

System Conception

COMP 3700.002
Software Modeling and Design

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System conception

- Deals with genesis of an application
- Knowledge of
 - Business needs
 - Technology
- Defer details and understand big picture
 - What need does the proposed system meet?
 - Can it be developed at a reasonable cost?
 - Will the demand for the result justify the cost of building it?

System conception: Steps

- Devise a system concept
- Elaborate the concept
- Prepare problem statement

1. Devising a system concept

- Add new functionality
- Remove restrictions and generalize
- Simplification of tasks
- Automation of manual processes
- Integration of functionality
- Analogies from other problem domains
- Global cultural and business practices

2. Elaborating a concept

- Who / What / Where / When / Why / How
- Who is the application for?
 - Stakeholders
 - Financial sponsors
 - Users
 - Agree to a measure of success
- What problems will it solve?
 - Establish scope
 - Bound effort
 - Obtain agreement of influential people

2. Elaborating a concept (Contd.)

- Where will it be used?
 - Mission-critical / experimental / new capability?
 - Complement existing systems?
 - Local use / distributed
 - Characterize customer base
- When is it needed?
 - Feasible time
 - Required time

2. Elaborating a concept (Contd.)

- Why is it needed?
 - Business case, with financial justification
 - Cost / benefits / risk / alternatives
 - Estimate scale of business & selling price per unit
- How will it work?
 - Determine problem feasibility
 - Evaluate various architectures
 - Prototyping & Experimentation

ATM Case Study: System concept

- Automated Teller Machine (ATM)
- System concept

Develop software so that customers can access a bank's computers and carry out their own financial transactions without the mediation of a bank employee.

ATM Case Study:

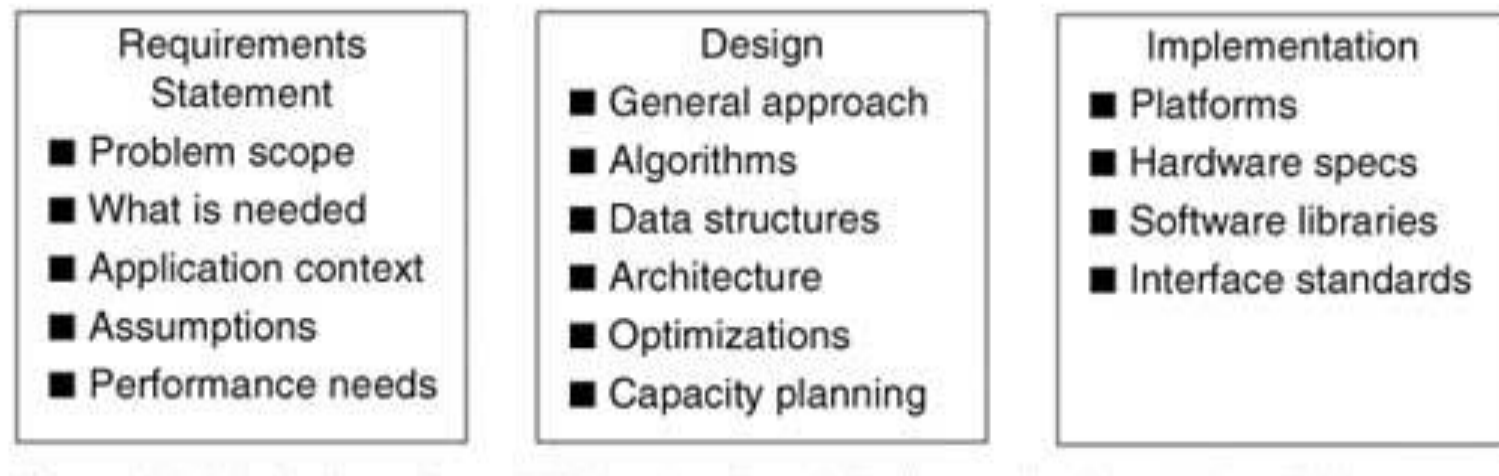
Elaborating concept

- Who is the application for?
- What problems will it solve?
- Where will it be used?
- When is it needed?
- Why is it needed?
- How will it work?

