

1. Which of the following is an example of a Pushdown Automaton (PDA)?

- a) Deterministic Finite Automaton (DFA)\
- b) Non-deterministic Finite Automaton (NFA)\
- c) Deterministic Pushdown Automaton (DPDA)\
- d) Non-deterministic Pushdown Automaton (NPDA)

Answer: d) Non-deterministic Pushdown Automaton (NPDA)

Explanation: PDAs extend the capabilities of DFAs and NFAs by allowing them to use a stack, enabling more complex processing of languages, and NPDA allows for multiple possible transitions from a given state and input symbol.

2. Which type of PDA requires that for each state and input symbol, there is only one possible transition?

- a) Non-deterministic PDA (NPDA)\
- b) Deterministic PDA (DPDA)\
- c) Deterministic Finite Automaton (DFA)\
- d) Non-deterministic Finite Automaton (NFA)

Answer: b) Deterministic PDA (DPDA)

Explanation: In DPDA, the transition function provides only one possible next state for each state and input symbol pair.

3. What is the primary difference between a Deterministic Pushdown Automaton (DPDA) and a Non-deterministic Pushdown Automaton (NPDA)?

- a) DPDA has a finite number of states, while NPDA has an infinite number of states.\
- b) DPDA always halts on any input, while NPDA may not halt on some inputs.\
- c) DPDA can have multiple possible transitions from a state for a given input, while NPDA has only one transition.\
- d) DPDA uses a stack with a limited size, while NPDA uses an unbounded stack.

Answer: c) DPDA can have multiple possible transitions from a state for a given input, while NPDA has only one transition.

Explanation: NPDA allows for non-deterministic transitions, meaning there can be multiple possible next states for a given state and input symbol pair.

4. Which of the following describes the conversion of a Pushdown Automaton (PDA) into a Context-Free Grammar (CFG)?

- a) CFG to PDA conversion\
- b) PDA to CFG conversion\
- c) PDA to DFA conversion\
- d) NFA to CFG conversion

Answer: b) PDA to CFG conversion

Explanation: This process involves creating a context-free grammar that generates the same language as the given PDA.

5. What does a Petri net model represent?

- a) A graphical modeling tool used for software development\

- b) A mathematical modeling tool used for analyzing concurrent systems\
- c) A type of network architecture used in computer networking\
- d) A data structure used for organizing information in databases

Answer: b) A mathematical modeling tool used for analyzing concurrent systems

Explanation: Petri nets are mathematical models used to represent and analyze systems with concurrent processes.

6. Which of the following represents a formal language generated by a Pushdown Automaton (PDA)?

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

Answer: b) Context-free language

Explanation: PDAs are capable of recognizing and generating context-free languages.

7. Which of the following automata can recognize languages that a Deterministic Finite Automaton (DFA) cannot?

- a) Non-deterministic Finite Automaton (NFA)\
- b) Deterministic Pushdown Automaton (DPDA)\
- c) Non-deterministic Pushdown Automaton (NPDA)\
- d) Turing Machine

Answer: c) Non-deterministic Pushdown Automaton (NPDA)

Explanation: NPDA can recognize non-context-free languages, which are beyond the capabilities of DFAs.

8. What is a characteristic feature of a Petri net model?

- a) Transition rules\
- b) Stack operations\
- c) Finite control\
- d) Parallelism

Answer: d) Parallelism

Explanation: Petri nets represent systems with concurrent processes, allowing for modeling of parallelism.

9. Which of the following represents the conversion of a Context-Free Grammar (CFG) into a Pushdown Automaton (PDA)?

- a) CFG to PDA conversion\
- b) PDA to CFG conversion\
- c) PDA to DFA conversion\
- d) NFA to CFG conversion

Answer: a) CFG to PDA conversion

Explanation: This process involves creating a PDA that recognizes the language generated by

the given CFG.

10. Which type of Pushdown Automaton (PDA) has a limited number of transitions from a state for a given input symbol?

- a) Non-deterministic PDA (NPDA)\
- b) Deterministic PDA (DPDA)\
- c) Non-deterministic Finite Automaton (NFA)\
- d) Deterministic Finite Automaton (DFA)

Answer: b) Deterministic PDA (DPDA)

Explanation: DPDA restricts the number of possible transitions from a state for a given input symbol, ensuring determinism.

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