

BUS Exercise 8

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Introduction

Welcome To the Jungle, we've got fun and games. Well actually we have hash-browns with laxatives for shits 'n giggles, just be careful. Please enjoy this, which i believe to be the last installment in this short running series. I hope it was entertaining, especially the Low-Effort versions. I hope all periods are in place¹, if so, then let us begin.

THE FORMAT

- Every file will be named similar to the sections in here, so `2.1-stack_exercise.c` is Exercise 2, section 1.
- Every Solution **WILL** be in this pdf, but not necessarily anything predefined by the exercise.
- Any explanation will be both in this PDF as well as in each file.
- This explanation will be in each PDF, in case someone who doesn't know the format tries to correct the exercises
- **WARNING:** Humor may or may not be used. If you are allergic to humor, that sounds like a personal problem.
- **WARNING:** Backing up your data is important. Although linux doesn't have the necessary shame to remove itself, unlike windows, please do back up your data. And try to keep track of your periods...they seem to be notoriously hard to find

¹unless it is that kind of period... i hope you don't have that today, otherwise, get well soon.

1 The accountant's Nightmare

1.1 M E T H S... or maths... whatever

$$12 + 256 + 256^2 + 256^3 = 16843020 \text{ [Blöcke]}$$

We have a maximum file size of 16843020 KiB. We have 12 directly addressed blocks, 256 which use indirect addresses 256^2 blocks that use double indirect addressing and 256^3 which use triple indirect addressing.

By doubling the blocksize, we double the maximum filesize, because the amount of addressable data-blocks are constant.

1.2 Blocks and blocks and blocks...

We start inside of the root-directory block and look for the directory entry of **home**. This entry links to the associated I-Node, in which the next directory-block is specified by addressing. This then lists all files inside of the **home** directory. now we look for the **bus** directory and its I-Node will be called and the directory block, that belongs to it, will be addressed, which then holds all entries within **home/bus/**. Here we look for an entry of the **test** directory, which links to the associated inode. If **test** is not a directory, but a file, then this I-Node addresses to the file-block of **est**, otherwise, it links to the associated directory-block.

2 Apple iNode

2.1 iNode tables

2.1.1

I-Node: 368	Type: Directory	HL Count: 1
Inode 370	"test"	
Inode 999	"test2"	

I-Node: 999	Type: Symbolic Link	HL Count: 1
"/home/bus/test"		

2.1.2

I-Node: 368	Type: Directory	HL Count: 1
Inode 370	"test"	
Inode 999	"test2"	
Inode 370	"test3"	

I-Node: 370	Type: File	HL Count: 2
"Lorem ipsum"		

2.1.3

I-Node: 368	Type: Directory	HL Count: 1
Inode 999	"test2"	
Inode 370	"test3"	

I-Node: 370	Type: File	HL Count: 1
"Lorem ipsum"		

2.1.4

I-Node: 368	Type: Directory	HL Count: 1
Inode 1005	"test"	
Inode 999	"test2"	
Inode 370	"test3"	

I-Node: 1005	Type: File	HL Count: 1
"Dolor sit amet"		

2.2 b

1. Lorem ipsum
2. Lorem ipsum
3. `cat: test2: No such file or directory`
4. Dolor sit amet

3 IO-system

3.1 Pontroller Vs. Crocessor²

Pros:

- I/O-controllers are only accessed via read/write commands which directly interface with the registers of the controller
- cheaper than seperate processors
- can use checksums for error correction (this is limited on I/O-processors)

Cons:

- less performance than a seperate I/O-processor
- only single commands can be executed, no command sequences
- they use the same databus

3.2

Due to interrupt handling, the CPU doesn't block, while the data is being retrieved. Instead the DMA acts independent from the CPU but gets its initial commands from the CPU directly, after which the CPU continues with its other tasks, until the DMA sends an interrupt, if it is done.

²this was actually a typo... i just left it in because why not

4 Frisbee planning

4.1 FCFS

Order:

4882, 1271, 433, 3492, 2372, 1121, 3232, 3493, 4978, 6700

Total Distance:

$$4449 + 3059 + 2371 + 5579 = 15458$$

4.2 SSTF

Order:

4882, 4978, 3493, 3492, 3232, 2372, 1271, 1121, 433, 6700

Total Distance:

$$96 + 4545 + 6267 = 10908$$

4.3 SCAN

Order:

4882, 4978, 6700, (6999), 3493, 3492, 3232, 2372, 1271, 1121, 433

Total Distance:

$$2117 + 6566 = 8683$$

4.4 LOOK

Order:

4882, 4978, 6700, 3493, 3492, 3232, 2372, 1271, 1121, 433

Total Distance:

$$1818 + 6267 = 8085$$

4.5 C-SCAN

Order:

4882, 4978, 6700, (6999), (0), 433, 1121, 1271, 2372, 3232, 3492, 3493

Total Distance:

$2117 + 7000 + 3493 = 12610$

4.6 C-LOOK

Order:

4882, 4978, 6700, 433, 1121, 1271, 2372, 3232, 3492, 3493

Total Distance:

$1818 + 6267 + 3060 = 11145$

4.7 NOOP

Order:

4882, 1271, 433, 3492, 3493, 2372, 1121, 3232, 4978, 6700

Total Distance:

$4449 + 3060 + 2372 + 5579 = 15460$