



2. Technical Specifications



CSE 498, Collaborative Design

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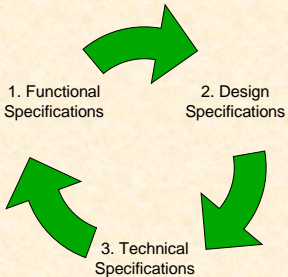
S Technical Specification

- Written Document
- Describes
 - The “Problem”
 - Your Proposed Solution
- Complete
 - Functionally
 - Design-Wise
 - Technically
- “Only” Thing Left To Do Is “Programming”
- (Ideally) Could Be Used for Out-Sourcing
- (AKA, Architecture Document,...)

S Not a Technical Specification

- Problem
 - Plane A leaves Los Angeles for New York traveling at 500 MPH.
 - At the same time, plane B leaves New York for Los Angeles traveling at 650 MPH.
 - How long will it take them to meet?
- **Not** a Technical Specification
 - Setup the appropriate algebraic equations involving distance, speed, and time.
 - Solve for time.

S Design Process Overview



```

graph TD
    A[1. Functional Specifications] --> B[2. Design Specifications]
    B --> C[3. Technical Specifications]
    C --> A
  
```

S Technical Specifications

- Functional Specifications
- Design Specifications
- Technical Specifications

S Functional Specifications

- What does this do? (Not “how” does it do it?)
- Short List of Features
- Not Necessarily Complete
- Starting With
 - Shared Vision?
 - No Formal Documents?
 - Minimal Documents?
 - Incomplete Problem Statement?
- Understandable by End User
- Initial Problem Statement
- **Usually Refined**

S Building a House (1 of 4)

Functional Specifications

- 4 Bedrooms
- 2.5 Bathrooms
- Study
- 2-Car Garage
- Walk-Out Basement

(Note: Understandable by "User")

Functionally, what else might you like to know?

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S Building a House (2 of 4)

Functional Specifications Refined

- ~ 2,500 sq. ft.
- \$275,000 - \$325,000
- 4 Bedrooms
- 2.5 Bathrooms
- Formal Living Room and Family Room
- Study
- 2-Car Garage
- Walk-Out Basement

What do you need to know next?

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S Interactions With Your Client

Functional Specifications

- Derived With/From Client
- Documented For Client
- Presented to Client
- Agreed Upon With Client
- Your Job to Capture the Client's Intent!

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S Technical Specifications

- Functional Specifications
- Design Specifications
- Technical Specifications

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S Design Specification

- Written Document
- Includes
 - Process Flow
 - Use Cases
 - Screen Mockups
 - Data Flow Diagrams
 - Data Organization
 - Etc...
- Identifies All the Parts and Their Interactions
- (Mostly) Understandable by End User
- Usually Refined

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S Building a House (3 of 4)

Design Specifications

- Mission Style, Stone Front
- Lots of Light
- Kitchen Connected to Family Room
- Master Bedroom on Main Floor
- Cathedral Ceilings
- Granite Counter Tops
- Etc...

What else will you need to know to build the house?

(Note: Understandable by "User")

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S Screen Mock-Ups

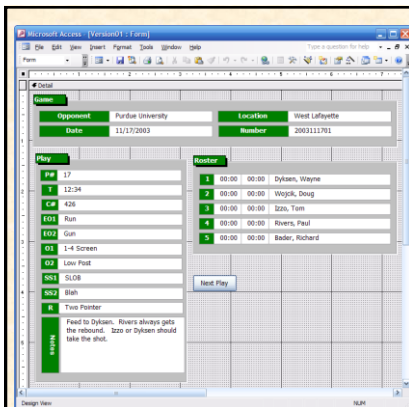
- User Interface Only
 - Shows Layout, Buttons, Pull-Downs, Etc...
 - Non-Functional
 - No Back End
- Helpful for Developing
 - Look-and-Feel
 - Use Cases
- “Use” with Clients
 - Show to Clients
 - Go Through Use Scenarios with Clients

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S Basketball Play Effectiveness

