

3. (a) Construct an LR(0) state machine for the following grammar:

$Z \rightarrow E \$$

$E \rightarrow T$

$E \rightarrow E + T$

$T \rightarrow i$

$T \rightarrow (E)$

[14]

- (b) Most programming languages support several forms of parentheses (curly, round, and square brackets, for example). Considering that many common programming errors have to do with balancing parentheses, explain how compilers could make it easier to debug programs in terms of parentheses balancing errors. Consider both top-down and bottom-up parsers.

[11]