```
from google.colab import files
uploaded = files.upload()
```

```
<IPython.core.display.HTML object>

Saving train.csv to train (1).csv
```

REGRESION LINEAL MULTIPLE

```
# Importar bibliotecas necesarias
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, r2_score
import matplotlib.pyplot as plt
import seaborn as sns

data = pd.read_csv("train.csv")
print(data.head())
```

```
   Id  MSSubClass MSZoning  LotFrontage  LotArea Street Alley LotShape
\
0   1          60       RL         65.0     8450   Pave   NaN      Reg

1   2          20       RL         80.0     9600   Pave   NaN      Reg

2   3          60       RL         68.0    11250   Pave   NaN      IR1

3   4          70       RL         60.0     9550   Pave   NaN      IR1

4   5          60       RL         84.0    14260   Pave   NaN      IR1


  LandContour Utilities  ... PoolArea PoolQC Fence MiscFeature MiscVal
MoSold  \
0         Lvl    AllPub  ...        0    NaN   NaN         NaN       0
2
1         Lvl    AllPub  ...        0    NaN   NaN         NaN       0
5
2         Lvl    AllPub  ...        0    NaN   NaN         NaN       0
9
3         Lvl    AllPub  ...        0    NaN   NaN         NaN       0
2
4         Lvl    AllPub  ...        0    NaN   NaN         NaN       0
12

  YrSold  SaleType  SaleCondition  SalePrice
0   2008        WD         Normal     208500
```

```
1   2007        WD         Normal     181500
2   2008        WD         Normal     223500
3   2006        WD        Abnorml     140000
4   2008        WD         Normal     250000

[5 rows x 81 columns]
```

```
# Preparar los datos
# Seleccionar solo variables numéricas
numeric_data = data.select_dtypes(include=[np.number])

# Eliminar filas con valores faltantes
numeric_data = numeric_data.dropna()

# Separar variables independientes y dependiente
X = numeric_data.drop(['Id', 'SalePrice'], axis=1)
y = numeric_data['SalePrice']

# Dividir en conjuntos de entrenamiento y prueba
X_train, X_test, y_train, y_test = train_test_split(X, y,
test_size=0.1, random_state=50)

# Construir y entrenar el modelo de regresión lineal
lr = LinearRegression()
lr.fit(X_train, y_train)
```

```
LinearRegression()
```

```
# Hacer predicciones
y_pred_lr = lr.predict(X_test)

# Evaluar el modelo
mse_lr = mean_squared_error(y_test, y_pred_lr)
r2_lr = r2_score(y_test, y_pred_lr)

print("Regresión Lineal:")
print(f"MSE: {mse_lr:.2f}")
print(f"R²: {r2_lr:.2f}")
```

