Loan Approval prediction

□ Required Tools & Setup

☑Local Environment:

1. **IDE**:
   - ☐ **VS Code** (Recommended for coding, API setup, and GitHub integration)
   - ☐ Or **Jupyter Notebook** (for EDA & model building, then migrate to VS Code for API)
2. **Python Version**: Python 3.8 or above
3. **Package Manager**: `pip` or `conda`
4. **Virtual Environment (Optional but Recommended)**:

```
bash
CopyEdit
python -m venv loan_env
source loan_env/bin/activate  # Linux/Mac
loan_env\Scripts\activate     # Windows
```

□ Step-by-Step Project Plan

1. □ Data Collection

- Source: Kaggle (Loan Prediction Dataset)
- Read via `pandas.read_csv()`

2. □ Data Preprocessing

- Handling missing values
- Encoding categorical variables
- Outlier detection & removal
- Feature scaling

3. □ Exploratory Data Analysis (EDA)

- Use:
  - `matplotlib`, `seaborn`, `plotly`
  - Visualize:
    - Target distribution
    - Correlations
    - Categorical feature impacts

4. □ Model Building

Try different models:

- Logistic Regression
- Decision Tree

- Random Forest
- XGBoost
- SVM
- KNN

Use `sklearn`, `xgboost`, `lightgbm`

5. □ Feature Selection

- Correlation matrix
- Recursive Feature Elimination (RFE)
- Feature Importance from models

6. □ Cross-Validation

- K-Fold
- StratifiedKFold
- Use `cross_val_score`, `GridSearchCV`, `RandomizedSearchCV`

7. □ Model Evaluation

- Confusion Matrix
- Precision, Recall, F1 Score
- ROC-AUC Curve

8. □ Model Testing

- Test on unseen data
- Save best model using `joblib` or `pickle`

□ Deployment Phase

9. □ API Creation using FastAPI (or Flask)

- Create `main.py` to expose your model
- Include `/predict` endpoint
- Input: JSON data
- Output: Prediction (Approved / Rejected)

10. □ Test API with Postman

- Run server with:

```
bash
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uvicorn main:app --reload
```

- Use Postman to send POST requests

11. □ Upload to GitHub

- Create a new GitHub repo
- Push your code:

```
bash
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git init
git remote add origin <repo-url>
git add .
git commit -m "Initial commit"
git push -u origin main
```

12. □ Retrieve from GitHub

- Clone project from any machine:

```
bash
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git clone <repo-url>
```

✅Libraries to Install

```
bash
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pip install numpy pandas matplotlib seaborn scikit-learn xgboost fastapi uvicorn joblib
```