In [ ]:
```
# house price prediction using logistic regression

# import libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn import datasets
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score, confusion_matrix, classification_report

# load the dataset
boston = datasets.load_boston()
df = pd.DataFrame(boston.data, columns=boston.feature_names)
df['MEDV'] = boston.target
df.head()
```

Out[ ]:

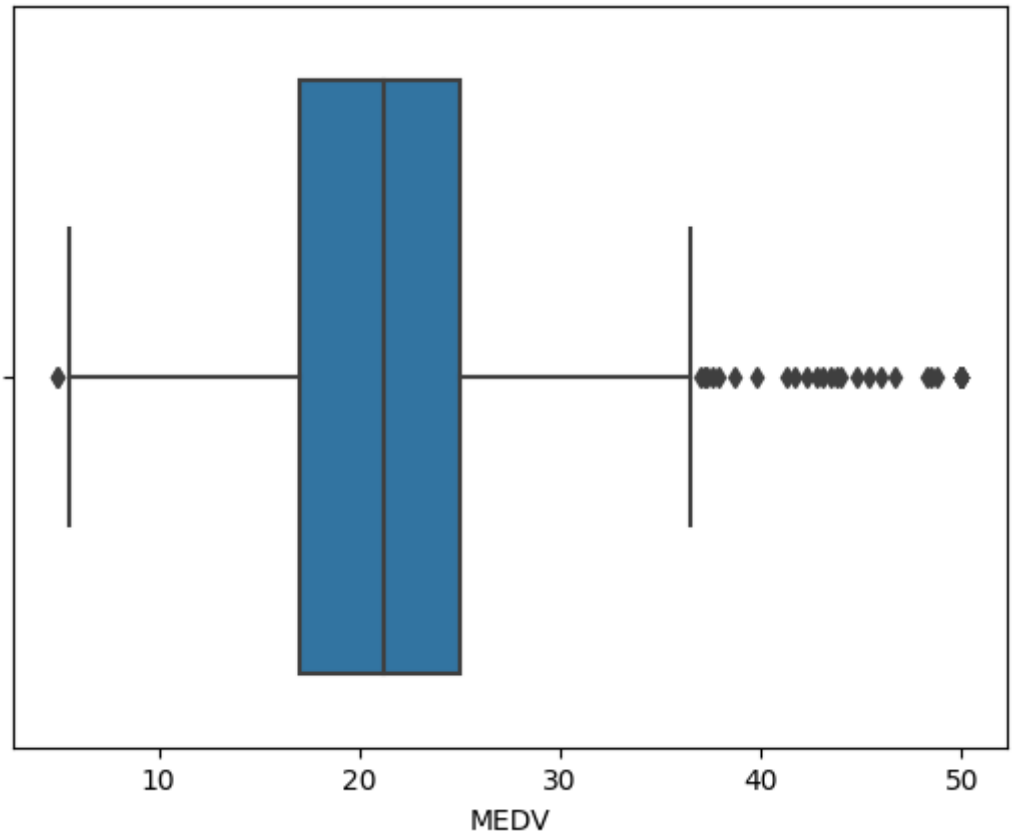
	CRIM	ZN	INDUS	CHAS	NOX	RM	AGE	DIS	RAD	TAX	PTRATIO	B	LSTAT
0	0.00632	18.0	2.31	0.0	0.538	6.575	65.2	4.0900	1.0	296.0	15.3	396.90	4.98
1	0.02731	0.0	7.07	0.0	0.469	6.421	78.9	4.9671	2.0	242.0	17.8	396.90	9.14
2	0.02729	0.0	7.07	0.0	0.469	7.185	61.1	4.9671	2.0	242.0	17.8	392.83	4.03
3	0.03237	0.0	2.18	0.0	0.458	6.998	45.8	6.0622	3.0	222.0	18.7	394.63	2.94
4	0.06905	0.0	2.18	0.0	0.458	7.147	54.2	6.0622	3.0	222.0	18.7	396.90	5.33

In [ ]:
```
# check the shape of the dataset
df.shape
```

Out[ ]:
```
(506, 14)
```

In [ ]:
```
#box plot to check the outliers
sns.boxplot(x=df['MEDV'])
```

Out[ ]:
```
<AxesSubplot:xlabel='MEDV'>
```



In [ ]:
```
#remove the outliers
df = df[df['MEDV'] < 50]
df.shape
```

Out[ ]: (490, 14)