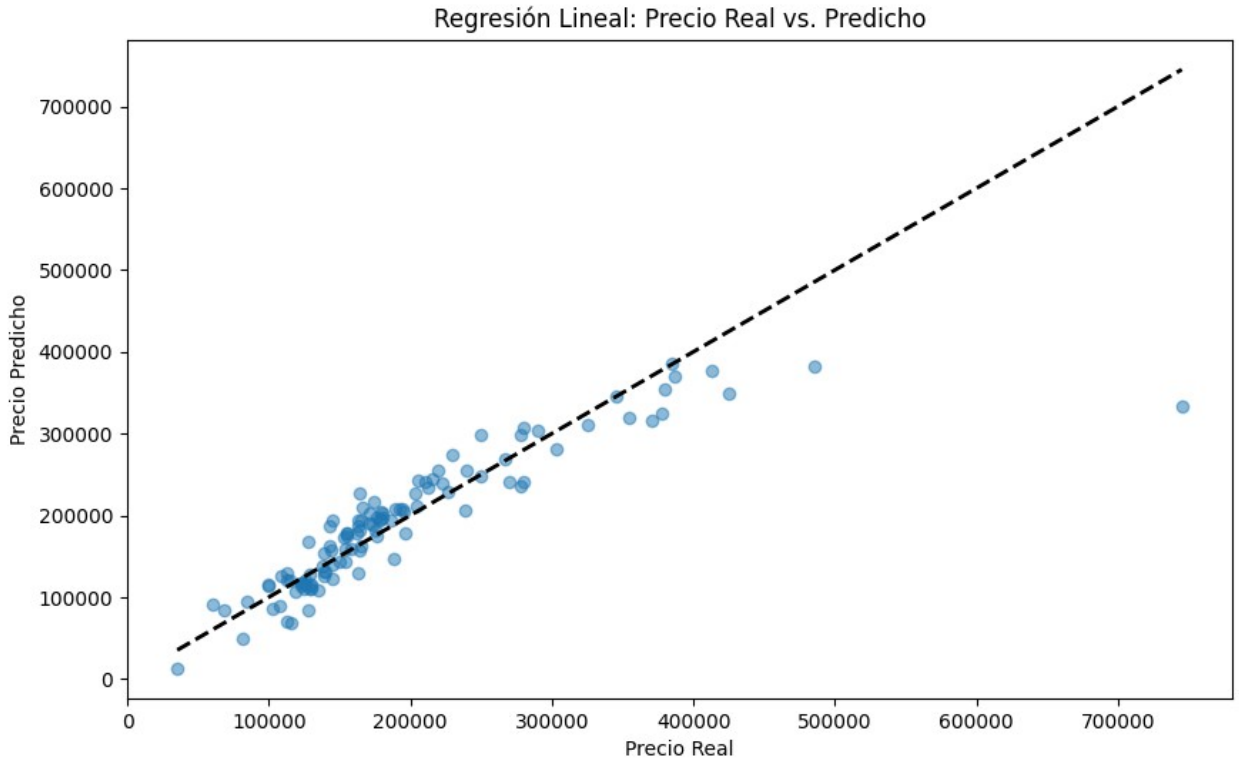
```
Regresión Lineal:
MSE: 2244869108.46
R²: 0.77
```

```
# Realizar 5 predicciones nuevas
nuevas_casas = X_test[:5]
predicciones_lr = lr.predict(nuevas_casas)

print("\nPredicciones de Regresión Lineal para 5 casas:")
for i, pred in enumerate(predicciones_lr, 1):
    print(f"Casa {i}: ${pred:,.2f}")
```

```
Predicciones de Regresión Lineal para 5 casas:
Casa 1: $159,150.37
Casa 2: $94,603.93
Casa 3: $125,841.45
Casa 4: $311,262.93
Casa 5: $324,628.61
```

```
# Visualización de resultados
plt.figure(figsize=(10, 6))
plt.scatter(y_test, y_pred_lr, alpha=0.5)
plt.plot([y_test.min(), y_test.max()], [y_test.min(), y_test.max()],
'k--', lw=2)
plt.xlabel('Precio Real')
plt.ylabel('Precio Predicho')
plt.title('Regresión Lineal: Precio Real vs. Predicho')
plt.show()
```



RED NEURONAL ARTIFICIAL

```
# Importar bibliotecas adicionales para la RNA
from sklearn.neural_network import MLPRegressor
from sklearn.preprocessing import StandardScaler
```

```python
# Escalar los datos (importante para redes neuronales)
scaler = StandardScaler()
X_train_scaled = scaler.fit_transform(X_train)
X_test_scaled = scaler.transform(X_test)

# Construir y entrenar el modelo de red neuronal
mlp = MLPRegressor(hidden_layer_sizes=(1500,), max_iter=1500,
random_state=45)
mlp.fit(X_train_scaled, y_train)
```

```
/usr/local/lib/python3.11/dist-packages/sklearn/neural_network/
_multilayer_perceptron.py:691: ConvergenceWarning: Stochastic
Optimizer: Maximum iterations (1500) reached and the optimization
hasn't converged yet.
  warnings.warn(
```

```
MLPRegressor(hidden_layer_sizes=(1500,), max_iter=1500,
random_state=45)
```

```python
# Hacer predicciones
y_pred_mlp = mlp.predict(X_test_scaled)

# Evaluar el modelo
mse_mlp = mean_squared_error(y_test, y_pred_mlp)
r2_mlp = r2_score(y_test, y_pred_mlp)

print("\nRed Neuronal:")
print(f"MSE: {mse_mlp:.2f}")
print(f"R²: {r2_mlp:.2f}")
```

