UNITED STATES MILITARY ACADEMY

PHASE 1

CS481: OPERATING SYSTEMS

SECTION K2

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By

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\_\_\_\_ MY DOCUMENT IDENTIFIES ALL SOURCES USED AND ASSISTANCE

RECEIVED IN COMPLETING THIS ASSIGNMENT.

\_\_\_\_ I DID NOT USE ANY SOURCES OR ASSISTANCE REQUIRING DOCUMENTATION IN COMPLETING THIS ASSIGNMENT.

SIGNATURE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Phase 1

1. After the stack is called on 0x30, syscall\_handler takes over and determines that sys\_creat takes 2 arguments. Syscall2 is called with the 2 respective arguments, the file path and file initial size. Within sys\_creat, the file system is locked first. Then it accesses the process control block inside the current thread to retrieve a free file descriptor integer. At this integer, sys\_creat maps a new struct file\* it gets from filesys\_create so that we can access the file pointer using just the file descriptor integer next time. At the end, it releases the thread and the file system lock. Finally, it returns the new file descriptor integer.
2. Using integer file descriptors is faster and saves memory. Using integer values allow us to utilize an array with file descriptor integers as the index numbers. Arrays are simple data structures that can be initialized to a certain size and require little maintenance. They are also easier to edit and quicker to access with known indexes.
3. Error cases for each system call
   1. Sys\_creat
      1. If filesys\_create fails and returns -1
   2. Sys\_unlink
      1. If filesys\_remove fails and returns -1
   3. Sys\_open
      1. If next\_fd returns an integer less than 2
   4. Sys\_filesize
      1. If the input file descriptor integer is less than 2
   5. Sys\_read
      1. If the input file descriptor integer is less than 2
      2. If the number of bytes read is a negative integer
   6. Sys\_write
      1. If the input file descriptor integer is less than 1
      2. If the number of bytes read is a negative integer
   7. Sys\_seek
      1. If the input file descriptor integer is less than 1
      2. If input position is less than 0
   8. Sys\_tell
      1. If the input file descriptor integer is less than 1
   9. Sys\_close
      1. If the input file descriptor integer is less than 1