Assignment

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**XV6**

Xv6 is a teaching operating system developed in 2006. Xv6 is modeled on Dennis

Ritchie’s and Ken Thompson’s Unix Version 6 (v6) for MIT Operating System course. It is written in ANSI C for the Intel x86 and RISC-V processor. It is a monolithic kernel. Its default user interface is a command line interface. It is much simpler than modern OSs like Linux, Windows, or macOS.

# Process Management

* It uses a round robin scheduler for scheduling tasks.
* There is no priority-based scheduler.
* No multithreading.
* It implements process table to manage active processes.
* No support for multiple CPU cores (only single-core scheduling).
* There is basic process isolation.

# File Management

* It uses a simple unix file system.
* It supports directories, inodes and files.
* Each file is represented by an inode.
* Inodes store metadata (size, owner, type) and data block pointers.
* Directories are special files that store mappings of filenames to inode numbers.
* The file descriptor table keeps track of open files for each process.
* No support for large files.
* No encryption or permissions, there is basic read/write support only

# Memory Management

* It uses paging for virtual memory.
* Each process has a separate address space (isolated memory).
* It uses a fixed-size page table (no dynamic memory allocation).
* Uses system calls for allocating, freeing, and managing memory.
* When a process is created, it inherits memory.

The page table maps virtual addresses to physical memory. Memory is allocated in fixed pages (4KB each).

If a process needs more memory, it uses sbrk() to expand its heap. When a process exits, memory is freed.

* There is no swapping or paging to disk.
* There is no memory protection.

# I/O Management

* + It uses system calls for I/O (read(), write(), open(), close()) and supports only basic operations.
  + There is no caching.
  + It implements a buffered I/O system.
  + There is no advanced driver support (only basic hardware).
  + There is no networking support.
  + No modern device management (no USB support etc).

**Conclusion**

XV6 is a much simpler OS than modern OS like Windows, Linux and MacOS since it is made for the purpose of learning. It is monolithic like Linux since they both are based on Unix. It lacks many features.