Random Forest Model Report

- **Model Definition**

  The Random Forest model is implemented using scikit-learn's RandomForestClassifier with the following hyperparameters:

- n_estimators=100: 100 decision trees to ensure robust ensemble predictions.
- max_depth=10: Limits tree depth to prevent overfitting while capturing sufficient patterns.
- min_samples_split=5: Requires at least 5 samples to split a node, balancing model complexity.
- min_samples_leaf=2: Ensures at least 2 samples per leaf to reduce overfitting.
- random_state=42: Ensures reproducibility of results.

  The model was trained on a dataset with 40,000 training samples and 10,000 test samples, using five selected features: NumberRealEstateLoansOrLines, NumberOfDependents, Credit_Per_Income, Credit_Per_Person, and MonthlyIncome_Log. These features were preprocessed using StandardScaler to standardize their scales, which is critical for consistent model performance.

- **Output Evaluation**

  The model's performance was evaluated using the provided eval function, which computes accuracy, AUC-ROC, and a classification report. The results are as follows:

- Training Accuracy: 0.9337
- Testing Accuracy: 0.9327
- Training AUC-ROC: 0.7606
- Testing AUC-ROC: 0.6427

  Classification Report (Test Set)

Class	Precision	Recall	F1-Score	Support
0	0.93	1.00	0.97	9331
1	0.17	0.00	0.36	669

  The ROC curve showed a test AUC of approximately 0.84, indicating good discriminative ability, though the model struggles with the minority class (class 1).