Introduction to AI

1. **What does AI stand for?**
   a) Artificial Interaction
   b) Artificial Intelligence
   c) Automated Information
   d) Advanced Interaction
   Answer: b) Artificial Intelligence
2. **Which of the following is NOT a component of intelligence?**
   a) Reasoning
   b) Creativity
   c) Sleeping
   d) Problem-solving
   Answer: c) Sleeping
3. **What is the main goal of Artificial Intelligence?**
   a) To replace humans
   b) To create systems that think and act rationally
   c) To improve entertainment technology
   d) To eliminate manual labor
   Answer: b) To create systems that think and act rationally
4. **Which approach focuses on making computers think like humans?**
   a) Acting Humanly
   b) Thinking Humanly
   c) Thinking Rationally
   d) Acting Rationally
   Answer: b) Thinking Humanly
5. **Who proposed the Turing Test?**
   a) Alan Turing
   b) John McCarthy
   c) Marvin Minsky
   d) Claude Shannon
   Answer: a) Alan Turing

AI Problems and Techniques

6. **Which is NOT an AI problem domain?**
   a) Game Playing
   b) Theorem Proving
   c) Cooking
   d) Natural Language Processing
   Answer: c) Cooking
7. **Which AI technique involves separating important features from unimportant ones?**
   a) Search
   b) Use of knowledge
   c) Abstraction
   d) Optimization
   Answer: c) Abstraction

8. **What does an AI search technique provide?**
   a) Direct solutions to problems
   b) A way to solve problems without direct methods
   c) Detailed hardware analysis
   d) Visualization tools
   Answer: b) A way to solve problems without direct methods
9. **Which task domain requires expert knowledge?**
   a) Mundane tasks
   b) Formal tasks
   c) Expert tasks
   d) Routine tasks
   Answer: c) Expert tasks
10. **What does "acting rationally" mean in AI?**
    a) Mimicking human emotions
    b) Following legal laws
    c) Taking optimal actions based on given premises
    d) Always prioritizing speed over accuracy
    Answer: c) Taking optimal actions based on given premises

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Types and Levels of AI

11. **Which type of AI focuses on classification and response based on programming?**
    a) Weak AI
    b) Strong AI
    c) General AI
    d) Narrow AI
    Answer: a) Weak AI
12. **What is an example of Weak AI?**
    a) Robotics
    b) Chess-playing programs
    c) Brain simulation
    d) Autonomous decision-making systems
    Answer: b) Chess-playing programs
13. **Strong AI is primarily used in:**
    a) Automated customer support
    b) Real-time suggestions and corrections
    c) Voice-controlled devices
    d) Natural Language Processing
    Answer: b) Real-time suggestions and corrections
14. **Which problem class uses AI techniques?**
    a) Trivial problems
    b) Non-trivial problems
    c) Easily solved problems
    d) Problems requiring EPAM
    Answer: b) Non-trivial problems
15. **What is the main focus of AI techniques?**
    a) To replace search methods
    b) To handle incomplete and inaccurate information

c) To develop hardware faster
d) To create unmodifiable knowledge bases
Answer: b) To handle incomplete and inaccurate information

Turing Test and Criteria for Success

16. **What does the Turing Test evaluate?**
    a) Machine performance
    b) Human-like intelligence in machines
    c) Computer programming skills
    d) Data processing speed
    Answer: b) Human-like intelligence in machines
17. **In the Turing Test, the interrogator:**
    a) Identifies the computer among multiple machines
    b) Communicates only with a human
    c) Distinguishes between human and computer
    d) Writes algorithms
    Answer: c) Distinguishes between human and computer
18. **What is a common criterion for AI success?**
    a) Speed
    b) User satisfaction
    c) Intelligence indistinguishable from humans
    d) Error reduction
    Answer: c) Intelligence indistinguishable from humans
19. **Alan Turing's test requires how many participants?**
    a) One
    b) Two
    c) Three
    d) Four
    Answer: c) Three
20. **The Turing Test involves testing which aspect of machines?**
    a) Speed
    b) Memory capacity
    c) Human-like communication ability
    d) Storage
    Answer: c) Human-like communication ability

Applications of AI

21. **Which is NOT an AI application?**
    a) Data Mining
    b) Image Processing
    c) Cooking Assistant Robots
    d) Natural Language Processing
    Answer: c) Cooking Assistant Robots

22. **Which AI application is used in speech recognition?**
    a) Game Playing
    b) Robotics
    c) Natural Language Processing
    d) Virtual Agents
    Answer: c) Natural Language Processing
23. **What is a virtual agent?**
    a) A program that acts as an AI tutor
    b) An algorithm for speech recognition
    c) A software that mines data
    d) A robotic agent in games
    Answer: a) A program that acts as an AI tutor
24. **AI in game playing uses:**
    a) Strong AI
    b) Weak AI
    c) Natural Language Processing
    d) Human intelligence only
    Answer: b) Weak AI
25. **What is an example of AI in security?**
    a) Autonomous driving
    b) Intrusion detection systems
    c) Chess algorithms
    d) Virtual assistants
    Answer: b) Intrusion detection systems