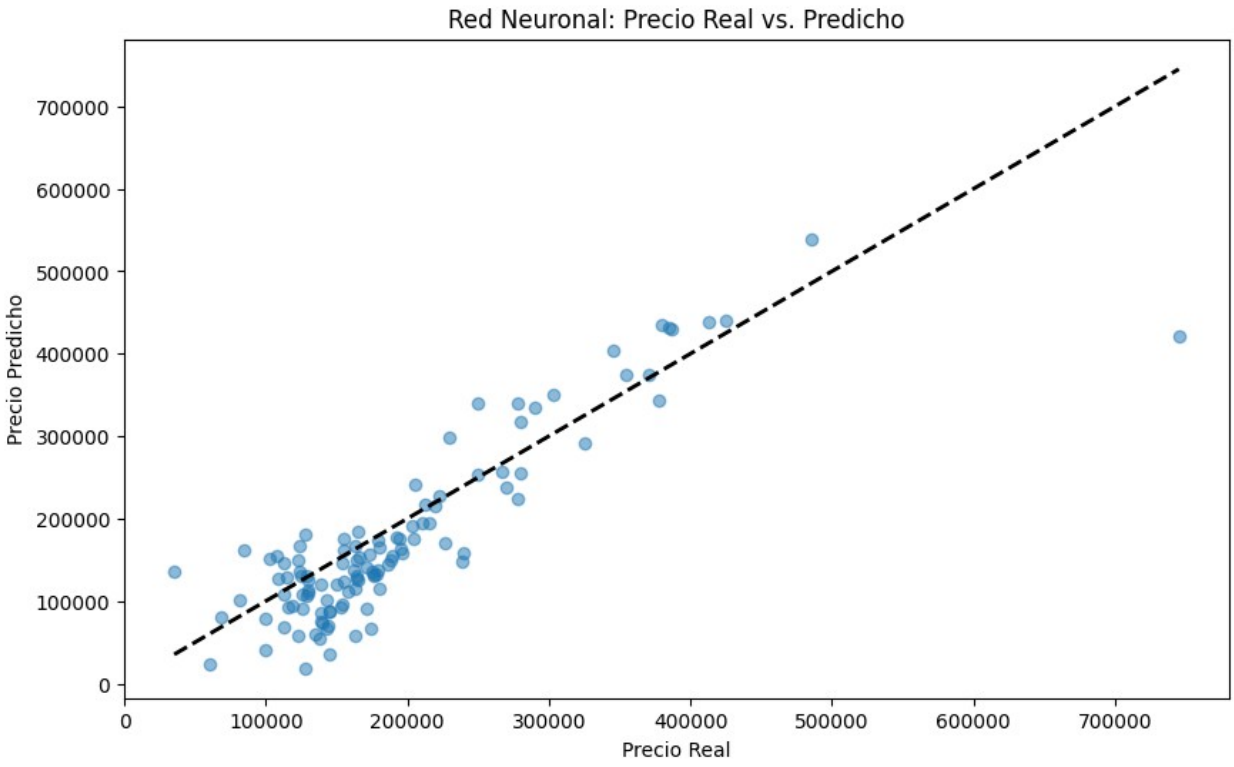
```
Red Neuronal:
MSE: 3119798082.26
R²: 0.68
```

```python
# Realizar 5 predicciones nuevas (usando datos escalados)
nuevas_casas_scaled = scaler.transform(nuevas_casas)
predicciones_mlp = mlp.predict(nuevas_casas_scaled)

print("\nPredicciones de Red Neuronal para 5 casas:")
for i, pred in enumerate(predicciones_mlp, 1):
    print(f"Casa {i}: ${pred:,.2f}")
```

```
Predicciones de Red Neuronal para 5 casas:
Casa 1: $96,017.26
Casa 2: $161,407.13
Casa 3: $127,807.79
Casa 4: $292,240.86
Casa 5: $343,631.42
```

```
# Visualización de resultados
plt.figure(figsize=(10, 6))
plt.scatter(y_test, y_pred_mlp, alpha=0.5)
plt.plot([y_test.min(), y_test.max()], [y_test.min(), y_test.max()],
'k--', lw=2)
plt.xlabel('Precio Real')
plt.ylabel('Precio Predicho')
plt.title('Red Neuronal: Precio Real vs. Predicho')
plt.show()
```



