Step 1: Import Required Libraries

```
Import pandas as pd
Import numpy as np
Import matplotlib.pyplot as plt
Import seaborn as sns

From sklearn.model_selection import train_test_split
From sklearn.preprocessing import StandardScaler
From sklearn.linear_model import LinearRegression, Ridge, Lasso
From sklearn.ensemble import RandomForestRegressor
From sklearn.metrics import mean_squared_error, r2_score
```

Step 2: Load the Dataset

```
# Example: Boston Housing Dataset
From sklearn.datasets import load_boston
Boston = load_boston()
Data = pd.DataFrame(boston.data, columns=boston.feature_names)
Data[‘PRICE’] = boston.target

Print(data.head())
```

Step 3: Exploratory Data Analysis (EDA)

```
Sns.pairplot(data[[‘PRICE’, ‘RM’, ‘LSTAT’, ‘PTRATIO’]])
Plt.show()

# Correlation matrix
Plt.figure(figsize=(10, 8))
Sns.heatmap(data.corr(), annot=True, cmap=’coolwarm’)
Plt.show()
```

Step 4: Data Preprocessing

```
X = data.drop(‘PRICE’, axis=1)
Y = data[‘PRICE’]

# Feature scaling
Scaler = StandardScaler()
X_scaled = scaler.fit_transform(X)

# Train-test split
X_train, X_test, y_train, y_test = train_test_split(X_scaled, y, test_size=0.2,
random_state=42)
```

Step 5: Model Building – Try Multiple Regressors

a. Linear Regression

```
Lr = LinearRegression()
Lr.fit(X_train, y_train)
Y_pred_lr = lr.predict(X_test)

Print("Linear Regression R2 Score:", r2_score(y_test, y_pred_lr))
```

b. Ridge Regression

```
Ridge = Ridge(alpha=1.0)
Ridge.fit(X_train, y_train)
Y_pred_ridge = ridge.predict(X_test)

Print("Ridge Regression R2 Score:", r2_score(y_test, y_pred_ridge))
```

c. Lasso Regression

```
Lasso = Lasso(alpha=0.1)
Lasso.fit(X_train, y_train)
Y_pred_lasso = lasso.predict(X_test)
```

```
Print("Lasso Regression R2 Score:", r2_score(y_test, y_pred_lasso))
```

d. Random Forest Regressor

```
Rf = RandomForestRegressor(n_estimators=100, random_state=42)
Rf.fit(X_train, y_train)
Y_pred_rf = rf.predict(X_test)

Print("Random Forest R2 Score:", r2_score(y_test, y_pred_rf))
```

Step 6: Model Evaluation

```
Models = {
   'Linear': y_pred_lr,
   'Ridge': y_pred_ridge,
   'Lasso': y_pred_lasso,
   'Random Forest': y_pred_rf
}

For name, preds in models.items():
   Print(f"{name} MSE: {mean_squared_error(y_test, preds):.2f}")
   Print(f"{name} R2 Score: {r2_score(y_test, preds):.2f}")
```

Step 7: Visual Comparison

```
Plt.figure(figsize=(10, 6))
Plt.plot(y_test.values, label='Actual', color='black')
Plt.plot(y_pred_rf, label='Random Forest', alpha=0.7)
Plt.plot(y_pred_lr, label='Linear Regression', alpha=0.7)
Plt.legend()
Plt.title('Actual vs Predicted House Prices')
Plt.xlabel('Test Data Index')
Plt.ylabel('Price')
Plt.show()
```

Sample Output (will vary by run)

Linear Regression R2 Score: 0.73

Ridge Regression R2 Score: 0.74

Lasso Regression R2 Score: 0.72

Random Forest R2 Score: 0.89

Linear MSE: 21.45

Ridge MSE: 20.98

Lasso MSE: 22.34

Random Forest MSE: 10.17