Quiz 3

1. **Briefly explain the compiler's scanner works?**

   It converts the original program's stream of characters into a stream of tokens. Spaces or comments in the program are removed in this process.

   It uses Regular Expressions to define tokens, and uses Finite Automata to recognize tokens.

2. **Give an example of 5 tokens.**

   - Operators: Factors like '=', '+', '-', '>' and so on.
   - Keywords: Word factors like "if", "while", "for" and so on.
   - Identifiers: Factors such as pi in program fragment const pi = 3.14;
   - Numeric literals: Factors such as 43, 6.035, -3.6e10 and so on.
   - Character literals: Factors like 'a', '~', and so on.

3. **What is the general approach for the scanner to recognize a token?**

   1. Build a deterministic finite automaton (DFA) from regular expression E
   2. Execute the DFA to determine whether an input string belongs to L(E)

4. **What are regular definitions?**

   Regular definitions are regular expressions associated with suitable names.

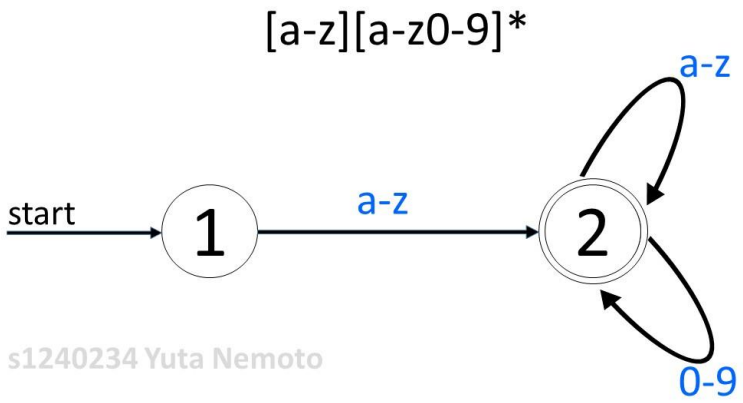
   For example, the set of identifiers in Java can be expressed by the Following regular definition:

   Letter → A | B | … | Z | a | b | … | z

   Digit → 0 | 1 | 2 | … | 9

   Id → letter (letter | digit)*

5. **Write an automaton for the regular expression [a-z][a-z0-9] ***



6. **What is the general approach for writing a scanner?**

   The construction is done automatically by a tool such as the Unix program lex.

7. Briefly explain how to use Lex for scanner writing?

Using the source program language grammar to write a simple lex program and save it in a file named lex.l

Using the unix program lex to compile lex.l resulting in a C (scanner) program named lex.yy.c

Compiling and linking the C program lex.yy.c in a normal way resulting the required scanner.