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## Summary of Chapter 11

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A TM is like an FA, but it has an infinite tape. The input starts on tape surrounded by blank cells denoted  $\Delta$ .

The program of a TM is: depending on the symbol under the head and the state, the machine writes a symbol, moves left or right or stays in place, and/or changes state.

Once a TM enters the accept state, it stops.

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## Summary of Chapter 12

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A normal TM can simulate a TM with a one-way infinite tape, with multiple tapes, etc.

A nondeterministic TM is no more powerful than a normal one.

Church's thesis says that there is an algorithm for a problem if and only if there is a TM for it.

A TM can simulate a normal computer.

A universal TM is one that can execute any other TM as an input.

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## Summary of Chapter 13

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Recursive languages are accepted by TMs that always halt.

R.e. languages are accepted by TMs.

A problem is decidable if the associated language is recursive.

Both recursive and r.e. languages are closed under intersection and union.

If a language is recursive, then so is its complement.

If both a language and its complement are r.e., then the language is recursive.

There is a connection with Printer-TMs.

All problems about FAs and REs are decidable.

Most problems about CFGs and PDAs are decidable.

A computation string is a record of the computation of a machine.