King Mongkut's University of Technology Thonburi

Midterm Exam, Academic Year 2010

COURSE CPE 333 Software Engineering **Computer Engineering Department, 3rd Yr.** (Inter)

Monday 27 December 2010 **09.00-12.00 h.**

Instructions:

1. This examination contains 4 problems, 6 pages (including this cover page).
2. Students are to solve all the problems
3. The answers must be written in the space provided in this exam paper.
4. One sheet of A4 note paper is allowed.
5. All electronic devices and books are **not** allowed.

This examination is designed by

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Name_____ ID _____

1. Draw a class diagram of the following application, and describe your diagram.

E-book reader

The application consists of a library of books in variety of formats including PDF, XPS, and ePub. PDF and XPS are page based formats where the each book has specified number of pages and sizes. On the other hand, ePub is a flow based book where there is only word count, and the number of pages and pages sizes are computed at the time the book is displayed. Books in the library are organized into categories.

In this application, a user can add books in the library to his own catalog of favorite books. In addition, the user can add bookmarks, highlights and notes to the book in his catalog. Bookmark is a page number (or word number in the case of ePub). Highlight is a set of words in some pages in a book, and notes can be added to either bookmark or highlights. **(5 points)**

Solution

2. Decide which architecture style/pattern you might use to implement the following systems. Explain or give a few examples of components, connectors and configurations that the architecture consist of.

Warehouse management system: Shipment module

You are asked to design an architecture for a business who owns and operates multiple warehouses. The company stores a number of inventories for its clients, and manages all its shipments from the company headquarter. All shipment requests are generated and processed by employee at the headquarters. After inventories are verified, the shipment instruction is sent to each warehouses, where warehouse operator confirm the shipping order, pack the goods, and send it off in a truck.

Each truck is equipped with mobile device that informs the warehouse and central management of its whereabouts and the contents on the truck, and update the status of the order to the central system when the shipment is successfully delivered to close the job. **(5 points)**

Solution

3. You are a part of a software team assigned to develop a "Pay Point Service" system for water utility payment. The service once developed will be deployed at multiple service centers located at the mall, convenient stores, and government service agencies. The workflow of the system can be described as follows:

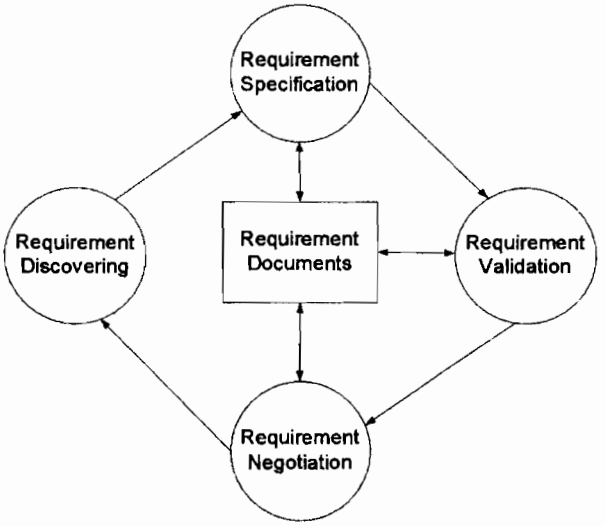
Pay Point Service

A client hands in a "bill of payment" to an officer at a service center requesting to pay for his/her monthly water utility bill. The officer scans the barcode from the bill, waits for an information display, and then verifies the first and the last name of the client. If the displayed name is incorrect, the officer notifies the error to the client and refrains from further processing. If the information is successfully verified, the officer collects the money from the client and keys the paid amount into the system. Finally, the officer issues a receipt for the client. At the end of each day, the service center compiles the total amount received and all the payment items into a report. The report is uploaded to the information system of the Metropolitan Waterworks Authority (MWA), while the money is transferred to the bank account owned by MWA. Finally, MWA verifies the report and the amount transferred. If the information is incorrect, the service center is notified. Otherwise, the information is recorded and the process is considered completed.

Draw an Activity Diagram with Swimlanes for the Pay Point Service system mentioned above. Provide an explanation of how the Model-View-Controller (MVC) concept can be adopted in the design of the Pay Point Service System. **(5 points)**

b.

4. Write an essay to explain the "Requirement Analysis" methodology as illustrated in the figure below. Include the following keywords in your writing: Iterative, stakeholders, workflow, scenario, deliverables, and constraints. The essay should fit in the space provided in this page. **(5 points)**



Solution