Project 3: Can we improve Minix?

- Due: November 23, 2022

- Self evaluations: (1) November 9 and (2) November 24, 2022.

We discussed improving system performance by reducing context switching and with the implementation of a cache and lookahead (the zone mechanism of MINIX can be considered as lookahead).

This project contains two parts. Part 1 asks you to implement 3 system calls, and Part 2 asks you to use these system calls in different ways to improve the read-write performance of MINIX.

The project is due November 23. We have a mid way check point on November 9 when each one of you will report progress and contributions in a self evaluation.

We encourage innovation. Great ideas with implementation can earn up to 30% bonus credits.

Part 1:

We ask you to implement the following system calls:

1. The *nicerTo()* system call which will change the priority of a process whose process id is passed to it as an argument. Note that this is not the same as the *nice()* system call of Linux.

2. The *MoreCache()* system call which will increase the number of buffers assigned to the disk block cache in MINIX.

3. The *MoreZone()* system call which will increase the number of blocks per zone in the MINIX file system.

The descriptions of the above system calls are intentionally brief.

Part 2:

1. You are asked to experiment with these system calls, and possibly additional changes to MINIX, to see how they affect the read/write performance of MINUX individually and in combination. We expect that you will take advantage of the data that you have collected in Projects 1 and 2.

2. You will be graded on the quality of your data and analysis of the data.

3. We are particularly interested in your data and analysis of changing the priority levels of different processes; explanations on why changing priority levels do or do not result in performance improvement.

4. Changing priority levels may result in issues like starvations and/or fairness. If they occur, we expect you to fix them.

5. We encourage you to innovate on performance improvements beyond what we ask of you.

Submission and grading standards

- **Submit a self evaluation to report progress on November 9.**
- **Submit the following files in the *Blackboard by November 23.***
    1. Source code of your programs
    2. Any other executable and shell to test your programs in each OSs
    3. A readme on how to use and test your program
    4. A document include your design, data and explanation.
    5. A contribution list for each group member
    6. Only one assigment answer need to be uploaded in each team
    7. The format of the upload file is "project3-group#your_group_number.zip"

- **You will be graded on the robustness of your program, and the grade for group members may depend on the self evaluations.**

- Working code (50%)

- Documentation (50%)
    1. Menu pages of the three system calls and additional ones (5%)
    2. Design for the system calls and changes to MINIX (at most 3 pages). (15%)
    3. Data presentation and explanations (30%)