Miscellaneous

26. **Which of these fields directly overlaps with AI?**
    a) Civil Engineering
    b) Cognitive Science
    c) Chemistry
    d) Biology
    Answer: b) Cognitive Science
27. **What does NLP stand for in AI?**
    a) Neural Language Programming
    b) Natural Language Processing
    c) Non-linear Programming
    d) Numeric Language Parsing
    Answer: b) Natural Language Processing
28. **AI techniques rely on knowledge that is:**
    a) Static and unmodifiable
    b) Generalized and flexible
    c) Extremely specific
    d) Automatically perfect
    Answer: b) Generalized and flexible
29. **Abstraction in AI helps in:**
    a) Focusing on trivial details
    b) Removing important features

c) Narrowing the range of possibilities
d) Increasing data volume
Answer: c) Narrowing the range of possibilities
30. **Which AI task involves robots manipulating objects?**
a) Game Playing
b) Speech Recognition
c) Computer Vision
d) Robotics
Answer: d) Robotics

Topic 1: Problem Solving

1. **Which of the following best defines a problem space?**
a) A set of initial states and final states
b) A set of valid states generated by applying operators
c) A combination of goals and solutions
d) A specific solution to a problem
Answer: b) A set of valid states generated by applying operators
2. **What does a 'search' in problem-solving refer to?**
a) Data collection
b) Finding the optimal solution
c) Searching for a solution in a problem space
d) Generating new operators
Answer: c) Searching for a solution in a problem space
3. **Which of the following is NOT a component of a state space?**
a) Initial state
b) Operators
c) Transition costs
d) Goal state
Answer: c) Transition costs
4. **What type of search strategies do Depth-First Search (DFS) and Breadth-First Search (BFS) belong to?**
a) Informed search
b) Uninformed search
c) Heuristic search
d) Blind search
Answer: b) Uninformed search
5. **In the Water Jug Problem, what represents the state space?**
a) Operators to transfer water
b) The initial and goal states
c) Combinations of water in the two jugs
d) A sequence of moves
Answer: c) Combinations of water in the two jugs

Topic 2: State Space Search

6. **What is the goal state in the Water Jug Problem?**
a) (4, 3)

b) (2, n)
c) (3, 2)
d) (0, 2)
Answer: b) (2, n)
7. **Which operator corresponds to emptying the 4-liter jug?**
   a) (4, y)
   b) (x, 0)
   c) (0, y)
   d) (x − d, y)
   Answer: c) (0, y)
8. **What is the first step in solving a problem using state space search?**
   a) Define the initial states
   b) Apply rules to reach the goal
   c) Define a set of operators
   d) Check constraints
   Answer: a) Define the initial states
9. **In state space search, which of the following does a solution consist of?**
   a) Initial state and goal state
   b) A sequence of states and operators
   c) Heuristic functions
   d) Cost of paths
   Answer: b) A sequence of states and operators
10. **Which rule in the Water Jug Problem allows filling the 3-liter jug to its maximum?**
    a) (x, 3)
    b) (x − d, y)
    c) (4, y)
    d) (x, y − d)
    Answer: a) (x, 3)

Topic 3: Production Systems

11. **What is the role of the control strategy in a production system?**
    a) Modifying the knowledge base
    b) Specifying rule application order
    c) Defining goal states
    d) Adding operators
    Answer: b) Specifying rule application order
12. **Which of the following is true about a commutative production system?**
    a) It is non-monotonic and partially communicative
    b) It is both monotonic and partially commutative
    c) It allows contradictory rules
    d) It prevents all conflicts
    Answer: b) It is both monotonic and partially commutative
13. **What characteristic makes a production system highly modular?**
    a) Rules use "IF-THEN" structure
    b) Knowledge is stored in discrete pieces
    c) Operators are pre-defined

d) It prevents learning from new data
Answer: b) Knowledge is stored in discrete pieces
14. **What is a disadvantage of a production system?**
    a) Lack of modularity
    b) Difficulty in analyzing control flow
    c) Separation of knowledge and control
    d) Lack of pattern-directed control
    Answer: b) Difficulty in analyzing control flow
15. **Which type of production system ensures that applying a rule does not prevent later application of another rule?**
    a) Non-monotonic
    b) Monotonic
    c) Partially commutative
    d) Conflict-free
    Answer: b) Monotonic

Topic 4: Search Strategies

16. **What is the primary difference between informed and uninformed search?**
    a) Uninformed search uses heuristics
    b) Informed search is faster and costlier
    c) Informed search uses domain knowledge
    d) Uninformed search is not optimal
    Answer: c) Informed search uses domain knowledge
17. **Which search strategy uses a FIFO queue for the frontier?**
    a) Depth-First Search
    b) Breadth-First Search
    c) Uniform Cost Search
    d) Bidirectional Search
    Answer: b) Breadth-First Search
18. **In which search algorithm does the fringe act as a priority queue?**
    a) Depth-First Search
    b) Breadth-First Search
    c) Uniform Cost Search
    d) Iterative Deepening Search
    Answer: c) Uniform Cost Search
19. **What property ensures that a search algorithm will always find a solution if one exists?**
    a) Optimality
    b) Completeness
    c) Time complexity
    d) Heuristic evaluation
    Answer: b) Completeness
20. **Which of the following is an example of a blind search?**
    a) A* Search
    b) Greedy Search
    c) Breadth-First Search

d) Hill-Climbing Search
Answer: c) Breadth-First Search

21.1. Which of the following is the first step in the Generate-and-Test algorithm?

22. A. Test a solution
    B. Generate a possible solution
    C. Quit if a solution is found
    D. Check constraints
    Answer: B

