CSCI 360 Software Architecture and Design
Spring 2009
Dr. Bowring

Team Project – Grain Elevator System

SRS for Grain Elevator System follows this page

Your team will produce a number of deliverables over the next few weeks that will serve as chapters in your final deliverable. The final project deliverable will be a compilation of these chapters with appropriate title pages, table of contents, introduction, conclusion, and team self-evaluation. The final document will be a single PDF document and submitted electronically via email. You are free to expand the contents of your submittal to suit the professional goals of your team and to reflect the quality of your design. Your deliverable will contain at a minimum an identifiable Use Case Model, SAD and DDD.

All questions regarding this project must be submitted in writing via email so that all teams may be electronically notified of the answers.

Schedule of Deliverables (→, ➔)

23 March: Use Case Model [TeamName]_UCM.pdf

Make a complete use case model for the Grain Elevator system. Include a use case diagram, actor briefs, use case descriptions for all use cases, and a design rationale in which you discuss important design decisions.

→ Chapter presenting use case model with supporting UML diagrams and text

6 April: Architecture [TeamName]_SAD.pdf

Develop and present a conceptual model for the Grain Elevator System software. Propose two architectures and show their decompositions and class models. Produce a utility tree with profiles and scenarios. Provide scenario descriptions for the scenarios in the utility tree. Evaluate each architecture two ways: first, by scenarios, and then second, by a scoring matrix. Choose one architecture and provide a rationale for your choice.

→ Present your architecture in a SAD, illustrated with UML diagrams

20 April: Detailed Design and Final Project Deliverable [TeamName]_FINAL.pdf

Develop a Detailed Design Document (DDD) including class diagrams, sequence diagrams and state charts as a minimum. Consider including a prototype to illustrate your design.

→ DDD illustrated with UML diagrams

➔ Completed project including UCM, SAD, DDD

23, 27 April: Presentation

20 minute presentations of your project (each member presents)

→ Files prior to presentation

SRS: Grain Elevator System

A. Harvested grain is trucked from farms to a central storage elevator where it is placed in silos. The grain is eventually moved from the silos to railroad cars that take it to processing plants. The elevator relies on a software system to track the grain.

B. The elevator accepts shipments of wheat, barley, long grain rice, short grain rice, oats, and hops. Each type of grain has two grades, high and low. An empty silo may store any kind of grain, but a silo with grain in it can store only grain of the same type and grade.

C. There are 12 silos in the elevator: silos 1-6 hold 8,000 bushels each, and silos 7-12 hold 12,000 bushels each. Each truck carries between 150 and 180 bushels. A single railroad car holds 2,000 bushels.

D. Grain only arrives in trucks from growers selling the grain, and only leaves in rail cars taking it to processing plants buying the grain. Each truck has a plate number, a driver, and a grain seller. Each rail car has a serial number, a conductor, and a grain buyer.

E. For accounting purposes, the system maintains a transaction log that records, for each shipment in or out of the elevator, all the information about the shipment, namely: the quantity, type, and grade of grain, the time and date, the elevator manager, the type of shipment (arrival or departure), the truck or rail car identifier, the driver or conductor, and the seller or buyer.

F. When a truck arrives at the elevator with a load of grain, the elevator manager informs the system of the type of grain, its grade, and its quantity. The system must find one or more silos to store the grain and tell the elevator manager which silos it has chosen, and how much grain goes in each one. The system may accept only part of a load if there is not room for the entire load, or none of it if there is no place to store it.

G. The elevator manager may accept or overrule the system's choice of silos for an arriving load of grain. The elevator manager must inform the system how much grain is actually deposited in each silo, and enter data about the truck, the driver, and the seller. The system should acknowledge receipt of this data.

H. As a train is loaded, the elevator manager must tell the system how much grain has been removed from each silo, the rail cars loaded, the conductor, and the buyer. The system should acknowledge receipt of this data.

I. Upon request from the elevator manager, the system must produce a complete report of the state of the elevator. This report should list, for each silo, the type of grain stored, the amount stored, and the remaining capacity of the silo. The report should also list the total remaining capacity of the elevator for each type of grain currently stored, and the total capacity of the elevator not currently committed to any type of grain.

J. Upon request from the elevator manager, the system must produce a chronological listing of the transaction log.