Computer Science 631
Database Management System Design
Sample Midterm Examination

- Exam Duration: 2hrs

- You are allowed to bring to the exam one sheet of paper HAND-WRITTEN on both sides (if needed). On this sheet of paper, you can write down what you think you will need for the exam.

- There is no question during the exam. If you are unsure, write down your assumptions

- The total points is 100

1 Database Querying [90]

Suppose we have a Web server that has the data of the web pages stored inside a database, and not in operating system files. The pages are retrieved through queries when needed. The schema of the Web server application is:

- **Page**(Page ID: number(4) not null, Path: varchar(80) not null, Owner: varchar(15) not null, Last Modified: date not null, text: long not null) contains an entry for every web page on the server: An identifying number, a path, the owner, the date of last modification, and the text of the page (the HTML source code).

- **Request**(Request No: Number(5) not null, IP: varchar(15) not null, when: date, Page ID not null) is used to log requests for web pages: Whenever a browser requests a web page, the IP address of the requesting machine, a timestamp (attribute "when") and the ID of the page are stored in the table "Request". The requests are numbered and the number served as key.

- **Keyword**(Word: varchar(10) not null, Page ID: number(4) not null): is used for a local search function: It contains keywords (search terms) for each page. A page can be described by any number of keywords.

Express the following Queries in Algebra, Calculus, SQL

1. When was the last time John updated at least one of his pages?

2. List the keywords defined by John for his Web pages.

3. Which IP addresses accessed only John's Web pages.

4. Which page owners has at least one of his/her pages accessed by all the IP addresses?

5. Which pages have been accessed by all the IP addresses?

Express the following Queries in SQL

1. List the number of accessed per day for every page.

2. On the average, how many pages are accessed by an IP address?

3. Which Web page is the most popular?

2 View Management [10]

1. Define a view (Access Count) which shows each user the access count for his/her pages. The view should have three columns, the ID of the page, the path, and the access count.

2. Is this view updatable? Please explain your answer briefly (one sentence).

3. Express the query " Which Web page is the most popular" in SQL using the view Access Count.