Finite automata are useful for lexical analysis because they provide a systematic way to recognize patterns in a sequence of characters, which is essential for identifying tokens in a programming language.

1. Recognizing Patterns: Finite automata are like machines that can recognize patterns in strings of characters. For lexical analysis, we need to recognize patterns that correspond to different types of tokens in a programming language, such as keywords, identifiers, operators, etc.
2. Regular Expressions: To describe these patterns, we use regular expressions, which are essentially rules that define what each type of token looks like. Each regular expression describes a specific pattern or token type.
3. Converting Regular Expressions to Automata: We can convert these regular expressions into a more structured form called Deterministic Finite Automata (DFA). DFAs are simpler and more efficient for computers to work with compared to regular expressions.
4. Token Recognition: Once we have DFAs representing the patterns of various tokens in the language, we can use them to scan through the source code of a program. As the DFA “reads” the characters one by one, it moves through its states according to the rules defined by the regular expressions.
5. Automating the Process: Instead of manually converting regular expressions into DFAs and writing programs to simulate them, we can use tools called lexical analyzer generators. These tools take the regular expressions as input and automatically generate the corresponding DFAs and code for the lexical analyzer program. This automation saves time and ensures accuracy in implementing the lexical analysis phase of a compiler or interpreter.

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How does finite automata useful for lexical analysis ?

structure of symbol table ?