3. Preparing a problem statement

- Requirements statement
 - Outlines goals and general approach
 - System behavior from user perspective
 - Performance specifications
 - Protocols for interaction with existing systems
 - Software engineering standards
 - Modularity, extensibility, testability
- Separate requirements from design decisions
- Avoid describing system internals
- Proof-of-concept implementation (optional)

3. Preparing a problem statement (Contd.)



- Problem statements may be
 - Ambiguous, incomplete, inconsistent, or incorrect

ATM Case Study:

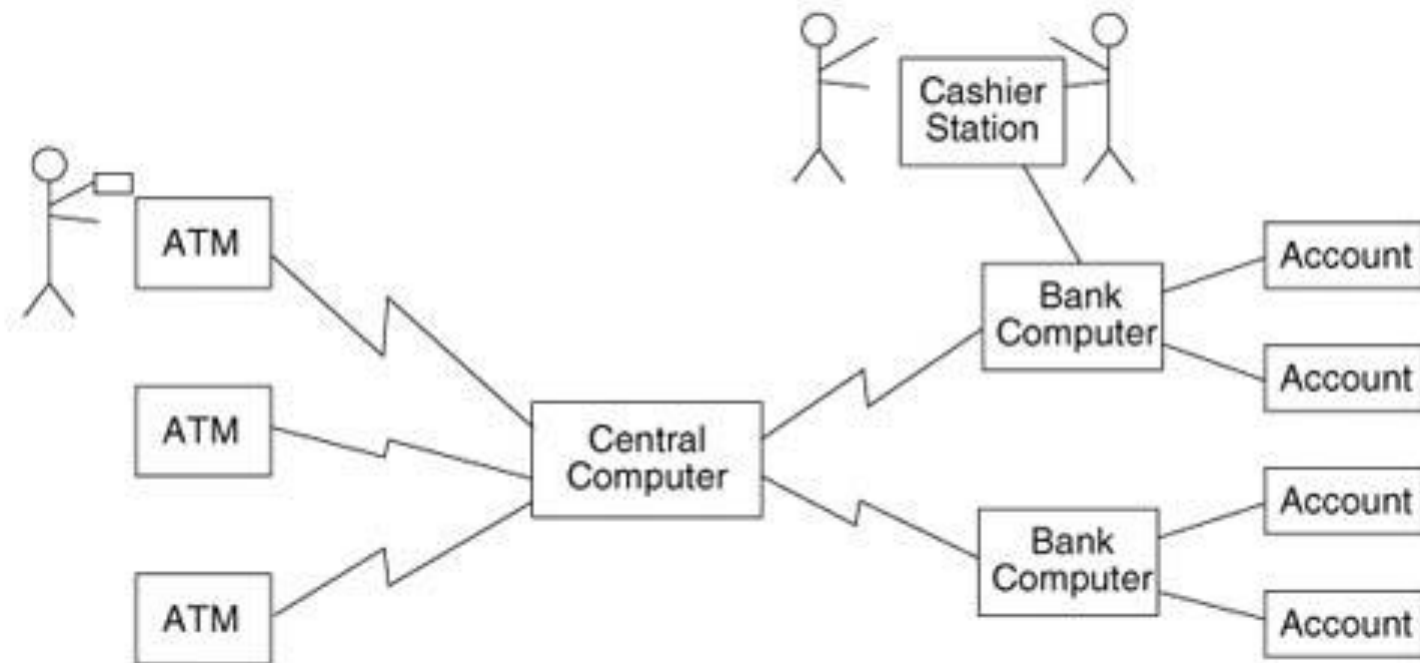
Problem statement

Design the software to support a computerized banking network including both human cashiers and automated teller machines (ATMs) to be shared by a consortium of banks. Each bank provides its own computer to maintain its own accounts and process transactions against them. Cashier stations are owned by individual banks and communicate directly with their own bank's computers. Human cashiers enter account and transaction data.

Automatic teller machines communicate with a central computer that clears transactions with the appropriate banks. An automatic teller machine accepts a cash card, interacts with the user, communicates with the central system to carry out the transaction, dispenses cash, and prints receipts. The system requires appropriate recordkeeping and security provisions. The system must handle concurrent accesses to the same account correctly.

The banks will provide their own software for their own computers; you are to design the software for the ATMs and the network. The cost of the shared system will be apportioned to the banks according to the number of customers with cash cards.

ATM Case Study: Representation



Next sessions...

- Domain Analysis

Reading assignment

- [Blaha] Chp 11: Pages 173-179