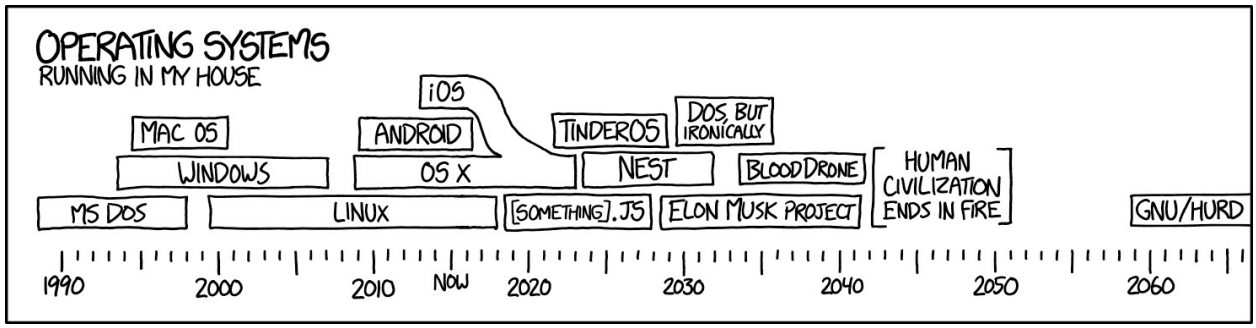
CS 370 – Project #5, Part B

Purpose: Familiarization with Frame Allocation
Points: 100



Source: xkcd.com/1508

Introduction

In a multiprocessing environment, processes may exceed the available memory. Virtual memory allows the *swapping* of pages to and from disk. This allows the aggregate set of processes to exceed the available memory transparently to each process.

To limit the impact of any process upon the set of all processes, each process is allocated a limited number of pages. When limited to a specific number of pages, the set of pages in memory are referred to as *frames*.

In this project, the impact of frame allocation and replacement algorithms will be explored. Implemented as a simulator, input to the simulator is a sequence of memory accesses. Each memory access is recorded as a page hit or fault while maintaining the frame table for a single process.

Project

Upon completion of Part A, Part B is dedicated to describing performance of the FIFO and LRU replacement policies.

Using the simulator written in Part A and Part B

- Develop an evaluation methodology for the two algorithms, focused upon the number of page faults. The methodology must operate on a reasonable scale where:
  - The page size and frame table sizes must be parameters to the methodology and classified in the results.
  - The number of simulated runs must be no less than 1,024 per replacement policy, page size, and frame table size combination
  - The memory accesses strings must vary between runs, they must be generated in the length of [8, 1024].
- Describe the evaluation methodology
- Implement the methodology
- Summarize the results of the methodology including at least two graphs.

Submission

When complete, submit:

- A **proj5b.zip** including:
  - A **proj5b.pdf** (no other formats permitted) document which conveys
    - The evaluation methodology
    - The results
    - Conclusions based upon the results
  - Any scripts or additional programs used in the methodology
  - If modified, updated versions of **paging.c** and the **makefile**
- Upload **proj5b.zip** to canvas
- *Note*, late submissions will not be accepted