

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Answer Key: Conquer the Matrix: High Stakes 11th Grade AI Architecture Quiz

Analyze neural pathways and machine learning logistics across 10 challenging prompts to prove your mastery of modern computational intelligence.

**1. In the context of Supervised Learning, which term best describes the 'ground truth' labels used to train a model to recognize specific patterns, such as identifying credit card fraud?**

**Answer:** B) Target Variables

Target variables are the specific outputs the model is being trained to predict based on input features in a supervised dataset.

**2. True or False: In a Recurrent Neural Network (RNN), the model possesses a 'memory' feature that allows previous outputs to be used as inputs, making it ideal for sequential data like time-series forecasting.**

**Answer:** A) True

Unlike standard feed-forward networks, RNNs have loops that allow information to persist, which is essential for understanding sequences.

**3. When an AI model performs exceptionally well on training data but fails to generalize to new, unseen data, it is experiencing a phenomenon known as \_\_\_\_\_.**

**Answer:** C) Overfitting

Overfitting occurs when a model learns the 'noise' in the training data rather than the actual underlying patterns, harming its predictive power for new data.

**4. Which specific architectural innovation allowed Transformer models to process entire sequences of text simultaneously rather than word-by-word?**

**Answer:** B) Self-Attention Mechanisms

Self-attention allows the model to weigh the importance of different words in a sentence regardless of their distance from each other.

**5. True or False: Reinforcement Learning relies primarily on pre-labeled datasets containing the correct answers for every possible scenario the agent might encounter.**

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**Answer:** B) False

Reinforcement Learning relies on a system of rewards and punishments through trial and error, not labeled datasets.

**6. In the hierarchy of AI, a system designed to perform a singular, specific task—such as AlphaGo playing a board game—is classified as \_\_\_\_\_ AI.**

**Answer:** B) Narrow

Narrow (or Weak) AI is specialized for one task, whereas General AI would possess the ability to apply intelligence to any problem like a human.

**7. Which of the following describes the role of 'Weights' within an artificial neural network layer?**

**Answer:** B) They adjust the importance of input signals during the learning process.

Weights are numerical values that the model adjusts to minimize error, determining how much influence a piece of data has on the output.

**8. The use of AI to analyze satellite imagery to predict crop yields for global food security is an example of \_\_\_\_\_, an application focusing on pattern recognition in visual data.**

**Answer:** B) Computer Vision

Computer Vision is the field of AI that trains computers to interpret and understand the visual world from digital images and videos.

**9. True or False: The 'Turing Test' is a benchmark used to determine if a machine can simulate human-like conversation effectively enough to fool a human evaluator.**

**Answer:** A) True

Proposed by Alan Turing in 1950, this test evaluates a machine's ability to exhibit intelligent behavior equivalent to, or indistinguishable from, that of a human.

**10. When an AI researcher refers to 'Black Box' AI, they are highlighting a specific challenge related to:**

**Answer:** B) The difficulty in explaining exactly how a model reached a specific conclusion.

Complexity in deep learning often creates a 'Black Box' where the decision-making process is not transparent to humans, raising issues of interpretability and ethics.