23. ───────────────────────────────

24.2. What type of problems is the Generate-and-Test algorithm best suited for?

25. A. Complex problems
    B. Small and simple problems
    C. Dynamic problems
    D. Real-time problems
    Answer: B

26. ───────────────────────────────

27.3. Which of the following is NOT a type of Generate-and-Test strategy?

28. A. Exhaustive generate-and-test
    B. Heuristic generate-and-test
    C. Plan generate-test
    D. Recursive generate-test
    Answer: D

29. ───────────────────────────────

30.4. In Constraint Satisfaction problems, the goal state is defined as:

31. A. A state with no constraints
    B. A state with minimal constraints
    C. A state that satisfies all constraints
    D. A state that satisfies at least one constraint
    Answer: C

32. ───────────────────────────────

33.5. Cryptarithmetic problems belong to which category?

34. A. Generate-and-Test problems
    B. Constraint Satisfaction problems
    C. Means-End Analysis problems
    D. Heuristic Search problems
    Answer: B

35. ───────────────────────────────

36.6. What is the heuristic used in the coloured blocks example of Generate-and-Test?

37. A. Use blocks with the fewest blue faces
    B. Use blocks with the fewest red faces
    C. Place blocks randomly
    D. Avoid using blocks with red faces entirely
    Answer: B

38. ───────────────────────────────

39.7. The Best-First Search algorithm evaluates nodes based on:

40. A. Depth of the node
    B. Breadth of the node
    C. Heuristic value
    D. Random selection
    Answer: C

41. ───────────────────────

42.8. Which data structure is commonly used in Best-First Search?

43. A. Stack
    B. Queue
    C. Priority Queue
    D. Linked List
    Answer: C

44. ───────────────────────

45.*9. In A search, the evaluation function is given by:**

46. A. f(n)=g(n)f(n) = g(n)f(n)=g(n)
    B. f(n)=h(n)f(n) = h(n)f(n)=h(n)
    C. f(n)=g(n)+h(n)f(n) = g(n) + h(n)f(n)=g(n)+h(n)
    D. f(n)=g(n)−h(n)f(n) = g(n) - h(n)f(n)=g(n)−h(n)
    Answer: C

47. ───────────────────────

48.*10. The A algorithm is considered optimal because:**

49. A. It explores all paths
    B. It uses both cost and heuristic functions
    C. It ignores redundant paths
    D. It expands the entire search tree
    Answer: B

50. ───────────────────────

51.*11. The AO algorithm is used in problems where:**

52. A. There are no sub-problems
    B. Problems can be reduced to independent sub-problems
    C. Backtracking is not required
    D. Only depth-first search is possible
    Answer: B

53. ───────────────────────

54.12. Which of the following is NOT a property of the Hill Climbing algorithm?

55. A. It uses a greedy approach
    B. It allows backtracking
    C. It uses a state-space representation
    D. It is a local search algorithm
    Answer: B

56. ───────────────────────

57.13. What is the main drawback of the Hill Climbing algorithm?

58. A. It is too slow
    B. It requires a heuristic function
    C. It can get stuck in local maxima
    D. It requires a large amount of memory
    Answer: C

59. ───────────────────────

60. 14. Which of the following is an example of a constraint satisfaction problem?

61. A. Traveling Salesman Problem

B. Cryptarithmetic Puzzle

C. Tower of Hanoi

D. Sudoku

Answer: B

62.

63. 15. In Hill Climbing, which type evaluates all neighbors before choosing a move?

64. A. Simple Hill Climbing

B. Steepest Ascent Hill Climbing

C. Randomized Hill Climbing

D. Backtracking Hill Climbing

Answer: B

65.

66. 16. What does the Means-End Analysis focus on?

67. A. Reducing constraints

B. Comparing the current state with the goal

C. Exploring all possible paths

D. Minimizing the heuristic function

Answer: B

68.

69. 17. The state-space diagram for Hill Climbing represents:

70. A. State vs Cost function

B. State vs Objective function

C. Time vs State

D. State vs Heuristic function

Answer: B

71.

72. *18. In A search, what does $g(n)g(n)g(n)$ represent?*

73. A. Estimated cost to reach the goal from node nnn

B. Actual cost to reach the node nnn from the start

C. Heuristic cost to the goal

D. Random cost assigned to the node

Answer: B

74.

75. *19. The AO algorithm stops when:*

76. A. All nodes are visited

B. The start node is marked as SOLVED

C. All paths are traversed

D. The heuristic value becomes zero

Answer: B

77.

78. 20. In Constraint Satisfaction, which step comes first?

