In [1]:
```
import pandas as pd
import sklearn as skl
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:
```
data = pd.read_csv("Adult/adult.data", header=None)
#data.head()
data.columns = ['age','workclass','fnlwgt','education', 'education-num', 'ma
```

In [3]:
```
data.head()
```

Out[3]:

	age	workclass	fnlwgt	education	education-num	marital-status	occupation	relationship
0	39	State-gov	77516	Bachelors	13	Never-married	Adm-clerical	Not-in-family
1	50	Self-emp-not-inc	83311	Bachelors	13	Married-civ-spouse	Exec-managerial	Husband
2	38	Private	215646	HS-grad	9	Divorced	Handlers-cleaners	Not-in-family
3	53	Private	234721	11th	7	Married-civ-spouse	Handlers-cleaners	Husband
4	28	Private	338409	Bachelors	13	Married-civ-spouse	Prof-specialty	Wife

In [4]:
```
target = data['income']
data.dropna(axis=0)
data = data.drop(columns=['fnlwgt','education-num','native-country','relatic
```

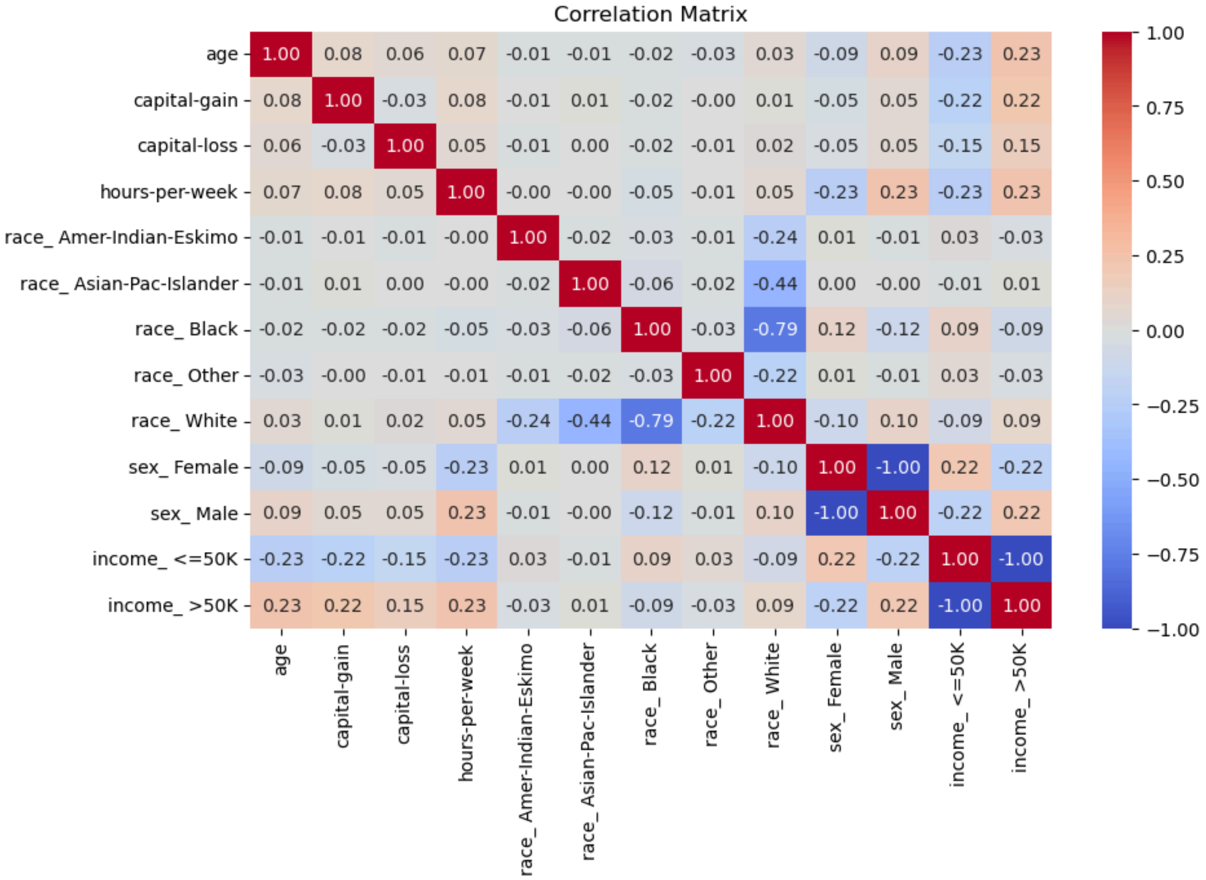
In [5]:
```
data.head()
encoded_data = pd.get_dummies(data, columns=['race', 'sex','income'])
print(encoded_data.columns)
```

