Software and its Engineering

Ali H. Doğru

Contents

• Introduction
• Software Project Management
  – Estimation
• Development Approaches
  – Traditional
  – OO
  – CO

Reference Books

• Software Engineering: A practitioners approach, Roger S. Pressman - McGraw Hill
• The Unified Modeling Language User Guide, Grady Booch, James Rumbaugh, Ivar Jacobson, Addison-Wesley, 1999
• Instant UML: Pierre Alain Muller -Wrox Press Canada 1977
• Component Software: Beyond Object Oriented Programming, Clemens Szyperski, Addison-Wesley, 1998

Software Characteristics

• Software is developed, not manufactured
• Software does not wear out
• Software problems are wicked
• Mostly custom built, should benefit from being assembled from existing components

Software Types

• System software
• Real-time software
  – Hard real-time
• Business software
• Engineering and scientific software
• Embedded software
• Fault tolerant
• Safety critical

Software Characteristics

Software Types

Failure Curves

Reference Books

Software Characteristics

Software Types

Software Characteristics
Myths

- **Management myths**
  - Standards and procedures are there, that is everything our people needs
  - development tools = newest computers
  - behind schedule? Hire more people
- **Customer Myths**
  - Begin with a general statement, details will be filled in later
  - Change can be accommodated easily because software is flexible
- **Practitioners Myths**
  - program works -> job is done
  - before the program runs, quality cannot be assessed
  - the only deliverable is a working program

What is Software?

- **program**
- **System of**
- **programs**
- **documents**

What is Software?

- **Logical**
- **glue**
  - Integration
  - Abstract design

Software Crisis

- **demand**
- **offer**
- **time**

Success?

- **Failure**
- **Big repair**
- **Some repair**
- **Success**

System Engineering

- **System Flow Diagram**
- **enter acct**
- **ver. acct**
- **enter PIN**
- **ver. PIN**
- **transaction**
- **serve user**
- **update DB**
- **accounts database**
- **PINs database**
- **customer receipt**

Engineering Problem

- Wicked problems
- Elevating abstraction
- Automation
- Software !!!

"physical" analysis and design tool