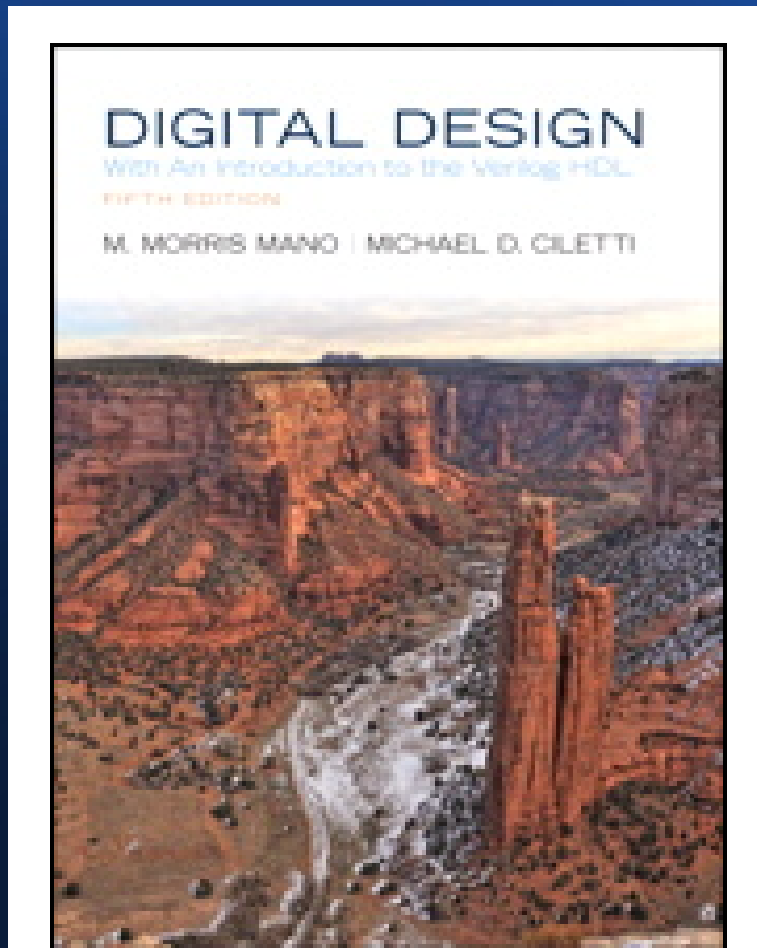


CS1026 Digital Logic Design I

<https://www.cs.tcd.ie/John.Waldron/CS1026/cs1026.html>



<http://www.mypearsonstore.com/bookstore/product.asp?isbn=0132774208>



Digital Design, 5th Edition

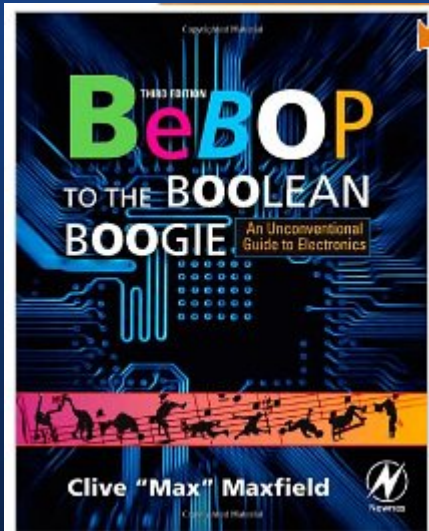
By M. Morris Mano,
Michael D. Ciletti

Published by Prentice Hall

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Published Date: Jan 2, 2012

Also recommended, written in a more informal style



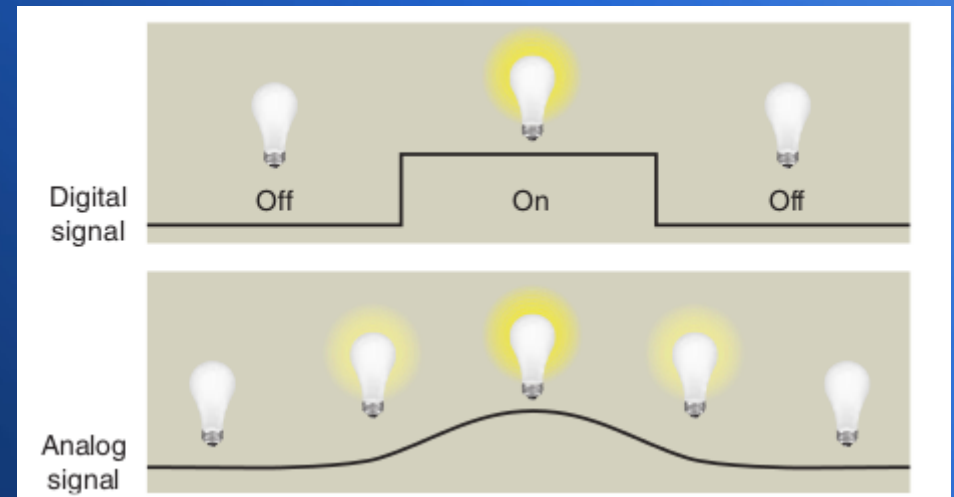
Bebop to the Boolean Boogie,
Third Edition: An Unconventional Guide
to Electronics

