



Project 3 WIKI

Implementing Symbolic Links in xv6

Design

The symbolic link implementation in xv6 requires modifications in various parts of the system.

The primary addition is a new file type `T_SYMLINK`, that the system can recognize and act upon. We plan to create a system call `symlink` that allows the creation of these special files. The `readi()` function and file operations will also be adjusted to handle symbolic links.

To correctly follow symbolic links, we will employ a helper function `follow_symlink` and add a depth counter to avoid infinite loops in case of recursive links.

Implementation

The original xv6 system did not support symbolic links. I added a new file type `T_SYMLINK` and extended the `create` function in `fs.c` to handle symbolic link creation.

The `readi()` function was modified to read the target path from a symbolic link's inode.

I also added two helper functions, `dir_name` and `base_name`, for path processing and a `follow_symlink` helper function for following symbolic links. The `strlen` function

was introduced in `sysfile.c` as it was required in the `create` function.

A depth counter was introduced in the `follow_symlink` helper function to prevent infinite loops due to recursive symbolic links.

The alignment issue with `BSIZE` was resolved by adding a padding field to `struct dinode`.

Result

XV6 was able to boot, but unfortunately there is an error regarding the initialization, and I could not solve it.

```
Booting from Hard Disk..xv6...
cpu0: starting 0
sb: size 0 nblocks 0 ninodes 0 nlog 0 logstart 0 inodestart 0 bmap start 0
ilock: dev 1 inum 1
lapicid 0: panic: ilock: no type
80101a83 801021d1 80102337 80100aab 80105bb8 8010507d 801061c1 80105f03 0 0
```

Trouble Shooting

During the implementation, we faced issues with the alignment related to `BSIZE` in the `mkfs.c` file.

To resolve this, we introduced a padding field in `struct dinode` to ensure the alignment works correctly.

We also had to adjust the `create` function to accommodate the extra parameter required for symbolic link creation. This change also required passing null to every other function calling `create` to maintain compatibility.