- Coaches Desired
 - Determine Effectiveness of Plays
 - Record All Plays with Result
 - Produce Report of Effectiveness
 - Each Play
 - # of Success / # of Attempts
- I Learned
 - Done After Game from DVR
 - Lots of Plays in Play Book
 - ~60-80 Plays Per Game
 - Plays Categorized
 - Early Offense 1,2 (E.g., Fast Breaks)
 - Offense 1,2 (E.g., Half Court Plays)
 - Special Situations 1,2 (E.g., Out of Bounds)

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BB Stats Alpha V1

- Fields
- P# Play Number
 - T Time
 - C#
 - EO Early Offense
 - O Offense
 - SS Special Situations
 - R Result

Nota Bene

- Just Screen Layout
- No Code (Underneath)
- Would **NOT** Have Entries in All Fields

S Interactions With Your Client

Design Specifications

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- Documented For Client
- Presented to Client
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S Technical Specifications

- Functional Specifications
- Design Specifications
- Technical Specifications

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S Technical Specification (1 of 2)

- Written Document
- Identifies All the Parts and Their Interactions
- Everything a Developer Needs to Write the Code
- Includes Things Like...
 - Functional Specifications
 - Design Specifications
 - Machine Architectures
 - Software Technologies
 - Production Environments
 - Development Environments
 - SDK's (Software Development Kits)
 - Network Topology
 - Continued...

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S Technical Specification (2 of 2)

- Includes Things Like...
 - Database Schema
 - Object Models and Class Diagrams
 - UML Diagrams
 - Pseudo Code
 - Function Prototypes
 - Schedule
 - Test Plan
 - Risk Analysis
 - Etc...
- Probably Not Understandable by End User
- Possibly Not Understandable by Client
- Usually Refined

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S Building a House (4 of 4)

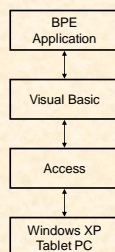
Technical Specifications

- 20 lb Asphalt Roof Shingles
 - 2" x 6" Outside Walls
 - R48 Blown Attic Insulation
 - Cat5E Wiring
 - Pre-Made Roof Trusses
 - 12" Poured Concrete Foundation
 - Etc...
- (Note: Probably Not Understandable by "User")

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S System Architecture Diagram

Basketball Play Effectiveness



S Approach

- Break Big Problems Into Smaller Problems
- Identify Constraints
- Identify "Risks"—Things You Don't
 - Know
 - Understand
 - Know How To Do
- Consider Tradeoffs
- Select Appropriate Technologies
- Identify Core Features for a Prototype

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S Architecture Constraints

- CPU Speed
 - PDA
 - Itanium Server
 - Mainframe
- Communication
 - Speed
 - GigE
 - Ethernet
 - 802.11b/g
 - Dialup
 - Protocol
 - TCP/IP
 - IrDA
 - POTS
- Etc...
- Topology
 - One Machine versus Multiple
 - Client/Server
 - Thin or Thick Clients
 - External Systems
- Device-Specific Parameters
 - PDA Display Size
 - Ink on TabletPC
- Legacy Support
- Etc...

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S Architecture Tradeoffs

- Complexity
 - Number of Technologies
 - Design Patterns vs. Execution Speed
 - Number of Tiers or Subsystems
- Fully-Custom, Semi-Custom, or Off-the-Shelf
 - Platform (OS, Servers, SDKs, ++)
 - Language and Compiler
 - Project Type Choice
- Appropriate Technology
 - Reusable Modules
 - Special-Purpose Languages
 - Community Support
- Tools and Process
 - How automated a process do you need?
 - How do you communicate designs? (UML, ORM, etc.)

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S Interactions With Your Client

Technical Specifications

- Derived With/From Client
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Cannot be emphasized enough!

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S How To's (1 of 4)

- Quickly identify...
 - what you don't know,
 - what you don't understand, and
 - what you don't know how to do.
- Conceptually...
 - Start with functional spec.
 - Get agreement with client.
 - Include as first part of technical spec.
 - Do design spec.
 - Get agreement.
 - Include as 2nd part of technical spec.
 - Do technical spec.
 - Get agreement.
 - Finish technical spec.
 - Do schedule.
 - Do development, testing, and deployment.
- In CSE498, must do all three in parallel (and iterate).

