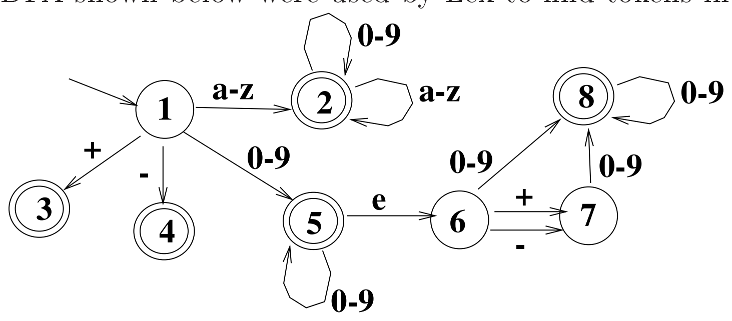
QUIZ 1

Date: 29th January 2003 — Max. Marks 35

1. Suppose the DFA shown below were used by Lex to find tokens in an input file.



What is the maximum number of characters that Lex might have look ahead past the end of a token, to be sure of the token's arrival? Illustrate you answer with an example. (5 Marks)

2. Informally, define a comment as a sequence of characters enclosed within `"` and `"`. If the character `"` itself appears within a comment, it is to be represented as `""`.

   (a) Draw a *minimised* DFA which recognizes comments.

   (b) Using the DFA above, write the code for lexical analyser to detect comments. This has to be done using a language which has:

      i. *assignment statements*,

      ii. *if* with a *then* and an optional *else* clause,

      iii. *go to* statements which can jump to a label at the beginning of a statement.

      iv. *expressions* made with *simple variables*, the operator ==, and *function calls* to the three functions *nextchar*(), *error*() and *action*(). These functions have obvious meanings. (5+5=10 Marks)

3. Given the following specification of a language through regular expressions:

   variable $\rightarrow$ `(` *simple_or_array* `.` `)`* *simple_or_array*
   simple_or_array $\rightarrow$ `id` `([` *elist* `])`*?*
   elist $\rightarrow$ `( e , )`$*$ `e`

   Consider `e` to be a terminal symbol.

   (a) Write a LL(1) grammar specifying the same language.

   (b) Construct the LL(1) parsing table for the grammar. (5+5=10 Marks)

4. Consider the grammar shown below:

$S \rightarrow X$
$X \rightarrow M\ a \mid b\ M\ c \mid d\ c \mid b\ d\ a$
$M \rightarrow d$

Now complete the following sentences:

The grammar is not ________. The state which demonstrates this has the following set of items ________. Consider the two items ________ and ________ in this state. The first suggest a ________ on the symbol ________, while the second suggests a ________ using production ________ on the same symbol. (1 + 3 + 6 × 1 = 10 Marks)