```
Index(['age', 'workclass', 'education', 'marital-status', 'occupation',
       'capital-gain', 'capital-loss', 'hours-per-week',
       'race_ Amer-Indian-Eskimo', 'race_ Asian-Pac-Islander', 'race_ Blac
k',
       'race_ Other', 'race_ White', 'sex_ Female', 'sex_ Male',
       'income_ <=50K', 'income_ >50K'],
      dtype='object')
```

Now we visualize

In [7]:
```
encoded_data = encoded_data.drop(columns=['workclass','education','marital-s
corr_matrix = encoded_data.corr()
```

```
# Plotting the correlation matrix
plt.figure(figsize=(10, 6))
sns.heatmap(corr_matrix, annot=True, cmap='coolwarm', fmt=".2f")
plt.title("Correlation Matrix")
plt.show()
```



In [8]:

```
data = pd.get_dummies(data)
data.head()
```

Out[8]:

	age	capital-gain	capital-loss	hours-per-week	workclass_ ?	workclass_ Federal-gov	workclass_ Local-gov	workclass_ Never-worked	w
0	39	2174	0	40	False	False	False	False	
1	50	0	0	13	False	False	False	False	
2	38	0	0	40	False	False	False	False	
3	53	0	0	40	False	False	False	False	
4	28	0	0	40	False	False	False	False	

5 rows × 60 columns

In [9]:

```
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, r2_score
from sklearn.metrics import accuracy_score


target = data['income_ >50K']
features = data.drop(columns=['income_ >50K','income_ <=50K'])

# split data
X_train, X_test, y_train, y_test = train_test_split(features, target, test_s

model = LinearRegression()
model.fit(X_train, y_train)
y_pred = model.predict(X_test)

mse = mean_squared_error(y_test, y_pred)
r2 = r2_score(y_test, y_pred)

print("Mean Squared Error (MSE):", mse)
print("R-squared (R2) Score:", r2)

y_pred_binary = [1 if pred >= 0.5 else 0 for pred in y_pred]

accuracy = accuracy_score(y_test, y_pred_binary)
print("Accuracy:", accuracy)
```

```
Mean Squared Error (MSE): 0.11625529212939553
R-squared (R2) Score: 0.36482124741447663
Accuracy: 0.8387839705204975
```

In [10]:

```
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import accuracy_score, classification_report

knn_model = KNeighborsClassifier(n_neighbors=5)
knn_model.fit(X_train, y_train)

y_pred_knn = knn_model.predict(X_test)

knn_accuracy = accuracy_score(y_test, y_pred_knn)
print("KNN Model Accuracy:", knn_accuracy)
print("\nKNN Classification Report:\n", classification_report(y_test, y_pred
```

```
KNN Model Accuracy: 0.8441578381698143

KNN Classification Report:
               precision    recall  f1-score   support

       False       0.89      0.91      0.90      4942
        True       0.69      0.64      0.66      1571

    accuracy                           0.84      6513
   macro avg       0.79      0.77      0.78      6513
weighted avg       0.84      0.84      0.84      6513
```

In [ ]: