

31 Lecture - CS402

Important Subjective

1. **What is a derivation tree in context-free grammars?**

Answer: A derivation tree shows how a given string can be derived from the start symbol of the grammar.

Define sentential form in the context of CFGs.

Answer: A sentential form is a string consisting of terminals and nonterminals that can be derived from the start symbol of a CFG.

What is the difference between leftmost and rightmost derivations?

Answer: A leftmost derivation replaces the leftmost nonterminal in each step, while a rightmost derivation replaces the rightmost nonterminal in each step.

What is a parse tree in context-free grammars?

Answer: A parse tree is a graphical representation of the derivation of a string in a context-free grammar.

What is a production rule in a CFG?

Answer: A production rule is a rule that specifies how a nonterminal can be replaced with a sequence of terminals and nonterminals.

What is a nullable symbol in a CFG?

Answer: A nullable symbol is a nonterminal that can derive the empty string.

Define ambiguous grammars.

Answer: An ambiguous grammar is a grammar that can derive a string in multiple ways, leading to multiple parse trees.

What is the Chomsky normal form of a CFG?

Answer: The Chomsky normal form is a form of a CFG where every production rule has either two nonterminals or one terminal on the right-hand side.

What is the difference between left recursion and right recursion in a CFG?

Answer: Left recursion is when a nonterminal appears as the leftmost symbol in one of its production rules, while right recursion is when it appears as the rightmost symbol.

What is the difference between a terminal and a nonterminal symbol in a CFG?

Answer: Terminal symbols are symbols that appear in the input string, while nonterminal symbols are symbols that can be replaced by a sequence of terminals and nonterminals during the derivation.