

System Design Standards

ManageIT

Decision Interface



Design

- Objective :
 - Detail and prioritize requirements of the application
 - Design the user interface look & feel of the application
 - Architect the application solution
 - Data, software, hardware, network
 - Prepare the client and application for production rollout and ultimately gain acceptance in a production environment
- Client Involvement :
 - Business rules experts, users, data experts, network analysts, systems architects, support & operations staff, QA liaison
- How Long :
 - 8 -15 Weeks
- Location :
 - At client site



Inputs for Design

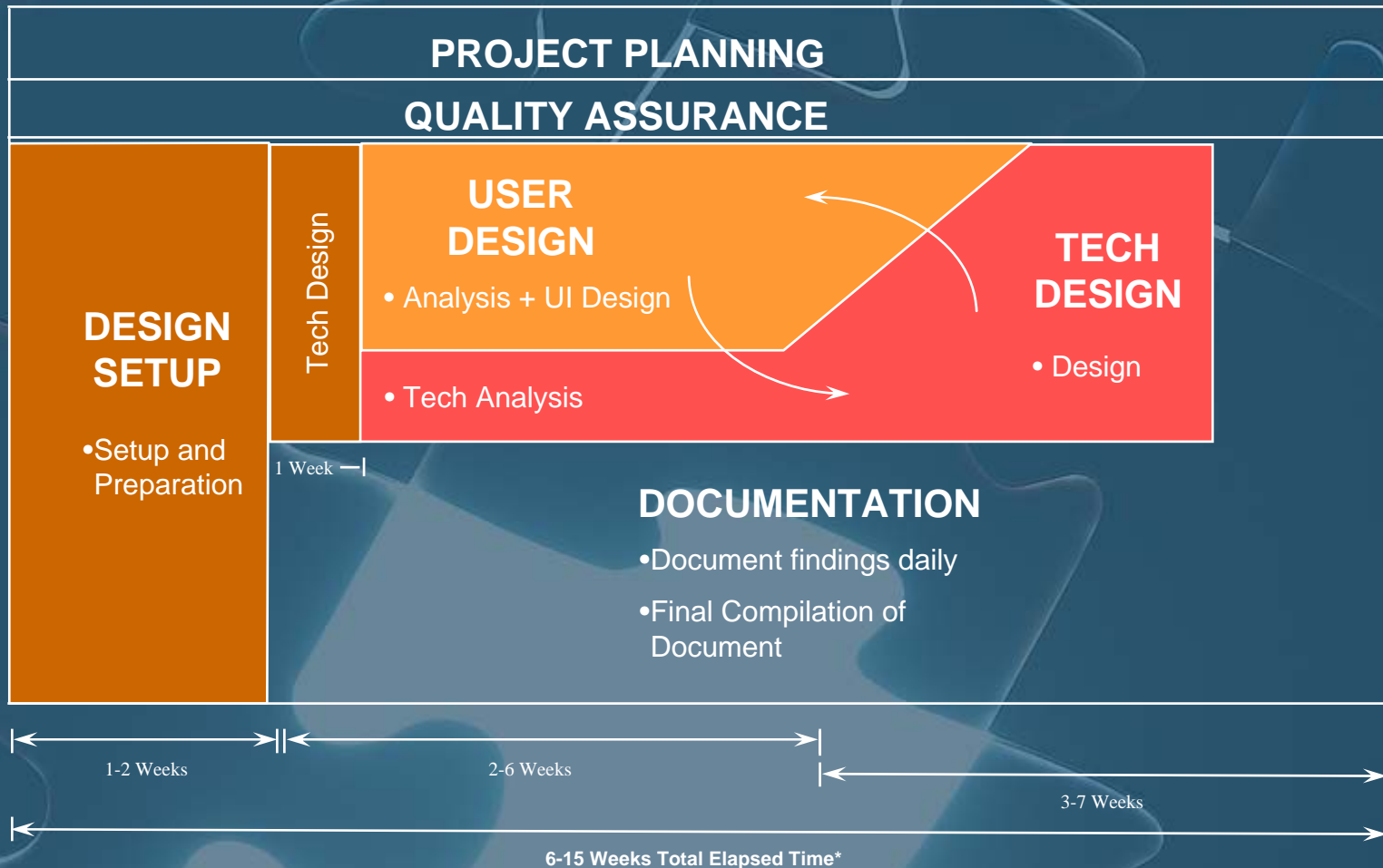
- Project Objective
- Business context and justification
- Goals, vision and critical success factors (CSFs)
- End-user profiles
- Scenario definitions (current and future)
- Business process models
- Prioritized functions and descriptions
- Organisational readiness assessment
- Proposed high-level technical application architecture



