

Nature and Technology Intersection

Computer Science · Practice Test · 20 Questions

1. Which bio-inspired algorithm is based on the food-foraging behavior of social insect colonies to solve optimization problems?

- A) Ant Colony Optimization
- B) Beehive Sorting
- C) Butterfly Clustering
- D) Spider Web Mapping

2. In computing, what is the 'Stigmergy' mechanism often observed in nature and used in agent-based modeling?

- A) Genetic mutation
- B) Communication through environmental modification
- C) Predator-prey oscillations
- D) Photosynthesis regulation

3. What type of computer memory is inspired by the structure of biological neural networks found in animal brains?

- A) RAM
- B) ROM
- C) Artificial Neural Networks
- D) Flash memory

4. Which field uses DNA molecules as a medium to store and process digital data?

- A) Nanotechnology
- B) Bioinformatics
- C) DNA Computing
- D) Genomics

5. The 'Genetic Algorithm' is a search heuristic inspired by which natural process?

- A) Biological evolution
- B) Metamorphosis
- C) Hibernation
- D) Photosynthesis

6. What is the primary application of 'Swarm Intelligence' in modern computer science?

- A) Decentralized control of robotic systems
- B) Weather forecasting
- C) Managing animal migration
- D) Data encryption

7. In computer vision, the 'Canny edge detection' algorithm was developed by studying the visual processing in the nervous system of which animal?

- A) Human
- B) Frog
- C) Cat
- D) Octopus

8. Which natural phenomenon is used to model the 'Simulated Annealing' algorithm used for finding global optima?

- A) River erosion
- B) Crystal formation in cooling metals
- C) Volcanic eruptions
- D) Forest fires

9. What is the main computational goal of 'Boids', a program that simulates the flocking behavior of birds?

- A) Flight speed calculation
- B) Emergent behavior in multi-agent systems
- C) Animal migration tracking
- D) Avian speech recognition

10. Which animal's efficient navigation of complex terrain inspired the development of 'Bug Algorithms' in robotics?

- A) Ant
- B) Cockroach
- C) Spider
- D) Earthworm

11. In environmental informatics, what does the term 'Precision Agriculture' rely on to reduce chemical usage?

- A) Sensor-based data analysis
- B) Manual soil testing
- C) Crop rotation cycles
- D) Rainfall pattern history

12. The 'Artificial Immune System' (AIS) in computing is modeled after the defense mechanisms of which biological entities?

- A) Vertebrates
- B) Bacteria
- C) Fungi
- D) Viruses

13. Which tree-like data structure is commonly used to model hierarchical relationships in nature, such as biological classification?

- A) Stack
- B) Queue
- C) Tree
- D) Graph

14. What computational method is used to simulate the movement of schools of fish or clouds of insects?

- A) Particle Swarm Optimization
- B) Linear Regression
- C) Binary Search
- D) Depth-First Search

15. The 'Turing Test' has been adapted into 'Biometric identification' systems that utilize which unique natural biological patterns?

- A) Fingerprints and irises
- B) Animal skin color
- C) Plant leaf veins
- D) Cloud formations

16. What does the 'L-system' (Lindenmayer system) primarily simulate in computer graphics?

- A) Fractal growth of plants
- B) Animal camouflage
- C) Ocean current flow
- D) Erosion patterns

17. 'Energy harvesting' in wireless sensor networks is often designed to mimic which natural energy acquisition process?

- A) Photosynthesis
- B) Respiration
- C) Digestion
- D) Evaporation

18. Which algorithm is inspired by the foraging behavior of bacteria to find the global minimum of a function?

- A) Bacterial Foraging Optimization
- B) Viral Propagation Algorithm
- C) Fungal Network Analysis
- D) Coral Reef Search

19. 'Biometric authentication' systems often analyze behavioral patterns, such as the gait (walking style) of an animal or human, to verify what?

- A) Identity
- B) Species
- C) Diet
- D) Age

20. What data storage breakthrough is inspired by the way sea creatures like mollusks create calcium carbonate shells?

- A) Biomimetic material synthesis
- B) Optical disc storage
- C) Quantum computing
- D) Solid state drives