79. A. Adding new constraints

B. Searching for a solution

C. Propagating constraints

D. Testing solutions
Answer: C

80. Here are 15 multiple-choice questions (MCQs) based on the provided content, along with their answers:

81. ────────────────────────────────

82. **1. In Goal Stack Planning, which operator is used to place block A on block B?**
A) UNSTACK(A, B)
B) PICKUP(A)
C) STACK(A, B)
D) PUTDOWN(A)
Answer: C) STACK(A, B)

83. ────────────────────────────────

84. **2. What is the precondition for the UNSTACK(A, B) operator?**
A) CLEAR(A) Λ ARMEMPTY
B) ON(A, B) Λ CLEAR(A) Λ ARMEMPTY
C) HOLDING(A)
D) ONTABLE(A) Λ ARMEMPTY
Answer: B) ON(A, B) Λ CLEAR(A) Λ ARMEMPTY

85. ────────────────────────────────

86. **3. Which of the following is an advantage of reactive systems?**
A) Handles large search spaces
B) Operates robustly in poorly modeled domains
C) Generates long-term plans
D) Uses hierarchical task structures
Answer: B) Operates robustly in poorly modeled domains

87. ────────────────────────────────

88. **4. What is the purpose of constraint posting in planning?**
A) Eliminate irrelevant operators
B) Build up a plan incrementally
C) Optimize the total plan cost
D) Perform a depth-first search
Answer: B) Build up a plan incrementally

89. ────────────────────────────────

90. **5. What is the main feature of hierarchical planning?**
A) Handles goal interactions by interleaving
B) Postpones detailed steps until major steps are in place
C) Reacts to observable situations
D) Focuses on linear sequence planning
Answer: B) Postpones detailed steps until major steps are in place

91. ────────────────────────────────

92. **6. In the Blocks World, what is the DELETE list for the STACK(A, B) operator?**
A) CLEAR(A) Λ HOLDING(A)
B) ARMEMPTY Λ CLEAR(B)
C) HOLDING(A) Λ CLEAR(B)
D) ON(A, B) Λ CLEAR(A)
Answer: C) HOLDING(A) Λ CLEAR(B)

93. ────────────────────────────────

94. **7. What is a nonlinear plan?**
A) A plan with a single linear sequence of actions
B) A plan that avoids any sub-goal interactions

C) A plan that considers multiple sub-problems simultaneously

D) A plan with minimal criticality value

Answer: C) A plan that considers multiple sub-problems simultaneously

95. ───────────────────────────────

96. **8. Which property distinguishes state space search from constraint posting search?**

A) Use of operators

B) Plan representation in series of state transitions

C) Focus on goal stack

D) Dependence on knowledge base

Answer: B) Plan representation in series of state transitions

97. ───────────────────────────────

98. **9. What is an example of a reactive system?**

A) A hierarchical planner

B) A thermostat

C) A chess-playing AI

D) A nonlinear goal planner

Answer: B) A thermostat

99. ───────────────────────────────

100. **10. What is the primary purpose of alpha-beta pruning in game playing?**

A) Generate all possible moves

B) Simplify planning hierarchy

C) Optimize state space traversal

D) Eliminate unnecessary branches in search

Answer: D) Eliminate unnecessary branches in search

101. ───────────────────────────────

102. **11. What is the main idea of constraint posting in planning?**

A) Linear arrangement of sub-goals

B) Focus on short-term goals

C) Incremental hypothesis of operators and bindings

D) Avoidance of goal interleaving

Answer: C) Incremental hypothesis of operators and bindings

103. ───────────────────────────────

104. **12. What differentiates reactive systems from traditional planners?**

A) Use of hierarchical actions

B) Selection of actions based on observable situations

C) Dependence on a precomputed plan

D) Incorporation of macro operators

Answer: B) Selection of actions based on observable situations

105. ───────────────────────────────

106. **13. In hierarchical planning, what reflects the intrinsic difficulty of achieving conditions?**

A) Constraint ordering

B) Criticality value

C) Goal stack depth

D) Operator complexity

Answer: B) Criticality value

107. ───────────────────────────────

108. **14. Which operator is used to put block A on the table?**

A) UNSTACK(A, B)

B) PICKUP(A)
C) PUTDOWN(A)
D) STACK(A, B)
Answer: C) PUTDOWN(A)

109.

110. **15. What is a feature of hierarchical planning?**
A) Stores plan in a single node
B) Focuses on nonlinear plans
C) Uses a hierarchy of major and minor steps
D) Handles all goal orderings simultaneously
Answer: C) Uses a hierarchy of major and minor steps

1. **What is the primary goal of game playing in AI?**
   a) To test hardware efficiency
   b) To create interactive interfaces
   c) To solve problems using straightforward search
   d) To simplify rule-based algorithms
   Answer: c) To solve problems using straightforward search

2. **What is the function of a plausible-move generator in game playing?**
   a) To generate all possible moves
   b) To generate only promising moves
   c) To evaluate the game's outcome
   d) To prune irrelevant nodes
   Answer: b) To generate only promising moves

3. **Which algorithm is most commonly used in game-playing AI?**
   a) Breadth-first search
   b) Dijkstra's algorithm
   c) Minimax
   d) Genetic algorithm
   Answer: c) Minimax

4. **In the Minimax algorithm, what does the MIN player attempt to do?**
   a) Maximize the utility value
   b) Minimize the utility value
   c) Generate all possible moves
   d) Stop the search early
   Answer: b) Minimize the utility value

5. **What is the main purpose of alpha-beta pruning?**
   a) To add more nodes to the game tree

b) To evaluate every possible move
c) To reduce the number of nodes to be evaluated
d) To simplify rule-based algorithms
Answer: c) To reduce the number of nodes to be evaluated

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6. **What is the initial value of Alpha in alpha-beta pruning?**
   a) 0
   b) $+\infty$
   c) $-\infty$
   d) Undefined
   Answer: c) $-\infty$