Design Process

- Start with high user focus - The analysis
 - Establish context for application around the user needs
 - Identify 'What' of application
- Use tools to organize information
 - Functionality / use case matrix
 - Business process flows/scenario definitions/data model/object model
- Perform technical analysis
- Iterate through process
- Move to high technical focus - The design
 - Gradual transition as functional requirements solidify
 - Identify 'How' for application
- Filter user priorities by business benefits, technical complexity and organizational readiness
- Conduct frequent team checkpoints and focus on common goals

Design Process Components



* Design for Phase 1 in detail. Look at subsequent phases at higher level for viability

Design Setup & Documentation Activities

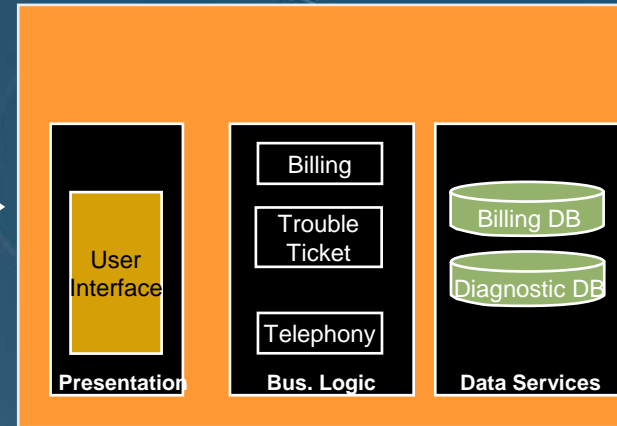
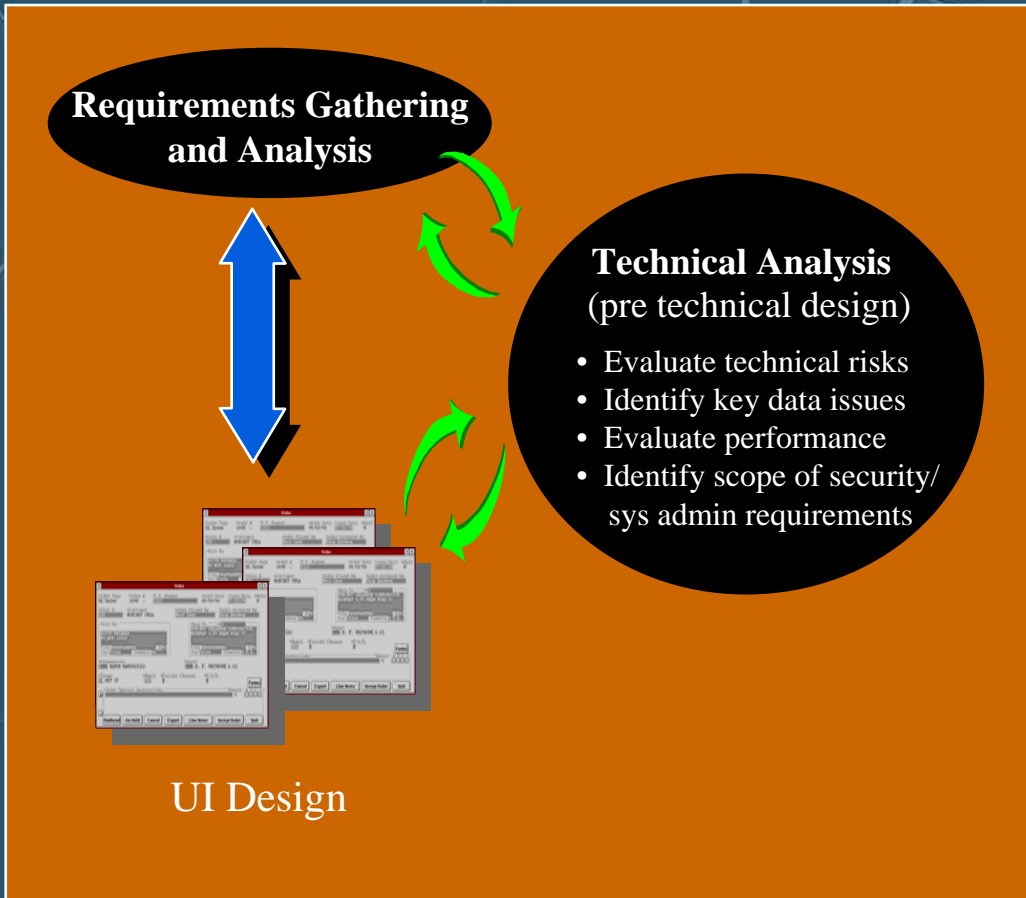
● Setup

