XV6 Operating System

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Topic - Rename command in OS File system and system call

Agenda :

- Introduction
- Motivation
- Project Goal
- Design Architecture
- Outcome

Introduction

- Rename command in Operating system is used to *rename* the files stored on the disk.
- Here I use rename command to change file names by using shell inside particular folder or using full file path.
- For that, when the projects were assigned I searched for many open source projects based on xv6 on *github* and some blogs on *medium.com* were also useful.
- In this project, the concept of *inode* and basic *data structures* is required alongside terminal *string computation*

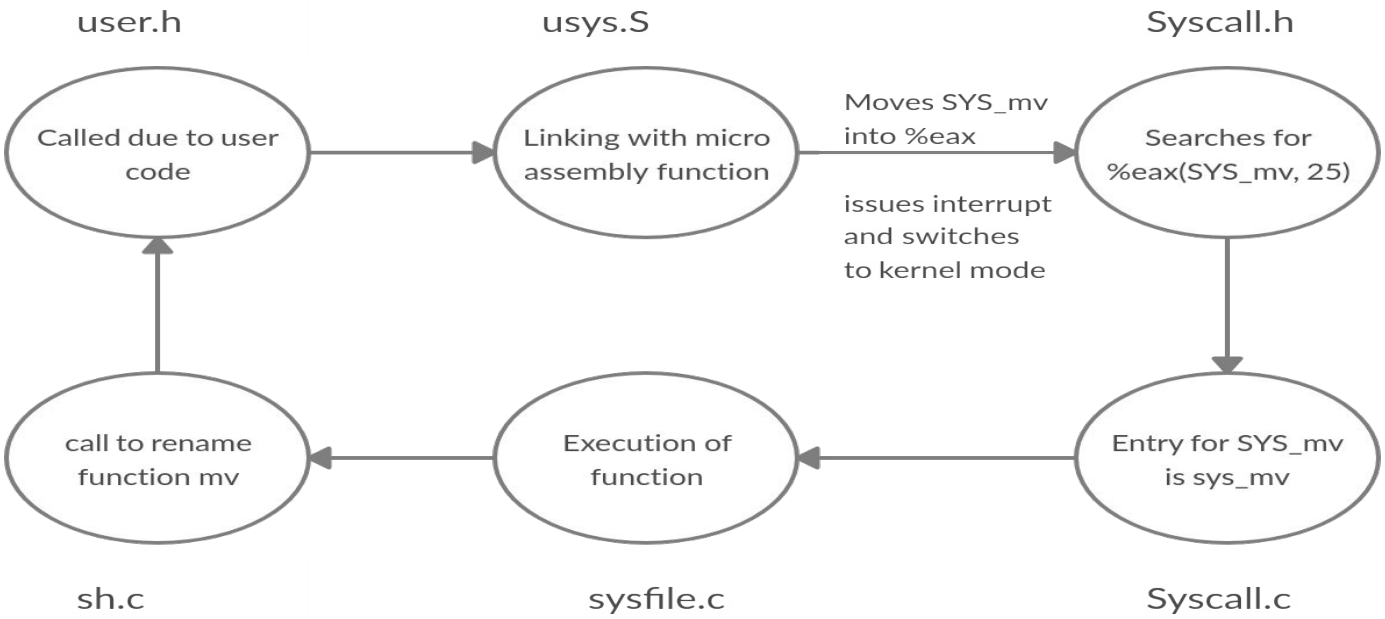
Motivation

- I wanted to implement *system call*. After searching on internet for many tutorials on xv6, I found no research on rename command.
- This command implementation also requires some knowledge from *file system* .
- Again if someone wants to change the filename *very few* people use command line. Many of us use UI.
- I have interest in writing functions where *string computations* are involved a lot.

Project Goal

- There are *2 functions* rename can do. Renaming a folder and renaming a file. So the goal was to do one of them. But I successfully managed to do *both.*
- As in file system, directory and file have *same inode* pattern but *structure is different* depending on implementation.
- Similarly if *same name file* existence is the challenge in this project. What if 2 file with same name exists after renaming ?
- So these were the 2 issues which were part of the *problem statement* of this project

Design Architecture



Procedure

- Add ID of syscall in ***syscall.h*** **#define SYS_mv 25**
- Add definitions to ***syscall.c*** **extern int sys_mv(void); [SYS_mv] sys_mv,**
- For User code we add header definition to user.h
  - **int mv(const char*, const char*, const char*);**
- To switch to kernel mode using assembly we edit usys.S
  - SYSCALL(mv)
- To use rename command we need to edit files related to file system and thus we edit sysfile.c because it has best interrupts related to file system
- For system call and to call the boiler plate code we edit sh.c which is a shell file and it is used to perform actions based on our input to it.

Schema

- Our target is to find the inode using *namei and nameiparent* function in xv6
- Once we get the inode for the parent, we search the filename to be changed using *dirent structure* method
- Replacing the filename in parent node will change the filename on the disk and content of the filename remains the same.

Outcome

- Once we successfully compile the xv6 os with qemu, we need to run the following two commands :-
  - mv folder_old folder_new // *normal rename*
  - mv --version // *to check version*
  - mv -n filename_old filename_new // *to check same filename*
- I learned about xv6 and I developed interest in xv6. I started writing blogs on xv6 on *medium.com* and I also answers questions frequently on *stackoverflow* based on xv6