorbed into “ecosystem”
- There's no “ecosystem”, either: nothing “alive”
- Thinking, not analogies
User Requirements (20%)

- What is needed?
- “Customer” knows (maybe)
- Try to
  - identify customer
  - check understanding
  - document
Requirements Spec (15%)

- What will developer build?
- Organize, formalize requirements
  - functional
  - non-functional
- Identify (and limit) design constraints
Architectural Design (15%)

- General plan for SW
  - Top-level decomposition
  - Description of interfaces
  - Technological approach
- Start of design refinement
- Hard
Detailed Design (15%)

- Ideally, pseudocode
- Hierarchical decomposition complete
- All interfaces specified
- Enables any reasonably skilled implementor to succeed
Implementation (20%)

- Write the program
- Debug the program
  - and the design
  - and the requirements
- Traceability
Verification & Validation (20%)

- Plan first, verify throughout, validate last
- Not just testing
  - testing
  - inspection
  - formal methods
- Adversarial
Phases are not process

● “Waterfall Model” = just do phases in order given

● Better:
  – Iteration and increment
  – Spiral, prototyping
  – XP / open source

● Phases still occur
Technical vs managerial

- Lifecycle is about development = \textit{project}
- Management is about meta-development = \textit{process}:
- Organizations etc are “products of management”
Next up

• Individual project management