- Identify roles and responsibilities
- Setup design environment
- Research and learn design tools
- Master application information
- Understand end-user profiles
- Build detailed design schedule
- Set expectations
- Conduct just-in-time training

● Documentation

- Document progress daily
- Publish periodic drafts of Document for client review
- Proof, compile and consolidate document

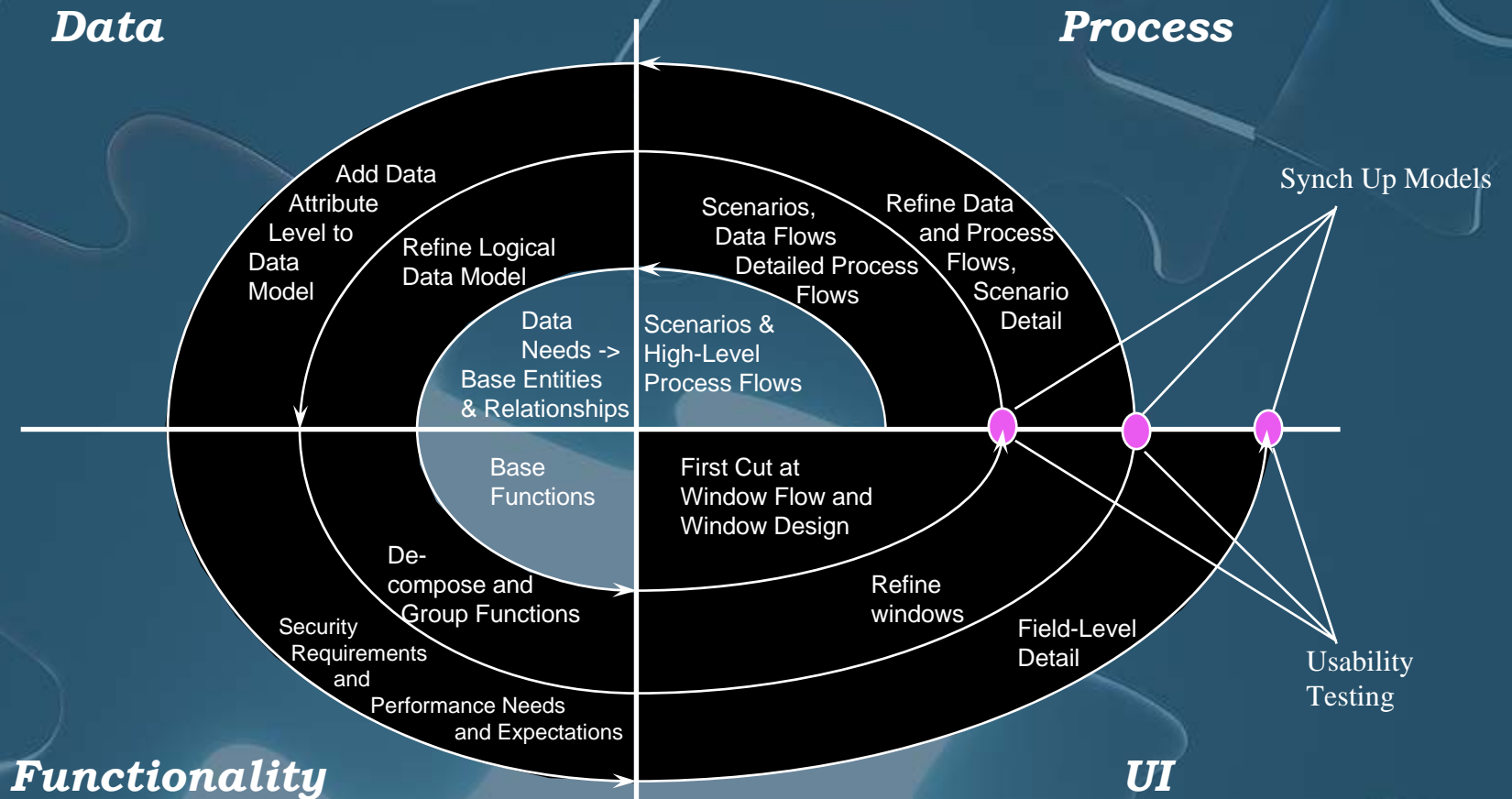
Design Activities



Four Models Behind Structured Analysis

- Data model - *What is the information domain?*
 - Data needs of the application
 - Logical view of data entities, data relationships and characteristics
- Process model - *How does the information behave?*
 - User scenarios - paths through the process
 - High-level and detailed process flows
 - Data flows
- UI model - *How does the user interact with the information? And what does the information look like?*
 - Window flows and window design
 - Window and field layout
 - Usability analysis of windows
- Functional model - *What does the user need to do with the information?*
 - Events, transactions, functions that support processes

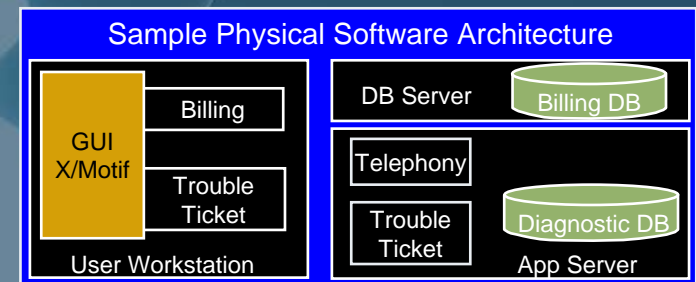
