**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:**

1. **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.

1. **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.

1. **Dealing with NP-Completeness**

*Expected Outcome:* Digital Literature Survey and Search Interface Prototype

*Suggested Topics*: Approximation Algorithms, Fixed Parameter Tractability.

1. **Adaptive Graph Mining**

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

1. **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.

1. **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**.