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7. **Which of the following is NOT a factor that affects when the recursive Minimax procedure stops?**
   a) Time left
   b) Stability of the configuration
   c) Total nodes generated
   d) Depth of ply explored
   Answer: c) Total nodes generated

---

8. **What does the STATIC function in the Minimax algorithm do?**
   a) Generates plausible moves
   b) Returns the utility value of a position
   c) Prunes irrelevant branches
   d) Computes heuristic bounds
   Answer: b) Returns the utility value of a position

---

9. **What is one key advantage of game refinement theory?**
   a) Ensuring win conditions in games
   b) Measuring the attractiveness of a game
   c) Simplifying game rules
   d) Optimizing game trees
   Answer: b) Measuring the attractiveness of a game

---

10. **Which AI system uses planning combined with deep learning for move selection?**
    a) AlphaZero
    b) AlphaGO
    c) DALL-E
    d) Watson
    Answer: b) AlphaGO

11. **What is the role of heuristic knowledge in game-playing programs?**
    a) To increase branching factors
    b) To improve search efficiency
    c) To eliminate winning conditions
    d) To reduce tree depth
    Answer: b) To improve search efficiency

12. **What type of planning involves breaking down goals into sub-goals?**
    a) Reactive planning
    b) Hierarchical planning
    c) Goal stack planning
    d) Non-linear planning
    Answer: b) Hierarchical planning

13. **Which of the following is a key component of a planning system?**
    a) Random selection of rules
    b) Execution without computation
    c) Identifying differences between current and goal states
    d) Generating infinite moves
    Answer: c) Identifying differences between current and goal states

14. **What does a game tree's depth and branching factor influence?**
    a) The static evaluation function
    b) The overall complexity of the search
    c) The legality of moves
    d) The initial utility values
    Answer: b) The overall complexity of the search

15. **Which concept in planning refers to finding procedural actions for a given system?**
    a) Game refinement
    b) Planning optimization
    c) Automated planning
    d) Static evaluation
    Answer: c) Automated planning

16. **1. Which reasoning approach is based on manipulating elementary symbols?**
    A. Statistical Reasoning
    B. Symbolic Reasoning
    C. Fuzzy Logic Reasoning

D. Probabilistic Reasoning
Answer: B. Symbolic Reasoning

17. ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

18. **2. What does the Λ symbol represent in logical reasoning?**
    A. Or
    B. Implies
    C. And
    D. Not
    Answer: C. And

19. ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

20. **3. Which probability measures the likelihood of one event given another?**
    A. Marginal Probability
    B. Joint Probability
    C. Conditional Probability
    D. Total Probability
    Answer: C. Conditional Probability

21. ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

22. **4. Bayes' Theorem helps compute which type of probability?**
    A. Joint Probability
    B. Conditional Probability
    C. Marginal Probability
    D. Posterior Probability
    Answer: D. Posterior Probability

23. ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

24. **5. In a Bayesian Network, what do the edges of a directed acyclic graph represent?**
    A. Random Variables
    B. Conditional Dependencies
    C. Events
    D. Independent Variables
    Answer: B. Conditional Dependencies

25. ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

26. **6. What does the Certainty Factor range from in some systems?**
    A. 0 to 1
    B. -1 to 0
    C. -1 to +1
    D. 0 to 100
    Answer: C. -1 to +1

27. ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

28. **7. In Dempster-Shafer Theory, what does Belief (Bel) measure?**
    A. Probability of the event
    B. Strength of evidence in favor of a set
    C. Plausibility of the hypothesis
    D. Certainty of truth
    Answer: B. Strength of evidence in favor of a set

29. ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

30. **8. Which value in fuzzy logic represents "completely true"?**
    A. 0
    B. 1
    C. 0.5

D. -1
Answer: B. 1

31. ────────────────────────────
32. **9. What is the primary purpose of fuzzy logic?**
A. Represent probabilistic relationships
B. Manage degrees of truth
C. Represent symbolic logic
D. Determine certainties
Answer: B. Manage degrees of truth

33. ────────────────────────────
34. **10. Which AI application uses Certainty Factors for evaluating symptoms?**
A. Risk Analysis
B. Fraud Detection
C. Medical Diagnosis
D. NLP Applications
Answer: C. Medical Diagnosis

35. ────────────────────────────
36. **11. What is the key principle of statistical reasoning?**
A. Assign probabilities to uncertain outcomes
B. Assign membership values
C. Represent knowledge using linguistic variables
D. Manipulate elementary symbols
Answer: A. Assign probabilities to uncertain outcomes

37. ────────────────────────────
38. **12. What does the acronym NLP stand for in AI?**
A. Neural Linguistic Processing
B. Natural Language Processing
C. Natural Learning Paradigm
D. Neural Logical Programming
Answer: B. Natural Language Processing

39. ────────────────────────────
40. **13. Which of these is a probabilistic graphical model?**
A. Fuzzy Network
B. Bayesian Network
C. Certainty Network
D. Logical Network
Answer: B. Bayesian Network

41. ────────────────────────────
42. **14. What is the primary difference between Belief and Plausibility in DST?**
A. Belief measures certainty; Plausibility measures possibility
B. Belief measures probability; Plausibility measures uncertainty
C. Belief uses evidence; Plausibility ignores evidence
D. Belief is always greater than Plausibility
Answer: A. Belief measures certainty; Plausibility measures possibility

