

2. (a) Explain the difference between top-down and bottom-up parsing. Explain the meaning of the abbreviations LL and LR which are often used to denote the two approaches. [8]

- (b) Consider the following grammar, where S is the start symbol:

$$S \rightarrow A \$ \quad A \rightarrow B A a \mid \epsilon \quad B \rightarrow b B c \mid A A$$

Calculate Nullable, First, and Follow for A and B . [9]

- (c) The First and Follow sets are used primarily to predict grammar rules in a top-down parser, but they can also be used for syntax error recovery. Show how syntax errors can be managed, using First and Follow sets for a grammar for arithmetic expressions as an example. [8]