Introduction to Computer Science 1st edition Franchitti Test Bank

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Introduction to Computer Science

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Chapter 1: Introduction to Computer Science

Review Questions

Multiple Choice

1. Information science is an interdisciplinary field studying information technologies and systems as they relate to _____.

A. people, organizations, and networks
B. organizations, networks, and societies
C. people, organizations, and societies *
D. people, networks, and societies

LO: 01.2.3
Difficulty: Moderate
Bloom's: Understand

2. The demand for data scientists is becoming increasingly important as more and more research and business contexts involve analyzing _____, or very large datasets that are not easily processed using spreadsheets.

A. big data *
B. infinite data
C. super data sets
D. databases of databases

LO: 01.2.3
Difficulty: Difficult
Bloom's: Understand

3. What subset of artificial intelligence relies on algorithms and data to make it possible for artificial intelligence to learn by mimicking how humans learn?

A. image processing
B. machine intelligence
C. human machine processing
D. machine learning *

LO: 01.2.3
Difficulty: Moderate
Bloom's: Understand

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4. _____ refers to applying computing concepts and technologies to advance scientific research and practical applications of science knowledge.

A. Data science
B. Natural science
C. Computational science *
D. Theoretical science

LO: 01.2.3
Difficulty: Easy
Bloom's: Understand

5. You write a new software program that applies cutting-edge methods to solve a problem. The program you created is an example of _____.

A. discovery
B. invention *
C. innovation
D. new theorem

LO: 01.2.3
Difficulty: Difficult
Bloom's: Analyze

6. What subfield of computer science emphasizes how problems can be solved with computers as well as the practices and processes that can help people design more effective software solutions?

A. computer engineering
B. information sciences
C. data sciences
D. software engineering *

LO: 01.2.3
Difficulty: Easy
Bloom's: Understand

7. Memory in the ENIAC was implemented by _____.

A. transistors
B. vacuum tubes *
C. quantum qubits
D. wireless signals

LO: 01.1.1
Difficulty: Moderate
Bloom's: Understand

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8. What subfield of computer science emphasizes the social aspects of computation?
A. artificial intelligence
B. human factors engineering
C. human-computer interaction *
D. human thinking and theory

LO: 01.1.1
Difficulty: Easy
Bloom's: Understand

9. A computer program is the implementation of _____.
A. software
B. mathematics
C. algorithms *
D. theories

LO: 01.1.2
Difficulty: Easy
Bloom's: Understand

10. What term is defined as **"**AI algorithm architecture that emphasizes connections between artificial 'neurons' whose behavior and values change in response to stimulus or input"?
A. machine learning
B. image processing
C. human intelligence analysis
D. neural network *

LO: 01.3.1
Difficulty: Easy
Bloom's: Understand

11. What piece of hardware is deemed the computer's brain?
A. memory
B. processor *
C. storage
D. network

LO: 01.3.1
Difficulty: Easy
Bloom's: Remember

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12. You use artificial intelligence to develop a new model that finds a completely new phenomenon in physics. The new model is an example of _____.
A. discovery *
B. invention
C. innovation
D. human-computing output

LO: 01.2.3
Difficulty: Difficult
Bloom's: Analyze

13. In a self-driving car, the ability to recognize that a traffic light has turned from green to yellow and then from yellow to red is an example of _____.
A. human intelligence
B. image processing *
C. networking applications
D. computational invention

LO: 01.3.1
Difficulty: Easy
Bloom's: Remember

14. Which of the following is a subfield of computer systems?
A. theory of computation
B. information representation
C. distributed computing *
D. software engineering

LO: 01.2.3
Difficulty: Moderate
Bloom's: Remember

15. What field of computer science focuses on the mathematical processes behind software?
A. artificial intelligence
B. machine learning
C. theoretical computer science *
D. applied computer science

LO: 01.2.3
Difficulty: Moderate
Bloom's: Understand

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True/False

16. True or false? By contributing tools and resources to handle tasks and improve operations, computer science enables many other fields and areas of research and development.

Answer: True

LO: 01.2.3
Difficulty: Moderate
Bloom's: Understand

17. True or false? Artificial intelligence is not a field in computer science; it is a field in psychology, as it involves human-like thinking and learning

Answer: False. While AI involves mimicking aspects of human cognition, it is fundamentally rooted in algorithms, programming, and computational techniques. Psychology may contribute insights into human cognition and behavior that inform AI development, but AI itself is not classified as a field of psychology.

LO: 01.2.3
Difficulty: Difficult
Bloom's: Understand

18. True or false? Artificial intelligence was used heavily during the SARS-CoV-2 outbreak to assist in mass production of vaccines.

Answer: True

LO: 01.3.3
Difficulty: Easy
Bloom's: Understand

19. True or false? All new advancements in technology are always positive and never have negative consequences.

Answer: False. While new advancements in technology often bring benefits such as improved efficiency, connectivity, and innovation, they can also have negative consequences. For example, technological advancements can lead to ethical concerns (e.g., privacy violations with surveillance technology), environmental harm (e.g., e-waste), social issues (e.g., digital addiction or misinformation), and job displacement due to automation.

LO: 01.3.3
Difficulty: Easy
Bloom's: Understand

20. True or false? The ENIAC was the first recognized computer.

Answer: False. It was the first general computer, meaning it could run more than one program.

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LO: 01.1.1
Difficulty: Moderate
Bloom's: Understand

Identification

For questions 21–25, use the following choices.

