38 [Z].—ARTHUR GILL, *Introduction to the Theory of Finite-State Machines*, McGraw-Hill Book Company, Inc., 1962, xi + 207 p., 23 cm. Price $9.95.

As pointed out by the author in his preface, this book was written as class notes for an introductory engineering course on the theory of "synchronous, deterministic, and finite-state machines." The material is that contained in articles by Moore, Mealy, Aufenkamp, Hohn, Ginsberg, Zadeh, Simon, Paull, Unger, and the author himself, and is arranged by chapters as follows: 1. The Basic Model; 2. Transition Tables, Diagrams, and Matrices; 3. Equivalence and Machine Minimization; 4. State Identification Experiments; 5. Machine Identification Experiments; 6. Finite Memory Machines; and 7. Input Restricted Machines.

Chapters 5 and 6 include discussions of "information lossless" and "linear binary" machines, respectively. The machines discussed in Chapter 7 are those incompletely specified machines for which an output entry is undefined if and only if the corresponding next state entry is undefined.

The book is as remarkable for its omissions as for the subject matter it includes. The author specifically excludes treatments of Turing machines, Markov chains, and modular sequential machines. In the same spirit, extensions of the finite-state machine model, such as reported by Rabin and Scott, and by Schützenberger, are not dealt with. By defining a machine with input, output, and state sets as arbitrary finite sets, the author avoids discussion of logical nets and the encoding problem. No account is given of the decomposition results reported by Hartmanis and Stearns. The most outstanding omission, however, is that of the theory of regular sets as available in articles by Kleene, Copi, Elgot and Wright, Rabin and Scott, and Chomsky.

In the reviewer's opinion, the book is not successful in collecting the available facts about finite-state machines and presenting them in a simple and concise manner. As a textbook, it may be objected to on two counts.

First, it is unnecessarily lengthy and repetitious. This is a consequence of including numerous "algorithms" which are essentially restatements of definitions and some of which could have been left to the ingenuity of the student, and of restating explicitly special instances of a given proposition.

Second, the book is not written at the (admittedly low) level of mathematical sophistication suitable to the subject. Thus, on one hand, the definitions and proofs are informal and the names 'lemma' and 'theorem' are used loosely. On the other hand, excessive terminology and symbolism are introduced.

A number of errors are present, which the reviewer has communicated to the author.

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