CP - MCQ1

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Instructions

- Each question has one and only one correct answer. Circle the corresponding letter.
- Grading: correct answer (1 pt), incorrect answer (-0.5 pt), no answer (0 pt).

1. A problem is classified as **NP-Hard** when:
   A. its resolution is always possible in polynomial time.
   (B.) its complexity increases exponentially with the size of the problem instance.
   C. there is no optimal solution.
   D. it is impossible to model the problem as constraints.

2. A constraint network consists of the following elements:
   A. variables, domains, and objective functions.
   B. only variables and domains.
   C. constraints and search heuristics.
   (D.) variables, domains, and constraints.

3. The separation between the model and the solver in CSP illustrates the principle of declarativity because:
   (A.) it allows the solver to impose specific constraints on the model.
   B. it requires the solver to know the implementation details of the model.
   C. it enables specifying "what to solve" independently of "how to solve it."
   D. it guarantees that the model is automatically optimal.

4. CSP is particularly suitable for:
   A. simple linear problems.
   (B.) complex combinatorial problems such as planning and optimization.
   C. intensive numerical calculations.
   D. solving statistical problems.

5. The size of the search space in a CSP is given by:

A. $|X|^{|D|}$.

(B) $|D|^{|X|}$.

C. $|D| + |X|$.

D. $|C| \times |D|$.

6. Backtracking (BT) is inefficient when:

A. domains are small and there are few constraints.

B. variables have compatible values.

(C) domains are large or constraints are numerous.

D. arcs are already consistent.

7. The primary goal of constraint propagation is to:

A. explore all possible instantiations.

(B) reduce domains to simplify the search.

C. eliminate valid solutions.

D. add additional constraints.

8. The main characteristic of the AC3 algorithm is:

(A) it makes every arc in the constraint graph consistent.

B. it directly finds a solution to the CSP.

C. it never modifies the variable domains.

D. it guarantees an optimal solution.

9. Forward Checking (FC):

(A) reduces the domains of uninstantiated variables after each assignment.

B. maintains arc consistency after each instantiation.

C. is more expensive than the MAC algorithm.

D. completely avoids backtracking.

10. Maintaining Arc Consistency (MAC) applies the algorithm:

(A) AC3 at each step of the search.

B. Forward Checking (FC) only before instantiation.

C. Branch-and-Bound (B&B) during the search.

D. no constraint propagation.