Switching Theory and Logic Design - Summary

Switching Theory and Logic Design Author: M. V. Subramanyam (2005)

Table of Contents (Summary in English)

1. Number Systems and Codes - Review of different radices / bases (binary, octal, hexadecimal, etc.) - Conversions between them - Representation of negative numbers (1’s and 2’s complement) - Different kinds of codes (BCD, Excess■3, Gray code, etc.) - Error detection and correction codes

2. Boolean Algebra - Fundamental postulates and basic properties - Laws and theorems (like De Morgan, duality, complement) - Simplification of Boolean expressions - Boolean functions and their representations - Universal gates; multi■level implementation using NAND/NOR

3. Design of Combinational Circuits - Methods of minimization (Karnaugh maps, tabular / Quine■McCluskey method, etc.) - Realization of functions: encoders, decoders, multiplexers, demultiplexers - Adders, subtractors, comparators, code converters - Use of programmable logic devices (e.g., PLA, PAL, PROM)

4. Introduction to Sequential Circuits - Definition of sequential circuits vs combinational circuits - Memory elements: flip■flops (SR, JK, D, T etc.), latches - Triggering, clocking, master■slave structures

5. Capabilities and Minimisation of Sequential Machines - Models of sequential machines (Moore, Mealy) - State diagrams, state tables, state reduction / minimization - State assignment, conversion between flip■flop types - Design procedures for synchronous sequential circuits

6. Algorithmic State Machines (ASM) - ASM charts: their components and usage - Examples of using ASM for designing control logic or digital systems