**Findings Summary – Perceptron Logic Gate Learning Task**

In this task, we implemented a simple perceptron with a **sigmoid activation function** and trained it using the **perceptron learning rule** to model two binary logic functions: **NAND** and **XOR**.

* **For NAND**:  
  The perceptron successfully learned the NAND function. Since NAND is **linearly separable**, the neuron was able to adjust its weights and bias to correctly classify all input combinations.
* **For XOR**:  
  The perceptron **failed to learn the XOR function**, as expected. XOR is **not linearly separable**, and a single-layer perceptron lacks the necessary complexity to model this behavior. This confirms that **multi-layer neural networks** (i.e., MLPs) are required for solving non-linear problems like XOR.

These findings highlight the **limitations of single-layer perceptrons** and the importance of network depth in handling complex decision boundaries.