

CS 736 Software Performance Engineering Homework Assignment #1

Assigned: Thursday, September 9, 2010

Due: Thursday, September 16, 2010 at the beginning of the class (HARD COPY)

No assignments will be accepted after 12:30 pm on Tuesday, September 21, 2010

1. Consider the following description of the library circulation system.

The library has a collection of books which borrowers may check out and subsequently return. Each book has a unique book number. Affixed to each book is a label bearing that number in bar code format. Each borrower has a unique borrower number. Each borrower has a card bearing that number in bar code format that is scanned when the borrower checks out a book.

Borrowers may determine all the books by a particular author in the library collection, all the books with a specific title, or all the books in a particular subject area.

Librarians check out a book by entering **C** at the terminal, scanning the borrower bar code, and scanning the book bar code. When a book is returned by a borrower, the librarian enters **R** at the terminal, and scans the book bar code. To add a new book to the collection, the librarian enters + (plus sign), the number of the new book, and other book details. To remove a book from the collection, the librarian enters – (minus sign) and enters the book number.

- (a) Draw a Use case diagram of this system. (10 points)
- (b) Write a scenario for checking out books and a UML sequence diagram for this scenario. Assume that borrowers typically check out no more than three books. (20 points)
- (c) Draw a software execution graph for `Checking out books` scenario. Assign software resource requirements for each step in a software execution graph. Assuming the values for the computer resource requirements given in the tables below, estimate the total elapsed time. (35 points)

Devices	CPU	Disk	Delay
Quantity	1	1	1
Service units	KInstr	Physical I/O	Unit

Work unit	20	0	0
DB	500	2	0
Delay	0	0	1

Service time	0.0001	0.02	1
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