

41 Lecture - CS402

Important Mcqs

1. Which of the following languages is non-context-free?

- a) $\{a^n b^n c^n \mid n \geq 1\}$
- b) $\{a^n b^n \mid n \geq 1\}$
- c) $\{a^n b^m c^n \mid n, m \geq 1\}$
- d) $\{a^n b^m c^k \mid n \geq m \text{ or } m \geq k\}$

Solution: a) $\{a^n b^n c^n \mid n \geq 1\}$

Which of the following grammars can generate non-context-free languages?

- a) Regular grammar
- b) Context-free grammar
- c) Context-sensitive grammar
- d) Unrestricted grammar

Solution: c) Context-sensitive grammar and d) Unrestricted grammar

Which of the following is an example of a non-context-free language?

- a) The language of regular expressions
- b) The language of context-free grammars
- c) The language of Turing machines
- d) The language of palindromes

Solution: d) The language of palindromes

Which of the following is an example of a context-sensitive grammar?

- a) $S \rightarrow aSb \mid ?$
- b) $S \rightarrow aB \mid bA$
 $A \rightarrow aAa \mid ?$
 $B \rightarrow bBb \mid ?$
- c) $S \rightarrow AB$
 $A \rightarrow aAa \mid ?$
 $B \rightarrow bBb \mid ?$
- d) $S \rightarrow aSb \mid ?$
 $S \rightarrow bSa \mid ?$

Solution: c) $S \rightarrow AB, A \rightarrow aAa \mid ?, B \rightarrow bBb \mid ?$

Which of the following is true about non-context-free languages?

- a) They can be recognized by a finite automaton.
- b) They can be generated by a regular grammar.
- c) They can be generated by a context-free grammar.
- d) They require more powerful formalisms than context-free grammars.

Solution: d) They require more powerful formalisms than context-free grammars.

Which of the following is an example of a non-context-free language?

- a) The language of all strings that contain an equal number of 0s and 1s
- b) The language of all strings that contain at least two consecutive 1s

- c) The language of all strings that are palindromes
- d) The language of all strings that begin and end with the same symbol

Solution: c) The language of all strings that are palindromes

Which of the following is an example of a context-sensitive grammar?

- a) $S \rightarrow aSb \mid ?$
- b) $S \rightarrow AB$
 $A \rightarrow aAa \mid ?$
 $B \rightarrow bBb \mid ?$
- c) $S \rightarrow aAaBb \mid bBbAa$
 $A \rightarrow aA \mid ?$
 $B \rightarrow bB \mid ?$
- d) $S \rightarrow aBc \mid Bc$
 $B \rightarrow bB \mid ?$

Solution: c) $S \rightarrow aAaBb \mid bBbAa$, $A \rightarrow aA \mid ?$, $B \rightarrow bB \mid ?$

Which of the following is true about the Chomsky hierarchy?

- a) Non-context-free languages are a subset of context-free languages.
- b) Context-free languages are a subset of regular languages.
- c) Regular languages are a subset of non-context-free languages.
- d) Unrestricted languages are a subset of context-sensitive languages.

Solution: b) Context-free languages are a subset of regular languages.

Which of the following is an example of a non-context-free language?

- a) The language of all strings of the form $a^n b^n$
- b) The language of all strings of the form $a^n b^a$