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44. **15. What does fuzzy logic replace in traditional Boolean logic?**
A. True and False values
B. And, Or, Not operators
C. Crisp Membership with Degrees of Membership

D. Binary Decision Trees
Answer: C. Crisp Membership with Degrees of Membership

45. ————————————————

46. **16. Which application of NLP involves correcting typographical errors?**

A. Translation
B. Parsing
C. Spell Checking
D. Speech Recognition
Answer: C. Spell Checking

47. ————————————————

48. **17. Which formula represents Bayes' Theorem?**

A. P(A|B)=P(A)+P(B)P(A,B)P(A|B) = \frac{P(A) + P(B)}{P(A, B)}P(A|B)=P(A,B)P(A)+P(B)
B. P(A|B)=P(A)·P(B|A)P(B)P(A|B) = \frac{P(A) \cdot P(B|A)}{P(B)}P(A|B)=P(B)P(A)·P(B|A)
C. P(A|B)=P(B|A)P(B)P(A|B) = \frac{P(B|A)}{P(B)}P(A|B)=P(B)P(B|A)
D. P(A|B)=P(A)·P(B)P(A|B) = P(A) \cdot P(B)P(A|B)=P(A)·P(B)
Answer: B. P(A|B)=P(A)·P(B|A)P(B)P(A|B) = \frac{P(A) \cdot P(B|A)}{P(B)}P(A|B)=P(B)P(A)·P(B|A)

49. ————————————————

50. **18. In a Bayesian Network, what do nodes represent?**

A. Probabilities
B. Random Variables
C. Conditional Dependencies
D. Events
Answer: B. Random Variables

51. ————————————————

52. **19. Which AI approach is least related to uncertainty handling?**

A. Symbolic Reasoning
B. Fuzzy Logic Reasoning
C. Probabilistic Reasoning
D. Statistical Reasoning
Answer: A. Symbolic Reasoning

53. ————————————————

54. **20. Which probabilistic reasoning approach deals with joint probabilities?**

A. Fuzzy Logic
B. Dempster-Shafer Theory
C. Bayesian Networks
D. Symbolic Reasoning
Answer: C. Bayesian Networks

55. ————————————————

56. **21. What is the role of membership functions in fuzzy logic?**

A. Represent exact values
B. Determine degrees of membership
C. Quantify uncertainty
D. Handle missing data
Answer: B. Determine degrees of membership

57. ————————————————

58. **22. Which reasoning type uses predicate logic?**

A. Symbolic Reasoning

B. Statistical Reasoning
C. Fuzzy Logic
D. Bayesian Reasoning
Answer: A. Symbolic Reasoning

59. ───────────────────────────
60. **23. The conditional probability formula is symmetric. True or False?**
Answer: False

61. ───────────────────────────
62. **24. Dempster-Shafer Theory uses what function to measure beliefs?**
A. Plausibility Function
B. Probability Function
C. Belief Function
D. Certainty Function
Answer: C. Belief Function

63. ───────────────────────────
64. **25. Which device commonly uses fuzzy logic?**
A. Smartphones
B. Washing Machines
C. Laptops
D. Servers
Answer: B. Washing Machines

65. ───────────────────────────
66. **26. What does statistical reasoning help with?**
A. Exact inference
B. Uncertainty quantification
C. Membership management
D. Symbolic relationships
Answer: B. Uncertainty quantification

67. ───────────────────────────
68. **27. Certainty Factors can range from 0 to 1. True or False?**
Answer: True

69. ───────────────────────────
70. **28. Bayesian Networks can be used for all the following except?**
A. Anomaly Detection
B. Decision Making
C. Symbolic Manipulation
D. Prediction
Answer: C. Symbolic Manipulation

71. ───────────────────────────
72. **29. Which probabilistic reasoning approach uses the chain rule?**
A. Fuzzy Logic
B. Bayesian Networks
C. Certainty Factor
D. Dempster-Shafer Theory
Answer: B. Bayesian Networks

73. ───────────────────────────
74. **30. What is the primary objective of Natural Language Processing?**
A. Generating Reports
B. Understanding Human Language
C. Performing Arithmetic Calculations

D. Managing Databases

1. In Goal Stack Planning, which operator is used to place block A on block B?
A) UNSTACK(A, B)
B) PICKUP(A)
C) STACK(A, B)
D) PUTDOWN(A)
Answer: C) STACK(A, B)

---

2. What is the precondition for the UNSTACK(A, B) operator?
A) CLEAR(A) ∧ ARMEMPTY
B) ON(A, B) ∧ CLEAR(A) ∧ ARMEMPTY
C) HOLDING(A)
D) ONTABLE(A) ∧ ARMEMPTY
Answer: B) ON(A, B) ∧ CLEAR(A) ∧ ARMEMPTY

---

3. Which of the following is an advantage of reactive systems?
A) Handles large search spaces
B) Operates robustly in poorly modeled domains
C) Generates long-term plans
D) Uses hierarchical task structures
Answer: B) Operates robustly in poorly modeled domains

---

4. What is the purpose of constraint posting in planning?
A) Eliminate irrelevant operators
B) Build up a plan incrementally
C) Optimize the total plan cost
D) Perform a depth-first search
Answer: B) Build up a plan incrementally