In [ ]:
```
# binninng the target variable
bins = (0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100)
group = ['0-10', '10-20', '20-30', '30-40', '40-50', '50-60', '60-70', '70-80', '80
df['binned_MEDV'] = pd.cut(df['MEDV'], bins = bins, labels = group)
df.head()
```

Out[ ]:

	CRIM	ZN	INDUS	CHAS	NOX	RM	AGE	DIS	RAD	TAX	PTRATIO	B	LSTAT
0	0.00632	18.0	2.31	0.0	0.538	6.575	65.2	4.0900	1.0	296.0	15.3	396.90	4.98
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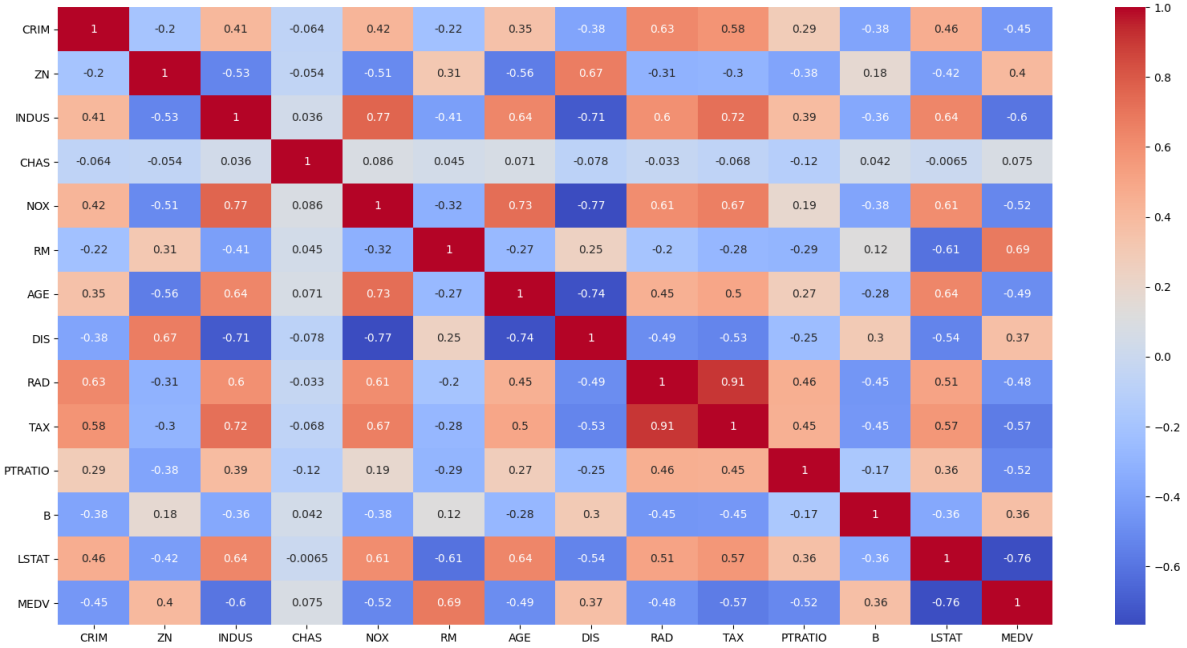
In [ ]:
```
# plot correlation matrix
plt.figure(figsize=(20,10))
sns.heatmap(df.corr(), annot=True, cmap='coolwarm')
plt.show()
```



In [ ]:
```
X = df.drop(['binned_MEDV'], axis=1)
y = df['binned_MEDV']
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.1, random_sta

# scaling the data
from sklearn.preprocessing import MinMaxScaler
sc = MinMaxScaler()
X_train_std = sc.fit_transform(X_train)
X_test_std = sc.transform(X_test)
```

