Reproduction Guide for Reported Results

To reproduce the experimental metrics and statistical results reported in the study, follow the steps below.

Step 1: Prepare Environment

```
# Create virtual environment (optional)
python -m venv venv
source venv/bin/activate    # on Windows: venv\Scripts\activate

# Install dependencies
pip install -r requirements.txt
```

Step 2: Organize Data

Place your bug report datasets (CSV files) inside a folder named datasets/
Each CSV should include at least the following columns:
Title, Body, class

Step 3: Run Experiments

python 9ways_final.py
This will automatically:
Preprocess and vectorize each dataset using TF-IDF
Train 9 classification models per project with grid search
Evaluate models with Accuracy, Precision, Recall, F1, AUC
Perform statistical significance analysis:
One-way ANOVA
Tukey HSD post-hoc test
Paired t-tests vs baseline (GaussianNB)

Step 4: Locate Output Files

esults will be saved in the 9WAYS_final/ folder, including:
PROJECTNAME_MODELNAME_YYYYMMDD_HHMMSS.csv
PROJECTNAME_all_models_summary.csv
PROJECTNAME_comparison.png
ALL_PROJECTS_summary_*.csv
ALL_PROJECTS_significance_*.md

Note: Radar charts, heatmaps, and other visual figures in the report were created using third-party graphics software based on exported data.