2000 Paper 11 Question 4

Compiler Construction

Consider the grammar

```
S -> E <eof>
E -> T + E
E -> T
T -> x
```

where `S` is the starting symbol, `<eof>` is a special token marking end of input and `x` is a terminal.

Explain and find the left, right and follow sets for all non-terminals in the grammar. [5 marks]

Suppose that an SLR parser for this grammar is required. One stage on the way to constructing the parsing tables is to create the *characteristic finite state machine* (sometimes known as the LR(0) states). Do this, explaining your working clearly. You do not need to complete the SLR parsing tables. [10 marks]

Now, assuming that the parsing tables have been constructed, show what values will be placed on a stack and comment about internal state while an SLR parser using this grammar processes the input text `x+x+x<eof>`. [5 marks]