



Module 2 – Practice Questions

Q1. In one sentence, what problem does a **perceptron** solve?

Q2. What are the three main components of a perceptron?

Q3. Is perceptron a classifier or a regressor? Explain briefly.

Q4. Why do we need to update weights in a perceptron?

Q5. What happens if we never update the weights during training?

Q6. Which two quantities decide **how much** the weight changes?

Q7. What does the term $(y - \hat{y})$ represent in perceptron learning?

Q8. If the prediction is correct, will weights change? Why?

Q9. What role does the learning rate (η) play intuitively?

Q10. Write the AND gate truth table.

Q11. Why is AND gate linearly separable?

Q12. Draw a rough decision boundary that separates AND gate outputs.

Q13. Why do we add a bias term in the perceptron?

Q14. Why is bias often added **after summation**?

Q15. Why do we initialize weights with small random values?

Q16. What is the purpose of `np.dot(X, w)` in perceptron code?

Q17. Why is matrix transpose used in weight updating?

Q18. What will happen if we remove the activation function?

Q19. Why can OR gate be solved using a single perceptron?

Q20. What is common between AND and OR gates from a geometry view?

Q21. Does XOR need more features or more layers? Why?

Q22. What does *linearly separable* mean?

Q23. Why can't a single straight line separate XOR data?

Q24. What change is required to solve XOR successfully?

Q25. List two strengths of a perceptron.

Q26. List two limitations of a perceptron.

Q27. When should we avoid using a single-layer perceptron?



Mini Challenge (Very Easy)

Q28.

Given:

- $x_1 = 1, x_2 = 1$
- weights = [1, 1]
- bias = -1.5

Will the perceptron output be **1** or **0**?

(Show reasoning in one line)