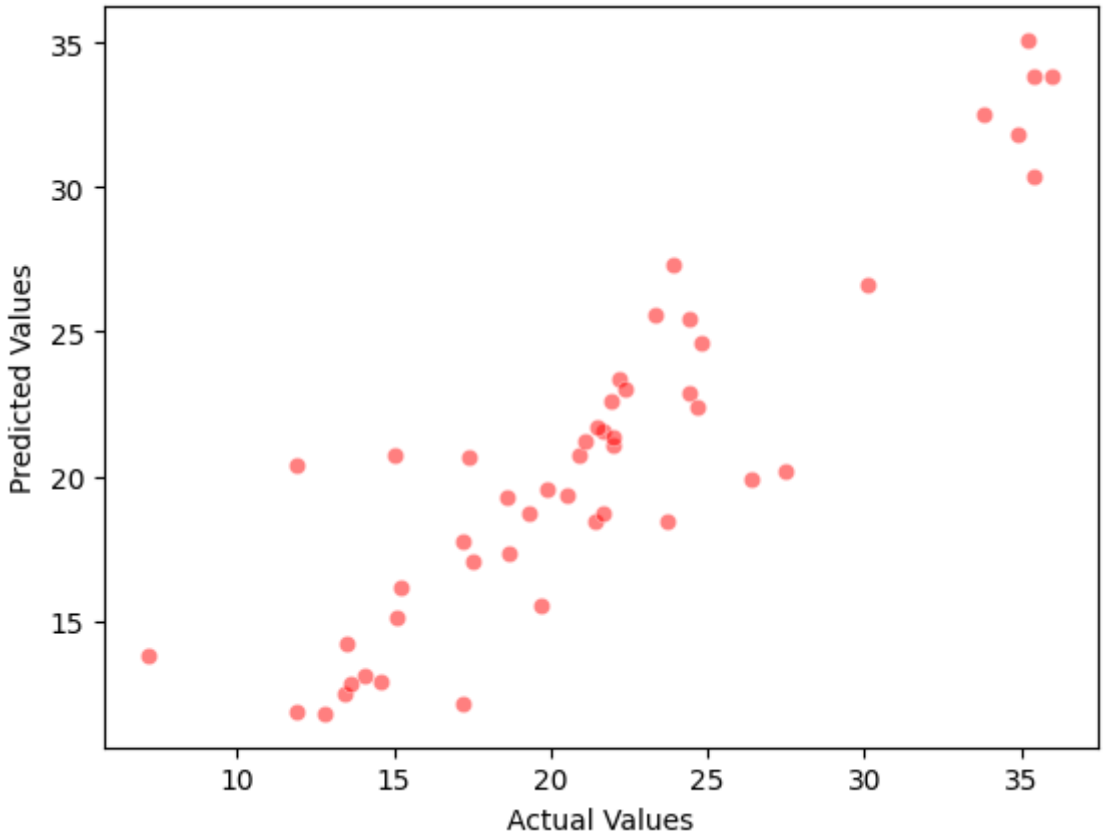
In [ ]:
```
# create the model
# ignore the warning
import warnings
warnings.filterwarnings('ignore')

model = LogisticRegression()
model.fit(X_train, y_train)

# predict the test set
y_pred = model.predict(X_test)

# evaluate the model
print('Accuracy: ', accuracy_score(y_test, y_pred))
print('Confusion Matrix: \n', confusion_matrix(y_test, y_pred))
print('Classification Report: \n', classification_report(y_test, y_pred))
```

```
Accuracy:  0.8367346938775511
Confusion Matrix:
 [[ 0  1  0  0  0]
 [ 0 19  1  0  0]
 [ 1  3 17  0  0]
 [ 0  0  1  5  1]
 [ 0  0  0  0  0]]
Classification Report:
              precision    recall  f1-score   support

        0-10       0.00      0.00      0.00         1
       10-20       0.83      0.95      0.88        20
       20-30       0.89      0.81      0.85        21
       30-40       1.00      0.71      0.83         7
       40-50       0.00      0.00      0.00         0

    accuracy                           0.84        49
   macro avg       0.54      0.49      0.51        49
weighted avg       0.86      0.84      0.84        49
```

In [ ]:

