CSCI 460 Project Proposal

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For the semester's final project, we propose to Implement a virtual memory space and page table over an array of FRAM chips. Via a USB-to-UART adapter, the user will be able to store data on these FRAM chips to retrieve later. On any other computer with the correct serial software and a similar cable, another user will be able to retrieve the same data just by providing a number that will serve as a pointer to a piece of data on the chips. When the device is provided this integer, it will return the piece of data stored at this address, even if it spans several blocks of memory or even several chips. A portion of these chips will be reserved for storing a table with each piece of data stored on the chips and their sizes, so we can return only the desired data without overflow.

To create this device, we will use a SAMD21 ARM-based microcontroller [1], and Fujitsu FRAM chips that operate via SPI [2]. For the sake of cost and to keep the device small, only two FRAM chips will be used here. Using two of these FRAM chips will provide the user a whopping 16 kilobytes of storage space. This device will also have an LCD display on it that will display to the user current RAM usage and other information relevant to the current state of the system.

[1] https://www.microchip.com/wwwproducts/en/ATsamd21g18

[2] https://cdn-shop.adafruit.com/datasheets/MB85RS64V-DS501-00015-4v0-E.pdf