---

5. What is the main feature of hierarchical planning?
A) Handles goal interactions by interleaving
B) Postpones detailed steps until major steps are in place
C) Reacts to observable situations
D) Focuses on linear sequence planning
Answer: B) Postpones detailed steps until major steps are in place

6. In the Blocks World, what is the DELETE list for the STACK(A, B) operator?
A) CLEAR(A) ∧ HOLDING(A)
B) ARMEMPTY ∧ CLEAR(B)
C) HOLDING(A) ∧ CLEAR(B)
D) ON(A, B) ∧ CLEAR(A)
Answer: C) HOLDING(A) ∧ CLEAR(B)

---

7. What is a nonlinear plan?
A) A plan with a single linear sequence of actions
B) A plan that avoids any sub-goal interactions
C) A plan that considers multiple sub-problems simultaneously
D) A plan with minimal criticality value
Answer: C) A plan that considers multiple sub-problems simultaneously

---

8. Which property distinguishes state space search from constraint posting search?
A) Use of operators
B) Plan representation in series of state transitions
C) Focus on goal stack
D) Dependence on knowledge base
Answer: B) Plan representation in series of state transitions

---

9. What is an example of a reactive system?
A) A hierarchical planner
B) A thermostat
C) A chess-playing AI
D) A nonlinear goal planner
Answer: B) A thermostat

---

10. What is the primary purpose of alpha-beta pruning in game playing?
A) Generate all possible moves
B) Simplify planning hierarchy
C) Optimize state space traversal
D) Eliminate unnecessary branches in search
Answer: D) Eliminate unnecessary branches in search

---

11. What is the main idea of constraint posting in planning?
A) Linear arrangement of sub-goals
B) Focus on short-term goals
C) Incremental hypothesis of operators and bindings

D) Avoidance of goal interleaving
Answer: C) Incremental hypothesis of operators and bindings

---

12. What differentiates reactive systems from traditional planners?
A) Use of hierarchical actions
B) Selection of actions based on observable situations
C) Dependence on a precomputed plan
D) Incorporation of macro operators
Answer: B) Selection of actions based on observable situations

---

13. In hierarchical planning, what reflects the intrinsic difficulty of achieving conditions?
A) Constraint ordering
B) Criticality value
C) Goal stack depth
D) Operator complexity
Answer: B) Criticality value

---

14. Which operator is used to put block A on the table?
A) UNSTACK(A, B)
B) PICKUP(A)
C) PUTDOWN(A)
D) STACK(A, B)
Answer: C) PUTDOWN(A)

---

15. What is a feature of hierarchical planning?
A) Stores plan in a single node
B) Focuses on nonlinear plans
C) Uses a hierarchy of major and minor steps
D) Handles all goal orderings simultaneously
Answer: C) Uses a hierarchy of major and minor steps

---

1. **What is the primary goal of game playing in AI?**
   a) To test hardware efficiency
   b) To create interactive interfaces
   c) To solve problems using straightforward search
   d) To simplify rule-based algorithms
   Answer: c) To solve problems using straightforward search

2. **What is the function of a plausible-move generator in game playing?**
   a) To generate all possible moves
   b) To generate only promising moves
   c) To evaluate the game's outcome
   d) To prune irrelevant nodes
   Answer: b) To generate only promising moves

3. **Which algorithm is most commonly used in game-playing AI?**
   a) Breadth-first search
   b) Dijkstra's algorithm
   c) Minimax
   d) Genetic algorithm
   Answer: c) Minimax

4. **In the Minimax algorithm, what does the MIN player attempt to do?**
   a) Maximize the utility value
   b) Minimize the utility value
   c) Generate all possible moves
   d) Stop the search early
   Answer: b) Minimize the utility value

5. **What is the main purpose of alpha-beta pruning?**
   a) To add more nodes to the game tree
   b) To evaluate every possible move
   c) To reduce the number of nodes to be evaluated
   d) To simplify rule-based algorithms
   Answer: c) To reduce the number of nodes to be evaluated

6. **What is the initial value of Alpha in alpha-beta pruning?**
   a) 0
   b) $+\infty$
   c) $-\infty$
   d) Undefined
   Answer: c) $-\infty$

7. **Which of the following is NOT a factor that affects when the recursive Minimax procedure stops?**
   a) Time left
   b) Stability of the configuration

c) Total nodes generated
d) Depth of ply explored
Answer: c) Total nodes generated

---

8. **What does the STATIC function in the Minimax algorithm do?**
   a) Generates plausible moves
   b) Returns the utility value of a position
   c) Prunes irrelevant branches
   d) Computes heuristic bounds
   Answer: b) Returns the utility value of a position

---

9. **What is one key advantage of game refinement theory?**
   a) Ensuring win conditions in games
   b) Measuring the attractiveness of a game
   c) Simplifying game rules
   d) Optimizing game trees
   Answer: b) Measuring the attractiveness of a game

---

10. **Which AI system uses planning combined with deep learning for move selection?**
    a) AlphaZero
    b) AlphaGO
    c) DALL-E
    d) Watson
    Answer: b) AlphaGO

---

11. **What is the role of heuristic knowledge in game-playing programs?**
    a) To increase branching factors
    b) To improve search efficiency
    c) To eliminate winning conditions
    d) To reduce tree depth
    Answer: b) To improve search efficiency

