Pipeline Architecture:

Cryptocurrency Liquidity Prediction for Market Stability

1. **Data Ingestion:**
    - Loaded cryptocurrency datasets (March 16 and 17, 2022) into Pandas DataFrames.

2. **Data Cleaning:**
    - Removed missing values
    - Removed duplicate records
    - Ensured correct data types for each column.

3. **Feature Engineering:**
   Created new features to enrich the dataset:
    - 2-day moving averages for price and market cap.
    - Volatility: Standard deviation of price over 2 days.
    - Liquidity Ratio: Volume divided by market cap.

4. **Exploratory Data Analysis (EDA):**
    - Visualized Bitcoin price over time.
    - Created correlation heatmap for numerical features.
    - Generated summary statistics to understand data distribution.

5. **Model Building:**
    - Trained an initial model using Linear Regression.
    - Trained the final model using Random Forest Regressor.
    - Performed hyperparameter tuning (if needed).

6. **Model Evaluation:**
   Evaluated the models using the following metrics:
    - Root Mean Squared Error (RMSE)
    - Mean Absolute Error (MAE)
    - R2 Score

7. **Model Saving:**
   Saved the trained model using Joblib:

8. **Optional Local Deployment:**

Developed a basic Streamlit or Flask app to:

- Load the saved model.
- Predict liquidity for new input data.