**Spring 2021 COT 3100H Project Timeline**

|  |  |  |
| --- | --- | --- |
| **Day, Date** | **What's Due** | **Points** |
| Monday, March 22 | Project Proposal, Sources | 10 |
| Week of April 5 - 9 | Informal Project Checkpoint | 10 |
| Friday, April 30 | Project Submitted on Webcourses | 80 |

**Project Proposal**

This should be a one or two page document which explains the topic you have chosen for your method, your goals in exploring this topic, a list of at least three sources you intend on using for your presentation, and descriptions of any experimentation you intend on carrying out or code you plan to write. The sources should simply be listed at the end of the document.

**Informal Check Point**

Briefly meet with me over Zoom during office hours or right after class in person and show me the progress you've made. The meeting shouldn't take more than a couple minutes. I may ask some questions. I just want to see that you've put forth what I deem as "reasonable effort" to that point in time. The grade is small, and will be filled in relative to the effort others' have put forth, which allows me to reward students who put in a good deal of effort.

**Final Project Submission**

The main part of the paper should be written in English and look like a typical research paper. This should be a .pdf file. (If you do it in Word, just save to pdf.) If you write some code or have other data to share, please share with me in a format that I'll be able to see easily (for code please give me either .cpp, .c, .java or .py files, ask me if you have something else you'd like to share and I'll let you know what file formats are permissible.)

**Sample Project Ideas**

*Probability Topics*

Taking a game, such as Monopoly, Risk, or any card game, and analyzing the probabilities involved in the game. In addition to this analysis, a simulation can be written to see if the experimental results coincide with the theoretical findings.

Markov Chains

*Counting Topics*

Catalan Numbers

Derangements

Stirling Numbers

*Other Topics*

Summation techniques not taught in class

Recurrence relations

*Special Numbers*

Harmonic numbers

Fibonacci numbers

Bernoulli numbers

*Number Theory*

Probabilistic Algorithms - Primality Testing (Miller-Rabin Algorithm)

Properties of the Euler-phi function

Brief introduction into group theory

RSA encryption, or another encryption technique that uses discrete mathematics

*Linear Algebra*

Introduction to Linear Algebra

Basics of Linear Algebra as related to image processing

*Specific Problem Idea*

Take a harder problem (maybe an AIME problem), solve it a couple different ways, and or generalize the problem and write a computer program to solve it as well

Anything else you can think of!