

## Silicon Synapse Expedition: 9th Grade Neural Architecture Quiz

Deconstruct backpropagation, ethical alignment, and gradient descent through high-level synthesis of modern deep learning frameworks.

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**1. In the context of training a Generative Adversarial Network (GAN), what occurs during the 'minimax' game between the Generator and the Discriminator?**

- A. They cooperate to reduce the computational overhead of the GPU.
- B. The Generator tries to maximize the probability of the Discriminator making a mistake.
- C. The Discriminator attempts to generate new data samples based on noise.
- D. Both networks use supervised labels to identify categorical errors.

**2. The process of \_\_\_\_\_ involves an AI model adjusting its internal weights based on the error rate of its previous output to improve accuracy.**

- A. Data Augmentation
- B. Backpropagation
- C. Linear Regression
- D. Tokenization

**3. Underfitting occurs when a machine learning model is so complex that it captures the 'noise' in the training data rather than the underlying pattern.**

- A. True
- B. False

**4. How does the 'Attention Mechanism' in a Transformer architecture function differently than a standard Recurrent Neural Network (RNN)?**

- A. It processes words one by one in a strictly chronological sequence.
- B. It ignores the context of surrounding words to save memory.
- C. It allows the model to weigh the importance of different parts of the input data regardless of distance.
- D. It prevents the model from understanding long-range dependencies.

**5. A concept known as \_\_\_\_\_ refers to the lack of transparency in how deep learning models make decisions, making them difficult for humans to interpret.**

- A. Open Source
- B. Bluelining
- C. Black Box
- D. Edge Computing

**6. Which of these scenarios best illustrates 'Reinforcement Learning from Human Feedback' (RLHF)?**

- A. Labeling 10,000 photos of cats and dogs to train a classifier.

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- B. A human ranking multiple AI responses to help the model align with human preferences.
- C. An AI scraping the entire internet to find grammar rules.
- D. A programmer writing 'If-Then' statements to control a robot.

**7. Edge AI refers to processing artificial intelligence algorithms locally on a device rather than in a centralized cloud server.**

- A. True
- B. False

**8. In AI ethics, the 'Alignment Problem' specifically focuses on which of the following challenges?**

- A. The physical speed of the processors running the AI.
- B. The cost of electricity required for data centers.
- C. Ensuring the AI's goals and behaviors match human values and intentions.
- D. Increasing the size of the training dataset to include more languages.

**9. A \_\_\_ is a specific type of neural network layer that uses mathematical filters to identify spatial hierachies in visual data, like edges and shapes.**

- A. Convolutional Layer
- B. Recursive Layer
- C. Storage Layer
- D. Binary Layer

**10. Transfer Learning allows an AI to apply knowledge gained from solving one problem to a different but related problem.**

- A. True
- B. False