The Forth Enlightenment

Hardware for the Forth programming language

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Contents

1 Introduction

In This Chapter

you will learn

- First topic
- Second topic
- Third topic

you will be able to

- Task one
- Task two
- Task three

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

1.1 Purpose

The purpose of this book is to address the necessity of trustless computing or verifyable computing.

- Don’t trust, verify
- trustless computing
- trusting the compiler

Design princples: simplicity is a virtue.

Don't trust, verify

In this section talk about blah blah blah.

Trustless computing

Discuss trustless computing here.

Trusting the compilers

In this subsection there will be a discussion of trusting the compiler.

Application: Bitcoin

These topics are relevant to Bitcoin because it relates to money. Don't get hacket. Artificial Intelligence is coming for your money.

1.2 Hardware Overview

No microcode. Implement logic in hardware. Complex optimization is bad. conceptual simplicity. Simplicity is a cirtue.

visual verification view with your own eyes
simplicity keep it simple to understand
repitation repeat blocks

Stack computers

- Why stack computers?
- Parts of a stack computer
- Types of stack computers

Do we cover the instruction cycle here? Instruction timing?

1.3 Instruction set Architecture

The instruction set architecture should be kept simple. Each bit encodes specific information.

The software should:

- be simple
- reuse code blocks
- not require a compiler
- be hand-writable

Threaded code. No compiler. Forth.

2 Hardware

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2.1 Stack Computers

We will discuss stack computers[1].

[1]: Philip J. Koopman (1989), *Stack Computers the New Wave*

3 Instruction Set Architecture (ISA)

In This Chapter

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- First topic
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3.1 ISA Explained

Explain what an ISA is.

3.2 Instruction cycle

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3.3 Instruction Format

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3.4 Instruction Timing

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4 The Forth Programming Language

In This Chapter

you will learn

- First topic
- Second topic
- Third topic

you will be able to

- Task one
- Task two
- Task three

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

4.1 The Forth Inner Interpreter

This section gives a general explaination[1] of the chapter topic[2].

The word : causes the innter interpreter to enter compile mode. The name of the word is next, followed by the definition. The word ; causes the inner interpreter to exit compilation and reenter interpretation mode.

Example:

```
1 : square ( x -- x )
2     dup
3     *
```

1: Use sidenotes if necessary

[2]: Loeliger (1981), *Threaded Interpretive Languages*

Listing 4.1: Definition of `dup` in Forth.

```
4     :
```

This, of course, can be more conveniently written on a single line

```
: square ( x -- x )
    dup * ;
```

4.2 Return Stack

The top of the return stack holds the return address. When a function call is made, the return address must be stored. If the call command is executed at address x, the return address x+1 is pushed to the top of the return stack.

4.3 Data Stack

The data styack is where temporary data is stored.

If a system has only one hardware stack, it shoulld be used for the data stack. Data manipulations are more common than function calls and the hardware stack is faster than memory access. The call stack will need to be stored in memory.

4.4 The Forth Outter Interpreter

This an intermediate section. There will be several. each such section will cover a discrete topic within this chapter.

Margin notes can be used to explain detail or add reminders that would otherwise break the flow of the document. I think sidenotes are numbered while margin notes are not.

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

5 Template Chapter

In This Chapter

you will learn

- what is the first topic
- how to identify the second topic
- best practices for the third topic

you will be able to

- perform the steps required to accomplish task one
- create a program that performs task two

This introduction gives the reader any context necessary to understand the proceeding sections in this chapter.

The contents of the 'In This Chapter' box should concrete. This should coorespond to a 'Chapter Review' section at the end of the chapter.

Illuminate any common obstacles for the reader. A few words of encouragement are also welcomed.

5.1 Heaps of Examples

This section is fairly dense with examples. You can delete everything from here until the end of the page.[1]

1: After you have saved this document as a new file.

This section serves as an easy way to demonstrate* multiple graphical elements that can be used in this book.

Add a list of elements

Keep chapters, sections, and sub sections capitalized.

* Like this footnote

5.1.1 Margin Stuff

Generally, any text that would be written between parentheses would do well as a margin note. Keep the flow going.

Remember

a kaobox can be used in the margins for special reminders)

Sections in Depth

Notice that `\subsubsection` does not cause numbering.

Sections within a chapter can be `\section`, `\subsection`, or `\subsubsection`.

5.1.2 Figures and Tables

Listing 5.1: This Forth code does NOT generate Table 5.1

```
: square  ( x -- x )
( Forth code that squares a number
   dup * ;
```

This is an example of a table contained withing the main column of text.

Table 5.1: A useless table.

col1	col2	col3	col4
Multiple row	cell2	cell3	cell4
	cell5	cell6	cell7
	cell8	cell9	cell10
Multiple row	cell2	cell3	cell4
	cell5	cell6	cell7
	cell8	cell9	cell10

We can also have full-width tables.

Table 5.2: A wide table with invented data about three people living in the UK. Note that wide figures and tables are centered and their caption also extends into the margin.

Name	Surname	Job	Salary	Age	Height	Country
Alice	Red	Writer	4.000 £	34	167 cm	England
Bob	White	Bartender	2.000 £	24	180 cm	Scotland
Drake	Green	Scientist	4.000 £	26	175 cm	Wales

And full-width images.

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Figure 5.1: A wide seaside, and a wide caption. Credits: By Bushra Feroz, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=68724647

5.1.3 Citations

Cite an author in the margin[3].

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like "Huardest gefburn"? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

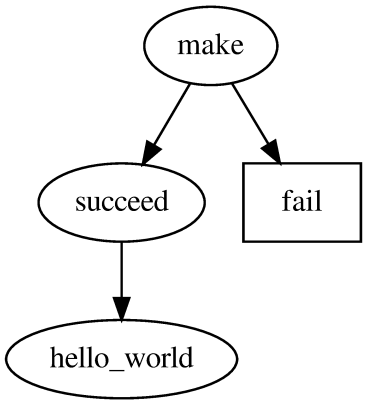

Figure 5.2: A diagram produced by the Dot program and saved as a PNG file.

[3]: McZampleface (1999), *The Great Book of Examples*

5.1.4 Glossaries and Indicies

5.1.5 Mathematics

The box below was created using the `definition` environment. Boxes are also provided by the `theorem`, `proposition`, `lemma`, `corollary`, `example`, `remark`, and `exercise` environments.

Definition 5.1.1 *Let y be some function of x such that $y = f(x)$*

where x and y are both variables in Definition 5.1.1.

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how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

5.2 Chapter Review

Chapter Review

you have learned

- what is the first topic
- how to identify the second topic
- best practices for the third topic

you are able to

- perform the steps required to accomplish task one
- create a program that performs task two

A

Template Appendix

A.1 One section

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A.2 Another Section

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

Bibliography

Works are listed in order of first citation.

[1] Jr. Philip J. Koopman. *Stack Computers the New Wave*. Ellis Horwood Limited, 1989 (cited on page 3).

[2] R. G. Loeliger. *Threaded Interpretive Languages*. BYTE Publications, 1981 (cited on page 7).

[3] Mr. Example McZampleface. *The Great Book of Examples*. Place Holder Publishing, 1999 (cited on page 11).

Glossary

compile word
: description.

CPU
: Central Processor Unit.

immediate word
: is executed during compilation and interpretation.