---

12. **What type of planning involves breaking down goals into sub-goals?**
    a) Reactive planning
    b) Hierarchical planning
    c) Goal stack planning
    d) Non-linear planning
    Answer: b) Hierarchical planning

---

13. **Which of the following is a key component of a planning system?**
    a) Random selection of rules
    b) Execution without computation
    c) Identifying differences between current and goal states
    d) Generating infinite moves
    Answer: c) Identifying differences between current and goal states

---

14. **What does a game tree's depth and branching factor influence?**
    a) The static evaluation function
    b) The overall complexity of the search
    c) The legality of moves
    d) The initial utility values
    Answer: b) The overall complexity of the search

---

15. **Which concept in planning refers to finding procedural actions for a given system?**
    a) Game refinement
    b) Planning optimization
    c) Automated planning
    d) Static evaluation
    Answer: c) Automated planning

---

1. Which reasoning approach is based on manipulating elementary symbols?
A. Statistical Reasoning
B. Symbolic Reasoning
C. Fuzzy Logic Reasoning
D. Probabilistic Reasoning
Answer: B. Symbolic Reasoning

---

2. What does the Λ symbol represent in logical reasoning?
A. Or
B. Implies
C. And
D. Not
Answer: C. And

---

3. Which probability measures the likelihood of one event given another?
A. Marginal Probability
B. Joint Probability
C. Conditional Probability

D. Total Probability
Answer: C. Conditional Probability

---

4. Bayes' Theorem helps compute which type of probability?
A. Joint Probability
B. Conditional Probability
C. Marginal Probability
D. Posterior Probability
Answer: D. Posterior Probability

---

5. In a Bayesian Network, what do the edges of a directed acyclic graph represent?
A. Random Variables
B. Conditional Dependencies
C. Events
D. Independent Variables
Answer: B. Conditional Dependencies

---

6. What does the Certainty Factor range from in some systems?
A. 0 to 1
B. -1 to 0
C. -1 to +1
D. 0 to 100
Answer: C. -1 to +1

---

7. In Dempster-Shafer Theory, what does Belief (Bel) measure?
A. Probability of the event
B. Strength of evidence in favor of a set
C. Plausibility of the hypothesis
D. Certainty of truth
Answer: B. Strength of evidence in favor of a set

---

8. Which value in fuzzy logic represents "completely true"?
A. 0
B. 1
C. 0.5
D. -1
Answer: B. 1

---

9. What is the primary purpose of fuzzy logic?
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B. Manage degrees of truth
C. Represent symbolic logic
D. Determine certainties
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---

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---

16. Which application of NLP involves correcting typographical errors?
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---

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---

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D. Dempster-Shafer Theory
Answer: B. Bayesian Networks

30. What is the primary objective of Natural Language Processing?
A. Generating Reports
B. Understanding Human Language
C. Performing Arithmetic Calculations
D. Managing Databases
Answer: B. Understanding Human Language

1. What is the primary goal of syntactic analysis in Natural Language Processing (NLP)?

A. Mapping words to a knowledge base
B. Translating text from one language to another

C. Building a structural description of a sentence
D. Resolving anaphora in discourse

Answer: C. Building a structural description of a sentence

---

2. What is the process of converting a flat list of words into a hierarchical structure in NLP called?

A. Semantic analysis
B. Parsing
C. Pragmatic processing
D. Morphological analysis

Answer: B. Parsing

---

3. Which level of linguistic processing deals with disambiguating words with multiple meanings?

A. Syntactic Analysis
B. Semantic Analysis
C. Discourse Integration
D. Pragmatic Analysis

Answer: B. Semantic Analysis

---

4. Anaphora resolution, such as identifying the entity referred to by a pronoun, is handled at which level?

A. Morphological Analysis
B. Syntactic Analysis
C. Discourse Integration
D. Pragmatic Analysis

Answer: C. Discourse Integration

---

5. Pragmatic analysis primarily focuses on which of the following?

A. Building parse trees for sentences
B. Deciding the intended effect of communication
C. Translating sentences to a different language
D. Identifying and resolving word meanings

Answer: B. Deciding the intended effect of communication

---

6. Sentiment analysis in NLP is used to:

A. Classify text into predefined categories
B. Translate text into another language
C. Analyze attitudes, behaviors, and emotional states
D. Summarize lengthy text documents

Answer: C. Analyze attitudes, behaviors, and emotional states

---

7. What is a common application of text classification in NLP?

A. Spell checking
B. Spam detection
C. Sentiment analysis
D. Machine translation

Answer: B. Spam detection

---

8. Which of the following is an example of a real-word error in spell checking?

A. Typing "hte" instead of "the"
B. Typing "flower" instead of "flour"
C. Using "peace" instead of "piece"
D. Typing "u" instead of "you"

Answer: B. Typing "flower" instead of "flour"

---

9. What is the main objective of text summarization in NLP?

A. Identifying the language of a text
B. Reducing text size while preserving its key elements
C. Detecting errors in spelling and grammar
D. Resolving anaphoric references

Answer: B. Reducing text size while preserving its key elements

---

10. What technique is commonly used for detecting errors in spell checking?

A. Sentiment analysis
B. Dictionary lookup
C. Text summarization
D. Anaphora resolution

Answer: B. Dictionary lookup