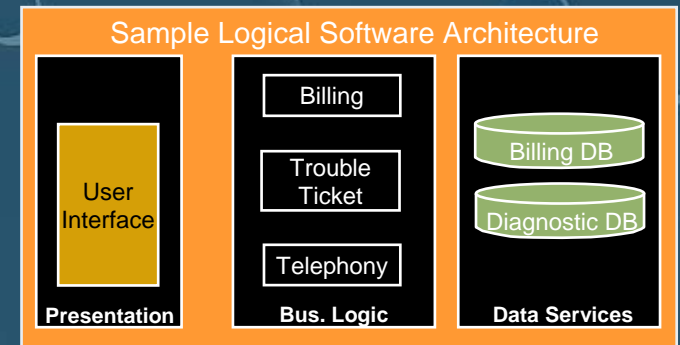
Structured Analysis: Iterate Through the Models





Technical Design Activities

- Define physical software architecture
- Design physical database
- Design network architecture
- Design interprocess communication
- Design performance requirements
- Define hardware architecture (logical and physical)
- Identify 3rd party tools
- Design system requirements
- Run data/process role playing exercise
- Maintain issues and assumptions
- Proofreading/editing of design document



Project Planning & QA Activities

- **Project Planning**
 - Manage design process
 - Compile testing criteria and Preliminary test plans
 - Develop user acceptance checklists
 - Develop detailed development project plan
 - Develop Implementation Project plan
 - Develop resource and cost figures
 - Identify client responsibilities
- **Quality Assurance**
 - Conduct usability testing
 - Conduct UI review
 - Conduct DB design review
 - Synchronize models
 - Conduct technical design reviews
 - Identify and select QA tools
 - Develop QA strategy
 - Compile testing criteria and preliminary test plans for implementation



