Task no 3

Task 3 Build a decision tree classifier to predict whether a customer will purchase a product or service based on their demographic and behavioral data. Use a dataset such as the Bank Marketing dataset from the UCI Machine Learning Repository.

```
import pandas as pd

# Select features and target
features = [
    'lead_time',
    'adults',
    'children',
    'babies',
    'stays_in_weekend_nights',
    'stays_in_week_nights',
    'adr',
    'previous_cancellations',
    'previous_bookings_not_canceled',
    'booking_changes',
    'required_car_parking_spaces',
    'total_of_special_requests'
]
```

```
from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test = train_test_split(
    X, y, test_size=0.2, random_state=42
)
```

```
from sklearn.tree import DecisionTreeClassifier

# Create model
dt_model = DecisionTreeClassifier(max_depth=5, random_state=42)

# Train model
dt_model.fit(X_train, y_train)
```

```
DecisionTreeClassifier(max_depth=5, random_state=42)
```

```
from sklearn.metrics import accuracy_score, classification_report, confusion_matrix
y_pred = dt_model.predict(X_test)
accuracy = accuracy_score(y_test, y_pred)
print("Accuracy:", accuracy)
print(classification_report(y_test, y_pred))
print(confusion_matrix(y_test, y_pred))
```

```
Accuracy: 0.7254821501846532
              precision    recall  f1-score   support

           0       0.74      0.77      0.75     10524
           1       0.71      0.68      0.69      8972

    accuracy                           0.73     19496
   macro avg       0.72      0.72      0.72     19496
weighted avg       0.72      0.73      0.72     19496

[[8051 2473]
 [2879 6093]]
```

```
import pandas as pd

importance = pd.Series(dt_model.feature_importances_, index=features)
importance.sort_values(ascending=False)
```

	0
lead_time	0.371141
total_of_special_requests	0.210415
booking_changes	0.144595
previous_cancellations	0.108292
adr	0.091894
required_car_parking_spaces	0.064642
previous_bookings_not_canceled	0.008020
stays_in_weekend_nights	0.001000