Clive Maxfield

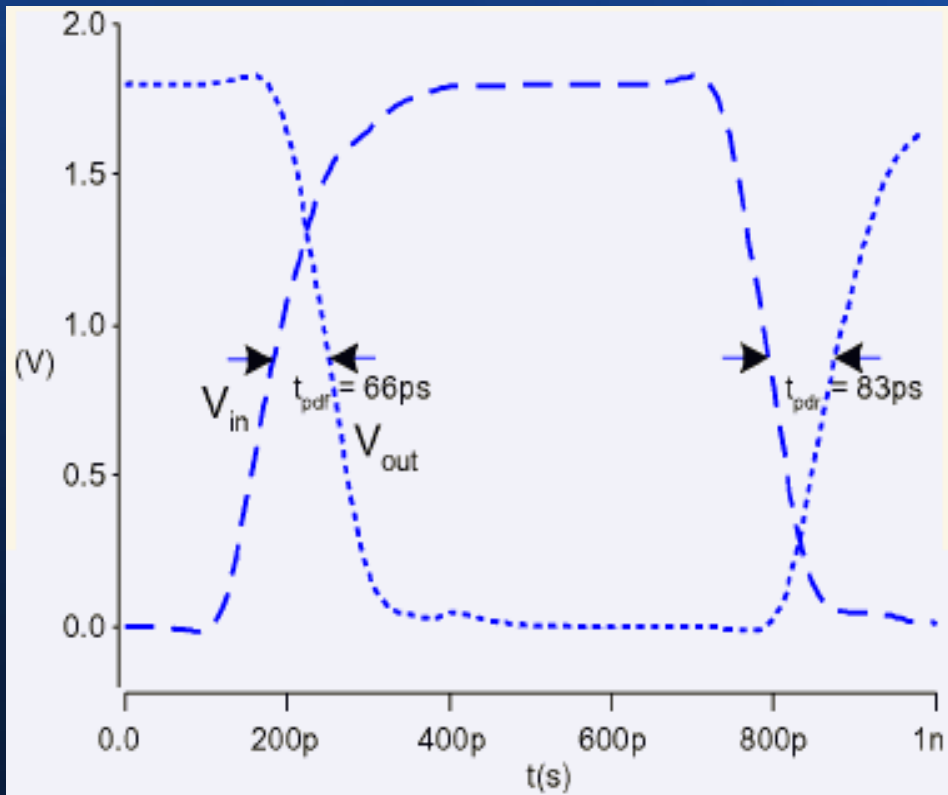
The only electronics book in the world to include a Seafood Gumbo
recipe

Publication Date: December 23, 2008 | ISBN-10: 1856175073 |
ISBN-13: 978-1856175074 | Edition: 3

Digital electronics represent signals by discrete bands of analog levels, rather than by a continuous range. All levels within a band represent the same signal state. Relatively small changes to the analog signal levels due to manufacturing tolerance, signal attenuation or parasitic noise do not leave the discrete envelope, and as a result are ignored by signal state sensing circuitry.



Inverter Delay



t_{pdr} : rising propagation delay

- From input to rising output crossing $V_{DD}/2$

t_{pdf} : falling propagation delay

- From input to falling output crossing $V_{DD}/2$

Pico is a unit prefix
in the metric system denoting
one trillionth, a factor of 10^{-12}
(0.000000000001). this
was one of the original 12
prefixes defined in 1960 when
the International System of Units
was established.

Logic refers to both the study of modes of reasoning (which are valid and which are fallacious) and the use of valid reasoning. In the latter sense, logic is used in most intellectual activities, including philosophy and science, but in the first sense is studied primarily in the disciplines of philosophy, mathematics, semantics, and computer science.

System design – breaking the overall system into subsystems and specifying the characteristics of each subsystem (memory, ALU, I/O etc)

Logic Design – how to interconnect basic building blocks to perform a specific function (use gates to perform addition)

Circuit design – connecting resistors diodes transistors etc to form a gate or other logic building block

Digital systems are used in communication, business transactions, traffic control, spacecraft guidance, medical treatment, weather monitoring, the Internet, and many other commercial, industrial, and scientific enterprises.

A digital system is an interconnection of digital modules

Understand the operation of each digital module

Basic knowledge of digital circuits and their logical function

The theoretical foundations of these systems have not changed much; indeed, one could argue that the stability of the core theory, coupled with modern design tools, has promoted the widespread response of manufacturers to the opportunities of the marketplace

Digital ICs are often categorized according to the complexity of their circuits

Small-scale integration (SSI) devices contain several independent gates in a single package. The inputs and outputs of the gates are connected directly to the pins in the package. The number of gates is usually fewer than 10 and is limited by the number of pins available in the IC

Medium-scale integration (MSI) devices have a complexity of approximately 10 to 1,000 gates in a single package. They usually perform specific elementary digital operations as decoders, adders, multiplexers, registers and counters

Large-scale integration (LSI) devices contain thousands of gates in a single package.

They include digital systems such as processors, memory chips, and programmable logic devices

Very large-scale integration (VLSI) devices now contain millions of gates within a single package.

Examples are large memory arrays and complex microcomputer chips.