Sample Design Schedule

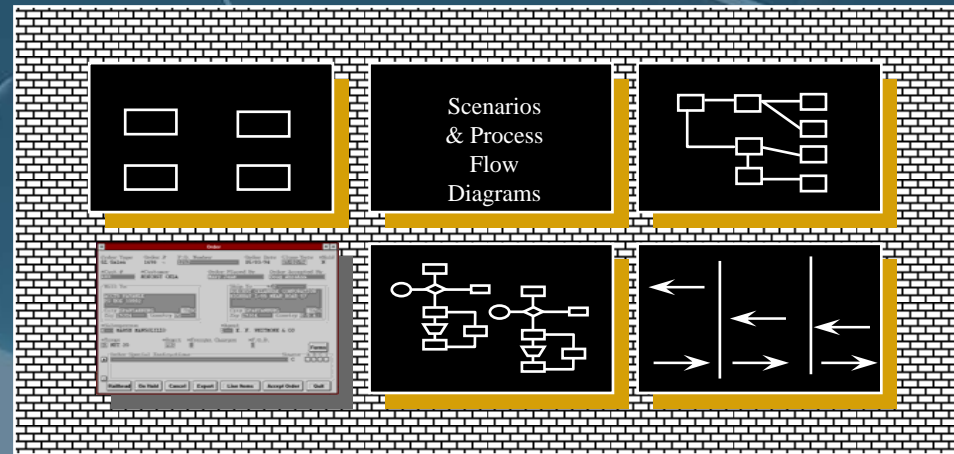
Week 1	Week 2	Week 3	Week 4	Week 5
Design Setup <ul style="list-style-type: none"> • Setup Design Env. • Research and Learn Design Tools • Master Application Info • Identify Roles and Resp • Understand End User • Just in Time Training • Set Expectations • Create Design Sched. 	User Design <ul style="list-style-type: none"> • Design Kick-off Scoping <ul style="list-style-type: none"> • Review Output of • Define Key Business Scenarios & New Work Flows/Process • Identify Data Sources in Scenarios/Flows • Explore window Flows 	User Design <ul style="list-style-type: none"> • Continue Definition of Future Flows/Scenarios • Refine window Flow • Identify Attributes • Identify Reporting Req • Begin Formal window Design • Begin Performance Expectations Capture 	User Design <ul style="list-style-type: none"> • Refine window Design • Identify Security Requirements • Detail Performance Expectations • Detail Functional Requirements 	User Design <ul style="list-style-type: none"> • Refine windows • Detail Business Rules • User Checkpoint <ul style="list-style-type: none"> • Review window Specs • Review Func. Specs • Review ERD • Review Outstanding Issue
Week 6	Week 7	Week 8	Week 9	Week 10
Technical Design <ul style="list-style-type: none"> • Continue Tools Selection Process • Continue Network Analysis & Design • Continue H/W & S/W Architecture Design • Begin Translation of Logical DB Design • Continue Connectivity Design 	Technical Design <ul style="list-style-type: none"> • Continue H/W & S/W Architecture Design • Evaluate Performance & Identify Bottlenecks • Identify Sys Admin Req • Begin Inter-Process Communication Design • Continue Physical DB Design • Identify Batch Processes 	Technical Design <ul style="list-style-type: none"> • Continue H/W & S/W Architecture Design • Continue to Address Performance • Design Sys Admin Module • Continue Inter Process Communication Design • Perform Database Sizing • Identify Security Req 	Technical Design <ul style="list-style-type: none"> • Finalize H/W & S/W Architecture Design • Finalize IPC Design • Finalize Physical Schema • Develop Pre Production Plan • Finalize Project Plan & Estimations 	Documentation <ul style="list-style-type: none"> • Make final revisions • Publish document • Provide estimations

← Issue Tracking and Resolution, Assumption Capture, QA, Usability Testing →

Design Techniques

“The Wall: Concept

- Make design visual, public, “All at Once” visible
- Place windows and scenarios first
- Place data model next - logical business model
- Place process flows next - business and system processes



Protocol

- Each person places latest version on wall (within 1 day)
- If anyone sees improvement or problem, write on the wall, sign it.
- Client/Cambridge conversations center on points on the wall.
- Team meets everyday - changes debated



Design Tools & Techniques

- Process tools and techniques
 - Functionality matrix, top level objects
 - Black boxing (allows deferred commitment)
 - Role playing exercises, use-cases, scenarios
 - Usability Analysis
- Analysis capture tools
 - VISIO
 - Erwin (ER Modelling), S-Designer
- Window building
 - Java, Visual Basic, Visual C++, MFC, HTML
- Documentation
 - MS Word
- Project planning
 - MS Project

	1	2	3	4	5	6		
A	View Material Detail	View Inventory	View Management Data	View Pricing Data	Analysis of Material Issues on Schedule	Analysis of Material Issues on Cost		
B	Project Management	View Project	View Schedule Data	View Cost Data	View Status	View & Audit Values	View Resource	View Resource Log
C	View Part Assembly	View Material Part List	View Material of Interest Data	View Assembly	View Related Part List	View Assembly Part List	View Assembly Part List	
D	View Labor Detail	View Material to Shop Code	View Data	Analysis of Labor Issues on Cost	Analysis of Labor Issues on Schedule			
E	View COC Detail	View COC Action	Analysis of COC Issues on Cost	Analysis of COC Issues on Schedule				

