

Nature and Technology Intersection

Computer Science · Answer Key · 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