CS 512 Sample Project IDEAS

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Useful Languages to know: C/C++, Java, JavaScript, Python (or Perl)

Goal: To become exposed to some of the current major algorithm classes that have become or are becoming predominant in applications.

A sample project is in the Sample.pdf file under this resource tab.

Projects can be chosen from one of the following areas:

a. **Deterministic Algorithm Animation and Algorithm Snippets**
Expected Outcomes: Instructional Videos or Pseudo Code Driven Animation
Suggested Topics: From Sec 1.3, 1.4, and 1.5 of DVP:
Primality, Cryptography, Universal Hashing
Max Flow-Linear Programming- Planarity –
Graph Decompositions – Graph Drawing –
NPCompleteness,
Clustering.

b. **Advanced Algorithm Sampler**
Expected Outcome: Digital Literature Survey and Search Interface Prototype
Suggested Topics: Same as those listed in item a. above but in
External Memory, Data Streaming, or Parallel and Distributed settings.

c. **Dealing with NP-Completeness**
Expected Outcome: Digital Literature Survey and Search Interface Prototype
Suggested Topics: Approximation Algorithms, Fixed Parameter Tractability.

d. **Adaptive Graph Mining**
***E**xpected Outcome:* Exploratory Data Driven Prototype (Adaptive Navigation and Summarization).

e. **Massive Algorithmics**
Expected Outcome: Library of Scalable Algorithms and Two Sample Applications.
Suggested Topics: Personalized Page Rank, Heavy Hitters, Near Neighbors Search, Similarity Search, Recommendation Systems, Deep Learning.

f. **Scalable Algorithms Infrastructure**
Expected Outcome: make Hadoop and MapReduce based environments operational.
Suggested References: BigTable, Dynamo, NoSQL, and Mongo.

***Final FUN Projects will be judged by a faculty panel**. **The best projects will be added to the incoming "MSCS Wall of Fame" and will be introduced to interested industry sponsors.** Initially, the projects will

be monitored by the class Teaching Assistants. At later stages some faculty members may become involved in offering expert advice.

Guiding evaluation principles will be:

*the "**value**" of the extracted information* from the chosen data set,

*the **methods and models** used*

the final application **Interactivity,**

the Project **Utility and Novelty**.