This is a take-home exam. You are asked to form a group of three people each. Each group will pick up a number randomly from 1 to 5. Then you take the topic below that matches your group number. Each group only needs to work on one topic. Each group only needs to turn in one paper as the joint work of the three people in the group. Your grade will be determined based on the quality of the paper. The quality of the paper is determined based on the originality of the ideas expressed in the paper, the logic of the organization of the paper, the clarity of the presentation of the paper, as well as how well the paper satisfies the technical and format requirements defined below.

You are asked to do joint research in a group on one of the following five topics, and as part of the final work, you are asked to turn in a paper within the required time frame as your research report. For all the topics, your paper must address the following technical issues:

- State the goals of the research on this topic in the context of multimedia research.

- Identify at least three leading-edge research problems on this topic in the context of multimedia research.

- Report, in a reasonable detail in your own words (as opposed to copying words in the literature in verbatim), one approach to solving for one of the three problems you have identified in the paper.

- Identify one potential problem for the solution you have reported, and conceptually propose a solution by your own to solve for this problem, or a solution that may offer improvement of the original solution to ease the problem. Note that you are not asked to implement your solution (that’s why you are only asked to conceptually propose the solution). However, you need to make technical justification regarding why your solution may offer improvement or may offer a solution to eliminate the problem.

- If you think your method can offer an improvement over the original solution but cannot completely eliminate the problem, discuss what prevents from a complete elimination of the problem; if you think your method is able to eliminate the problem completely, discuss why you think so.

The format requirements of the paper are as follows. Your paper must not exceed 20 pages, 11 points in font, and single line spacing, including all the figures, tables, and references. Your paper must be printed in the standard letter size paper (8.5 by 11 inches), and leave the four-sided margins all as one inch.

Now the five topics are as follows:
1. Audio Indexing
2. Image Indexing
3. Video Indexing
4. Spatial Data Structures
5. Multimedia Transmissions and Communications

The resources available to you are:

- The Internet (the most comprehensive, complete, and frequently updated, even though not necessarily the most authoritative)
- The University Libraries (the authoritative, even though might not be complete and comprehensive in some areas; note that the University Libraries have online access to IEEE Explore and ACM digital libraries)

As a final note, for anything you cited, you must give references. You are not allowed to copy any work from the literature without references.

You have four weeks to complete this research project and the paper. The paper is due on Dec. 18, 2001, at 5pm in my office at P-29, Engineering Building.

Good luck!