

Problem 1: Describe the alternative design approaches of a lexical analyzer.

Problem 2: Implement a lexical analyzer system for simple arithmetic expression using C-programming, as demonstrated in your course textbook (11th edition, Fig. 4.1, Page 191). Explain each block of codes being used. Show the output for the source code segment `(sum + 47)/total`.

Problem 3: Implement a lexical analyzer stated in Problem 2 using Java programming language and compare its execution speed and memory usage with that of C-programming.

Problem 4: Define finite automata and explain how finite automata can be used to detect source code string.

Problem 5: Design a state diagram to recognize comments both in Java and C programming.