

## RESEARCH PROJECT

*Spring 2024*

## Task

For this research project you must:

1. Delve into one of the algorithmic problems found in Skiena's Hitchhiker's Guide (the second half of the textbook) and familiarize yourself with the problem. You are also welcome to find a problem not in the Guide, though you must get prior approval from me for this.
2. Pick an area of focus for the problem and do some deeper research on that area.
3. Prepare a survey-style paper about your focus area. Papers should be no longer than 8 pages.
4. Give a 10-12 minute presentation about your findings.

The goal here is not just to read and report on Skiena's overview of the problem, but to use his overview as a jumping off point for a more focused, in-depth research area. Skiena's overview provides context, background material, and a place to start.

Particularly good papers can be submitted to journals such as MJUR, which would make a great addition to a resumé.

## Topic Focus

There are a lot of ways that you can focus your research. The key is to choose a very specific topic and not something broad. Here are some possible things you can do as a focus:

1. Benchmark a set of existing algorithm implementations.
2. Study source code of credible implementations in multiple languages and/or paradigms and evaluate ease of implementation.
3. Implement an algorithm from scratch, profile and benchmark your implementation against existing implementations.
4. Implement an algorithm in several languages/paradigms and compare ease of implementation.
5. Survey progress on the problem since publication of the Skiena's overview.
6. Deeper inspection of a specific algorithm, including close examination of the primary source(s) and historical context.
7. Close examination of a specific application and its challenges with respect to the algorithm(s).

You are not limited to these options. If you have another idea as to how you'd like to focus your research, feel free to discuss it with the instructor.

## Timeline

March 1	Topic claiming period opens
March 20	Topic and focus must be approved
April 15	Annotated Bibliography due
April 29	Papers due by 5:00 PM
May 3	Peer Review due
May 6	Presentations

Topics must be unique to each student and will be claimed on a first come first serve basis beginning on March 1. Your annotated bibliography should include all of the sources you believe you'll use for your paper. Annotations should be no more than a paragraph, should give a high-level overview of the source, and highlight its importance and/or relevance to your topic and focus area. Digital copies of your paper should be mailed to the class mailing list by the date given above. You'll be expected to read everyone else's paper before presentations start and fill out a basic peer review form before presentations begin. Presentations should utilize slides or some kind of visual aid. Be prepared to answer questions regarding your topic and your paper.