Order

Order Type: SL Sales Order #: 1698 P.O. Number: 1212 Order Date: 05-03-94 Close Date: 07-02-94 *Hold: N

*Cust #: 680 *Customer: HORCHST CELA Order Placed By: Mary Jane Order Accepted By: Doug Abraham

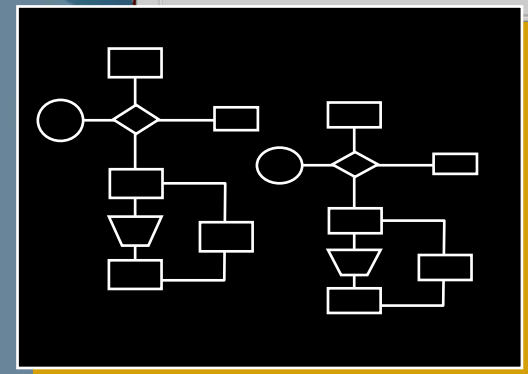
Bill To: ACCTS PAYABLE, PO BOX 10602, City: SPARTANBURG, State: SC, Zip: 29304, Country: US

Ship To: #2, HORNST CELANESE CORPORATION, HIGHWAY 1-95 NEAR ROAD 57, City: SPARTANBURG, State: SC, Zip: 29304, Country: U S A

*Salesperson: MARSH MANSOLILLO *Agent: E. F. WHITMORE & CO

*Terms: NET 30 *Remit: 521 *Freight Charges: *F.O.B. Form

Order Special Instructions: Source: Buttons: Order, Quit





Design Deliverable

- Design Document That Contains :
 - Introduction:
 - Project Overview, Application Constraints, Business Case, Functionality Matrix, High Level Business Process Flow
 - User Design:
 - User Profile, Business Process Flows, Scenarios, User Interface Design, window Specifications, Logical Data Model, Functional Requirements, System Requirements, Data Flow Diagrams, Usability Test Scenarios and Results, GUI Standards
 - Technical Design:
 - Software/Hardware/Network Architecture, System Requirements Design, External System Specifications, Functional Specifications, Physical Data Model, Software/Hardware/Network Requirements
 - Project Plan including:
 - Client Responsibilities, QA Plan (Preliminary Test Plan, UAT Checklist) Development and Implementation Project Plan, Issues & Assumptions, Rollout Plan



Object-Based Design Deliverable

- Design Document Which Contains :

- Introduction:

- Project Overview, Application Constraints, Business Case, Functionality Matrix, High Level Business Process Flow

- User Design:

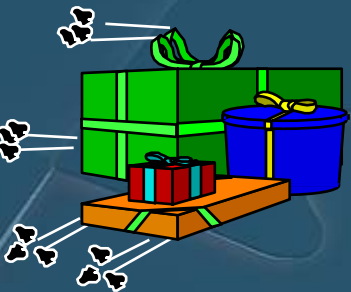
- User Profile, Business Process Flows, Scenarios, Use-Cases Catalog and Model, User Interface Design, Window Specifications, **Event Trace Diagrams, Object Model**, Functional Requirements, System Requirements, **Data Flow Diagrams, State Transition Diagrams**, Usability Test Scenarios and Results, GUI Standards

- Technical Design:

- Software/Hardware/Network Architecture, System Requirements Design, External System Specifications, **Class Specifications**, Database Design & **Persistence Strategy**, Performance, Software/Hardware/Network Requirements

- Project Plan including:

- Client Responsibilities, QA Plan (Preliminary Test Plan, UAT Checklist) Development and Rollout Project Plan, Issues & Assumptions, Rollout Plan





Design Achievements



- Consensus
- User validated design
- Kick-start of development process
- Concrete implementation strategy
- Solidified scope of phase I deliverable



Design Success Factors

1. Design preceded by high level analysis
2. Appropriate level of detail - intense focus on business objectives
3. User involvement throughout process
4. Usability analysis of design
5. Technical people involved in user sessions
6. Continuity of staff across phases
7. Short timeframes
8. Quality
9. Focus on benefits capture