CS 466, Fall 2017
Assignment #5
An OS Project
Due 12/4/17, in class

Input
An OS related topic that interests you.
One or two friends (different from your Assignment 3 partner).

Output
An OS project (a paper, a program, or a mix of the two).
A presentation on your project. [ This may change. ]
An evaluation of group members.

Submission Details
Projects and presentations should be committed and pushed to GitHub. The README.md file should contain all relevant information such as the purpose of your project (the problem you are addressing and why it is important), the layout of your repo, instructions on how to compile and run any programs that you include, and finally, a statement that each group member has not violated the honor code in doing this project.

Notes
(1) Important: by 1 November push a one paragraph group project proposal that includes at least two resources you have found and hope to use in your project.
(2) I am interested in quality not quantity; thus, papers are limited to five pages (single spaced, 10 point font, · · ·), and programs should be significant, well written, and working, but not necessarily long. Your goal is to concisely demonstrate that you’ve learned enough to count as a large project.
(3) The project is 20% of your grade.
(4) Code projects require a 2-3 page writeup in addition to the (working) code.
(5) Write scientifically. The word "I" or phrases like "I believe" or "I learned" should never occur in your paper. You are stating and explaining facts as they stand. If you are describing debate within a field, describe it as such.
(6) Express the organization of the paper in the paper.
(7) Paragraphs have a topic sentence. Everything in a paragraph relates to or supports this sentence.
(8) Plagiarism costs 50 to 100% of the points depending on significance (as determined by the prof).
(9) All group members are expected to make equal contributions to the project.
(10) Alas, your predecessors have motivated
    - Pre-approved topic changes cost 20 points, while
    - Un-approved topic changes cost 50 points.
(11) For your presentation, ask me for a copy of “how to give a good research talk.”
Project Ideas
You should try and come up with a topic that interests your group. If you can’t, then use the following list for suggestions.

1. http://tempos-project.org/about-it
   The Apache Hadoop project develops open-source software for distributed computing.
5. Bricks! os bricks-os.org
6. Digital signatures
7. Build a distributed white board
8. Circular files (requires understanding and then modifying the FAT or NTFS file structure).
9. Write challenge login
10. Distributed systems: any subtopic (e.g., distributed game playing)
11. Write a program using Remote Procedure Calls (RPCs) (Or any project dealing with RPC.)
12. Implement a small kernel on top of BIOS on a PC or a Mac.
13. Write a disk device driver for an encrypted usb key (using cheesy encryption).
14. Write a paper on one (or more) of the following topics:
   1. Unix Implementation
   2. Ethernet: Distributed Packet Switching for Local Computer Networks
   3. Encryption and Secure Computer Networks
   4. Design and implementation of a log structured files system.
   5. A language with distributed scope.
   6. Randomized distance-vector routing protocol
   7. Middleware
   8. Decentralized communication efficient distributed shared memory.
   9. Virtual memory (3 papers)
   10. OS issues in Cloud Computing
15. Write a monitor-to-C front end that inserts necessary DOWN and UP calls.
16. Synchronous and Asynchronous group communication.
17. Internet time synchronization.
19. Finding and dealing with race conditions.
21. Write a program to explore different disk scheduling algorithms in real time.
22. Beowulf: linux clustering
23. NIST network emulation tool for emulating IP networks
25. Come look through by ideas folder
26. experiment with disk benchmarking (e.g., bonnie)
27. Work with menuetos http://www.menuetos.org
28. Authentication
29. Further details on hardware that interfaces with the OS, such as flash SSDs and I/O devices
Regarding writing a usb driver note that there are many different usb.h’s out there. Each also has a vendor and product ID (e.g., V_ID 5451 and P_ID 87), which can be obtained using `lsusb -v`.

The Concurrent Computing Group at Michigan Technological University is proud to announce the availability of our first pedagogical tool, ThreadMentor, for teaching concurrent computing in various courses (e.g., operating systems, concurrent programming, parallel and distributed computing).

http://www.cs.mtu.edu/~shene/NSF-3/e-Book/index.html This is ThreadMentor tutorial home. It is still under construction and will become a complete user guide very soon. Every feature of ThreadMentor is discussed. Many examples are used to illustrate the concept and use of various synchronization primitives.

http://www.csl.mtu.edu/cs4411.ck/www/Home.html This is our Introduction to Operating Systems course page. This page will be gradually updated to show how multithreaded programming can be incorporated into an OS course for programming assignments.