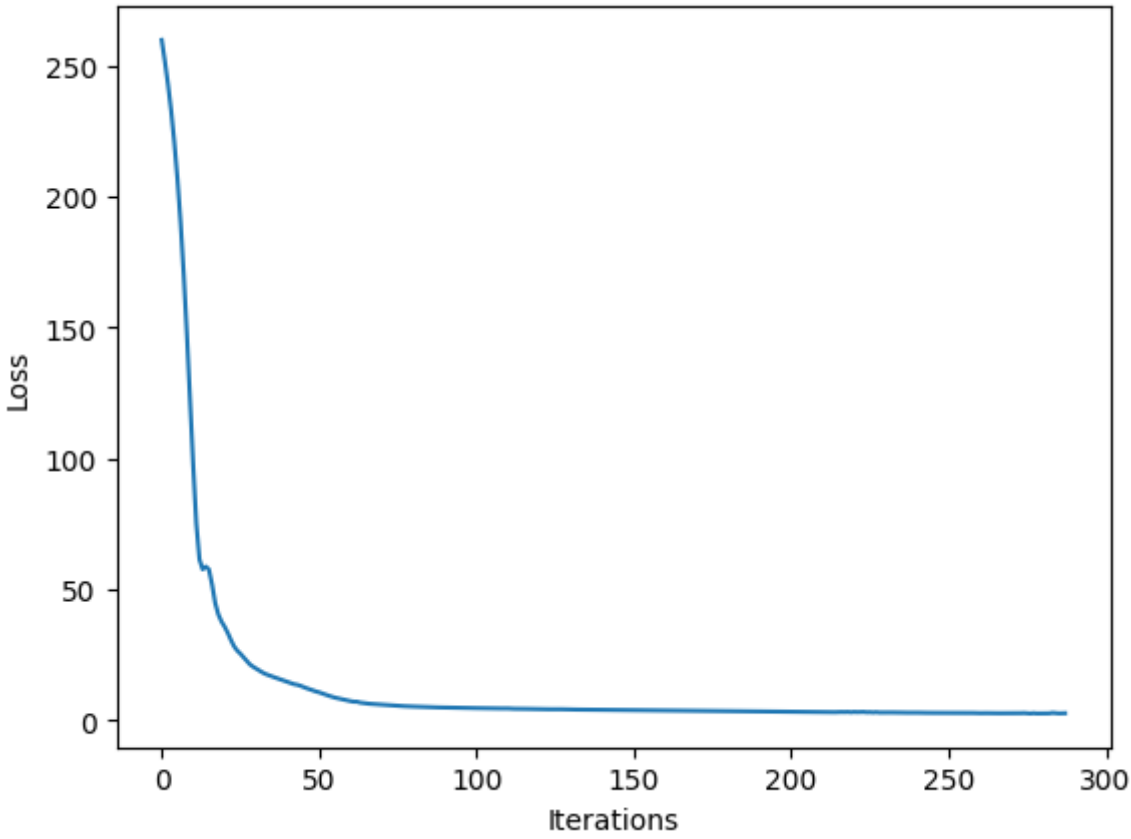
```
# using SVM regression
X = df.drop(['MEDV','binned_MEDV'], axis=1)
y = df['MEDV']

from sklearn.svm import SVR
model = SVR(kernel='poly')

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.1, random_sta
#scaling
sc = MinMaxScaler()
X_train_std = sc.fit_transform(X_train)
X_test_std = sc.transform(X_test)
model.fit(X_train_std, y_train)

# predict the test set
y_pred = model.predict(X_test_std)

# evaluate the model for regression
from sklearn.metrics import mean_squared_error, r2_score
print('Mean Squared Error: ', mean_squared_error(y_test, y_pred))
print('R2 Score: ', r2_score(y_test, y_pred))

# plot the predicted values vs actual values
sns.scatterplot(y_test, y_pred, alpha=0.5, color='red')
plt.xlabel('Actual Values')
plt.ylabel('Predicted Values')
plt.show()
```

```
Mean Squared Error:  8.990886407745721
R2 Score:  0.8069566560733742
```



In [ ]:
```
# using ANN regression
from sklearn.neural_network import MLPRegressor
model = MLPRegressor(hidden_layer_sizes=(100, 100, 100), max_iter=1000)
model.fit(X_train_std, y_train)

# predict the test set
y_pred = model.predict(X_test_std)

# evaluate the model
print('train accuracy: ', model.score(X_train_std, y_train))
print('test accuracy: ', model.score(X_test_std, y_test))

# plot the performance of the model
plt.plot(model.loss_curve_)
plt.xlabel('Iterations')
plt.ylabel('Loss')
plt.show()
```

```
train accuracy:  0.9128156250338318
test accuracy:  0.8225464572001939
```


250
200
150
100
50
0
Loss
0
50
100
150
200
250
300
Iterations