COMPARACION DE MODELOS

```
# Comparación de los modelos
comparacion = pd.DataFrame({
    'Modelo': ['Regresión Lineal', 'Red Neuronal'],
    'MSE': [mse_lr, mse_mlp],
    'R²': [r2_lr, r2_mlp]
})

print("\nComparación de Modelos:")
print(comparacion)
```

```
Comparación de Modelos:
```

```
              Modelo           MSE        R²
0  Regresión Lineal  2.244869e+09  0.767097
1      Red Neuronal  3.119798e+09  0.676324
```

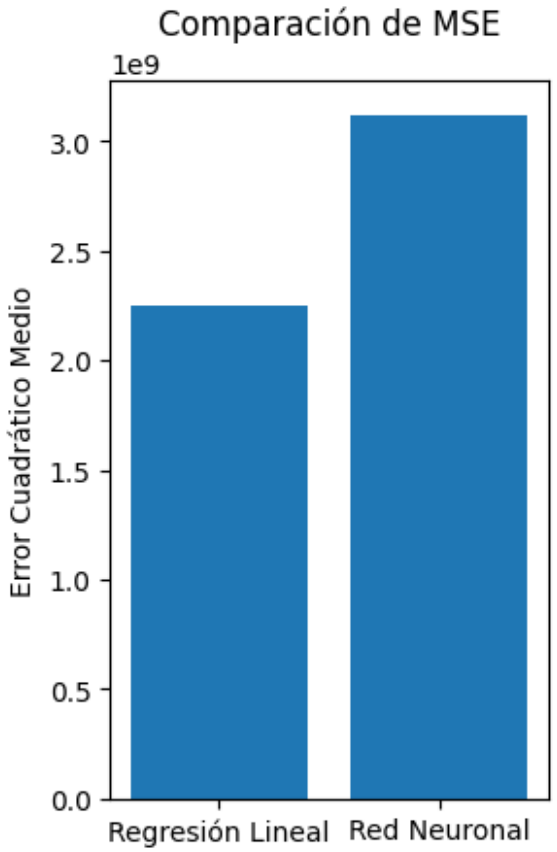
```
# Configurar el gráfico
plt.figure(figsize=(12, 5))
```

```
<Figure size 1200x500 with 0 Axes>
```

```
<Figure size 1200x500 with 0 Axes>
```

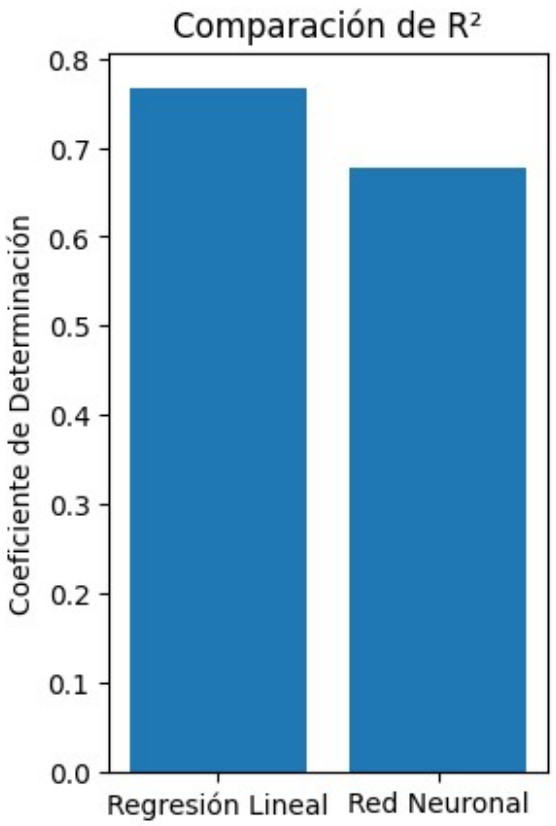
```
plt.subplot(1, 2, 1)
plt.bar(comparacion['Modelo'], comparacion['MSE'])
plt.title('Comparación de MSE')
plt.ylabel('Error Cuadrático Medio')
```

```
Text(0, 0.5, 'Error Cuadrático Medio')
```




```
plt.subplot(1, 2, 2)
plt.bar(comparacion['Modelo'], comparacion['R²'])
plt.title('Comparación de R²')
plt.ylabel('Coeficiente de Determinación')
```

```
Text(0, 0.5, 'Coeficiente de Determinación')
```




```
plt.tight_layout()
plt.show()
```

```
<Figure size 640x480 with 0 Axes>
```