1. Best Deep Learning Model

Based on the results, the deep learning model with **2 hidden layers of 4 nodes each** is considered superior. It consistently achieved lower training and validation errors across all dataset sizes compared to the 1-layer model. For instance, at 100,000 observations, the 2-layer model achieved a validation error of **0.0064**, outperforming the 1-layer model's **0.0120**. Although it took slightly more time to train, the significant improvement in error rates makes it the better architecture for this task.

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2. XGBoost Results (Week 11)

Dataset Size	Testing-set Predictive Performance	Time Taken (s)
1,000	0.7355	0.03
10,000	0.7742	0.13
100,000	0.7984	1.34

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3. Deep Learning vs. XGBoost: Final Recommendation

While **XGBoost** provided strong predictive performance and faster training times, the deep learning models — especially with 2 layers — showed superior learning capability, as reflected by much lower validation error values. For example, at 100,000 observations, the deep learning model achieved a validation error of **0.0064**, while XGBoost reached a test accuracy of **0.7984**, which corresponds to a higher error rate.

Therefore, **deep learning (2-layer)** is recommended for high-accuracy applications where execution time is less critical, whereas **XGBoost** remains preferable when speed and interpretability are priorities.