

Checklist for Web Book

Chapter 5: Modeling Reality with Computers

Know the context and significance of the following concepts.

Introduction

- Computers as universal machines
- Concept of representation
- Levels of modeling reality inside a computer
 - Physical conversions
 - Encoding schemes
 - Algorithmic modeling
 - Definition of an algorithm
 - Examples of algorithms
 - Balance between representative and practicality of choosing variables

Preliminary Concepts

- Binary numbers
 - Switches
 - Converting decimal (base-10) to binary (base-2)
 - Representing negative numbers
 - Fractional binary numbers
 - Special binary numbers
- Binary arithmetic
 - Adding in binary

Information That Is Relatively Easy to Digitize

- “Relative” ease
- Forms of information relatively easy to digitize
- Digitizing and value judgments
- ASCII versus Unicode
- Digitizing letters and words
- Interpretation and meaning
- RTF
- Steps of converting colors into digital bits
- Digitizing images
 - Pixels
 - Grids
 - Determining image size
- Digitizing sound
- Digitizing relationships



Information That is Difficult to Digitize

- Examples of information that is difficult to digitize
- Reasons why difficult to digitize
- Digital “filtering” due to limited resources for digitizing information

Implications of Digitizing the World

- Limits of bits
- Reformed perspective on modeling
- Computer versus human being