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S How To's (2 of 4)

- Approach
 - Make Skeleton Document Immediately
 - Will Get You Organized and Focused
 - Include "Under Construction" Sections (Totally Empty)
 - Develop In Parallel When Possible But...
 - Complete Functional First
 - Complete Design Second
 - Revise As Needed
 - Refine As Needed
 - Assign Sections to Team Members
 - Share with Client
 - Ask For (Specific) Feedback
 - Highlight What's New
 - Tricky Balance
 - Not Enough?
 - Too Much?

Is this what you had in mind?

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S How To's (3 of 4)

- Schedule
 - Dictated by Course
 - See [Meeting Agendas](#)
 - 09/10 Team Progress Report
 - 09/17 Technical Specifications / Schedule
 - 10/08 Prototypes
 - 12/03 Project Video
 - 12/05 All Deliverables
 - Other Milestone By Educated Guesses
 - Track To It
 - Revisit Often
 - Delivery Slippage = Graduation Slippage

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S How To's (4 of 4)

"Living Document"

Make Sure Your Tech Spec Has...

- Cover Page
- Title
- Table of Content
- Page Numbers
- Headers and Footers
- Etc...

(That is, make sure your spec looks professional.)

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S Interactions With Client

Client May Specify...

- Requirements
 - Functional
 - Design
 - Technical Requirements
 - Operating Systems
 - Programming Languages and Environments
 - Web Technologies
 - Etc...
 - Legacy
 - Milestones
 - Etc...
- (You may explore and propose other ideas.)

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S Nota Bene: Tech Spec

- How many...
 - ...drafts will you write? Many.
 - ...drafts will you share with your client? A Couple.
 - ...final documents will you submit for CSE498? One
- Due Date
 - September 17
 - Less Than 4 Weeks
- In Class Formal Presentations
 - September 17– September 24
 - PowerPoint Template Provided

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S Resources on the Web (1 of 2)

- By Peter Surna
 - [How to Write Specifications Part 1](#)
 - [How to Write Specifications Part 2](#)
 - [Joke-A-Day Web Site – A Sample Design Specification](#)
 - www.yart.com
- CSE498 Web Site [Downloads](#)
 - [Motorola](#)
 - [Union Pacific](#)

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S Resources on the Web (2 of 2)

- [W3 Schools](#)
 - Web Developer Resources
 - Tutorials
 - HTML
 - XML
 - Browser Scripting
 - Server Scripting
 - References
 - Examples
 - Quizzes
 - Quick Starters
 - Good
 - Free
- CSE498 Web Site [Other Links](#)
 - .NET
 - Multimedia
 - Web Building

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S Technical Specifications

- Functional Specifications
- Design Specifications
- Technical Specifications

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S What's next?

- Meet Team Members After Class
- Schedule
 - First Meeting ASAP
 - Schedule Weekly Team Meeting
 - Schedule Weekly Triage Meeting with Matt
- Select Client Contact Person
- Contact Client
- Setup
 - Team Machines
 - Team Website
- Think About [Team Status Report](#)

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S Client Contact

- Pick a Team Client Contact Today
- Send Email Immediately
- Send Contact Info for All Team Members
 - Email
 - Cell Phones
- Request
 - Contact Info for All Client Contacts
 - Time (in Next Day or So) for Meeting and/or Call
- On-Site Visit(s)
 - Do If Possible
 - Do Not Wait for On-Site to Get Started

S Team # Status Report (1 of 4) →

- Client Contact
 - Point 1
 - Point 2
- Team Meetings
 - Point 1
 - Point 2
- Team Organization
 - Point 1
 - Point 2

Team #: Team Name

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S Team # Status Report (2 of 4) →

- Server Systems / Software
 - Point 1
 - Point 2
- Development Systems / Software
 - Point 1
 - Point 2
- Web Site
 - Point 1
 - Point 2

Team #: Team Name

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S Team # Status Report (3 of 4) →

- Project Definition
 - Point 1
 - Point 2
 - Point 3
 - Point 4
- Technical Specification Document
 - Point 1
 - Point 2
 - Point 3
 - Point 4

Team #: Team Name

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S Team # Status Report (4 of 4) →

- Risks
 - Risk 1
 - Description
 - Mitigation
 - Risk 2
 - Description
 - Mitigation
 - Risk 3
 - Description
 - Mitigation
 - Risk 4
 - Description
 - Mitigation

Team #: Team Name

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