A. data science
B. information science
C. technological fix
D. software engineering
E. social determination of technology

21. The idea that technologies can solve social problems, but now often used to critique blind faith in technological solutions to human problems
Answer: C. technological fix

LO: 01.3.3
Difficulty: Difficult
Bloom's: Understand

22. The belief that technologies are inherently neutral and that it is the people who use a technology who ultimately make it "good" or "bad"
Answer: E. social determination of technology

LO: 01.3.3
Difficulty: Moderate
Bloom's: Understand

23. Interdisciplinary field studying information technologies and systems as they relate to people, organizations, and societies
Answer: B. information science

LO: 01.2.3
Difficulty: Easy
Bloom's: Understand

24. Subfield of computer science that emphasizes how problems can be solved with computers, as well as the practices and processes that can help people design more effective software solutions
Answer: D. software engineering

LO: 01.2.3

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Difficulty: Moderate
Bloom's: Understand

25. Interdisciplinary field that applies computing toward managing data and extracting information from data
Answer: A. data science

LO: 01.2.3
Difficulty: Easy
Bloom's: Understand

Fill in the Blank

26. To ensure that treatments were safe and effective during the SARS-CoV-2 outbreak, clinical trials were held at disease transmission "hot spots" predicted using _____ methods that drew on data aggregated and monitored from across the world.
Answer: data science

LO: 01.3.3
Difficulty: Difficult
Bloom's: Understand

27. Purposefully injecting inaccurate or bad data as an input into a system to cause the system to crash is an example of a(n) _____.
Answer: adversarial attack

LO: 01.3.2
Difficulty: Moderate
Bloom's: Understand

28. A system that can learn to recognize similar patterns that appear across millions or billions of sample images is an example of a(n) _____.
Answer: neural network

LO: 01.3.1
Difficulty: Moderate
Bloom's: Understand

29. _____ design, analyze, and evaluate computational structures, systems, and processes.
Answer: Computer scientists

LO: 01.2.1
Difficulty: Easy

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Bloom's: Understand

30. Advancements in natural sciences are recognized as discoveries, while advancements in _____ are considered inventions.

Answer: engineering

LO: 01.2.1
Difficulty: Easy
Bloom's: Understand

Short Answer Questions

31. What was the first recognized computing device, and how did it allow arithmetic operations to be performed?

Sample Answer: The abacus was the first calculator, which is a type of computing device. It used beads that could be pushed along a rod to represent numbers and then manipulated to perform arithmetic operations.

LO: 01.1.1
Difficulty: Moderate
Bloom's: Understand

32. What was the first general-purpose computer, and why was it considered the first?

Sample Answer: The ENIAC is notable in computer history because it was the first general-purpose computer, meaning that it could run not just a single program but rather any program specified by a programmer.

LO: 01.1.1
Difficulty: Moderate
Bloom's: Understand

33. What is an algorithm?

Sample Answer: An algorithm is a sequence of precise instructions that enables computing.

LO: 01.1.2
Difficulty: Easy
Bloom's: Understand

34. What is a neural network?

Sample Answer: A neural network is an AI algorithm architecture that emphasizes connections between artificial nerve cells whose behavior and values change in response to a stimulus or input.

LO: 01.1.2

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Difficulty: Difficult
Bloom's: Understand

35. Explain what data science is.
Sample Answer: Data science is an interdisciplinary field that applies computing to the problems of managing data and extracting information from data.

LO: 01.2.3
Difficulty: Easy
Bloom's: Understand

36. Identify at least eight subfields of computer science.
Sample Answers :

- Theoretical computer science
- Theory of computation
- Information representation
- Data structures and algorithms
- Programming language and formal methods
- Computer systems
- Architecture
- Artificial intelligence
- Networks
- Security
- Databases
- Distributed computing
- Graphics
- Applied computer science
- Scientific computing
- Human-computer interaction
- Software engineering

LO: 01.2.4
Difficulty: Easy
Bloom's: Understand

Long Answer Questions

37. Provide and explain an example of a negative consequence of technology.
Sample Answer: An adversarial attack is when a sample input is purposefully injected into a system to cause problems. Specifically in neural networks, existing images can be altered, or new images can be used to trick the image-recognition algorithms into acting in unknown ways. In systems such as self-driving cars, the safety risk to passengers in the car, passengers in other cars, and pedestrians nearby is extremely high.

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LO: 01.3.3
Difficulty: Moderate
Bloom's: Analyze

38. Provide and explain an example of how technology has benefited society.
Sample Answer: In 2020, the SARS-CoV-2 outbreak occurred. The healthcare industry was rapidly overwhelmed, as there were no medical treatments or cures for this new virus. Artificial intelligence, modeling, and simulations were used in a variety of ways, including cutting-edge research to develop a vaccine and analysis of logistical factors relevant to mass vaccination of the public in a very short amount of time.

LO: 01.3.3
Difficulty: Moderate
Bloom's: Analyze

39. Explain how the field of computer science involves mathematics, science, and engineering.
Sample Answer:

- Mathematics plays a key role in theoretical computer science, which emphasizes how a computational problem can be defined in mathematical terms and whether that mathematical problem can be efficiently solved with a computer.
- Engineering plays a key role in software engineering, which emphasizes how problems can be solved with computers and what practices and processes can help people design more effective software solutions.
- Science plays a key role in human-computer interaction, which emphasizes experimentation and evaluation of the interface (boundary) between humans and computers, often toward designing better computer systems.

LO: 01.2.2
Difficulty: Difficult
Bloom's: Analyze

40. Identify and explain the four pillars of modern computer hardware.
Sample Answer:

1. The processor can be regarded as the computer's "brain," as it follows instructions from algorithms and processes data.
2. The memory is a means of storing information in consistent locations in a computer.
3. The network refers to the various technological devices that are connected and that share information.
4. The storage consists of the hardware and physical components of a computer that permanently house the computer's data.

LO: 01.1.1
Difficulty: Easy

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Bloom's: Analyze

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