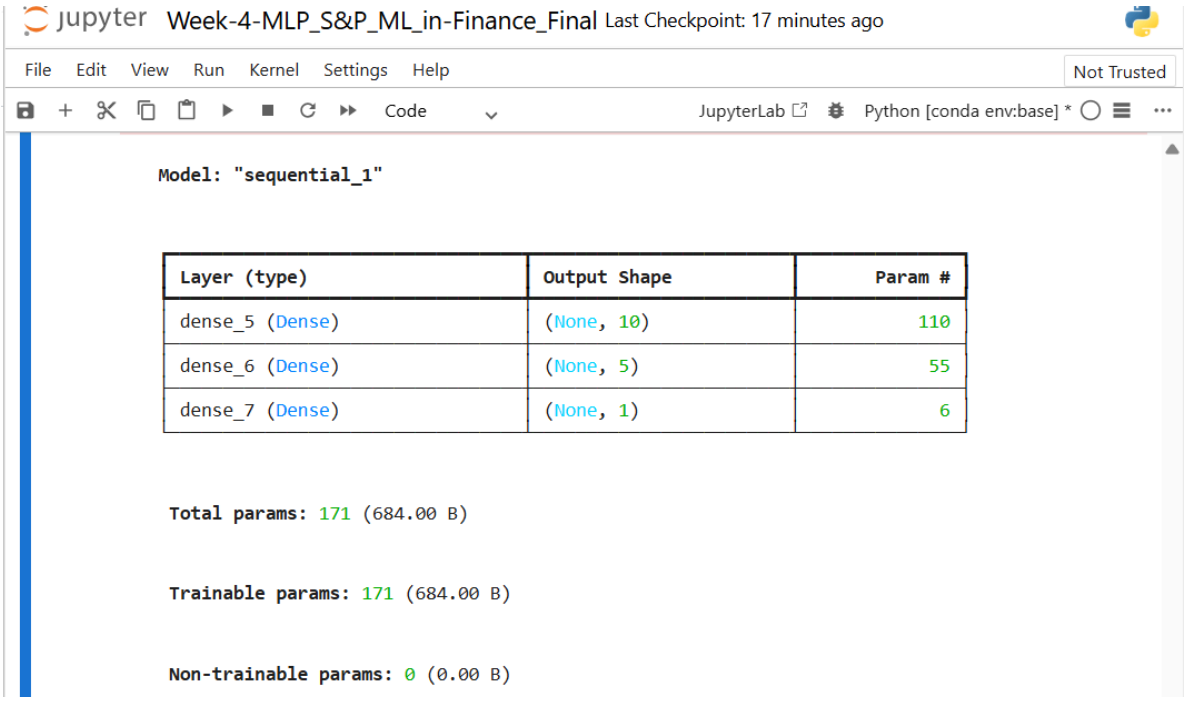
Machine Learning In Finance
WEEK 4 LAB LOG BOOK

CODE:

```
import numpy as np
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense
from tensorflow.keras.optimizers import Adam
from sklearn.model_selection import train_test_split
from sklearn.metrics import mean_absolute_error
from sklearn.preprocessing import MinMaxScaler

X = np.random.rand(1000, 10)  # 10 input features
y = np.random.rand(1000, 1)   # 1 target variable

scaler = MinMaxScaler()
X_scaled = scaler.fit_transform(X)

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

model = Sequential()
model.add(Dense(10, activation='relu', input_shape=(X.shape[1],)))  # First hidden layer
model.add(Dense(5, activation='relu'))  # Second hidden layer
model.add(Dense(1))  # Output layer

model.compile(optimizer=Adam(), loss='mae', metrics=['mae'])

model.summary()

history = model.fit(X_train, y_train, epochs=10, validation_split=0.2)

mae = model.evaluate(X_test, y_test, verbose=0)[1]
print(f"Test MAE: {mae:.4f}")
```

OUTPUT:



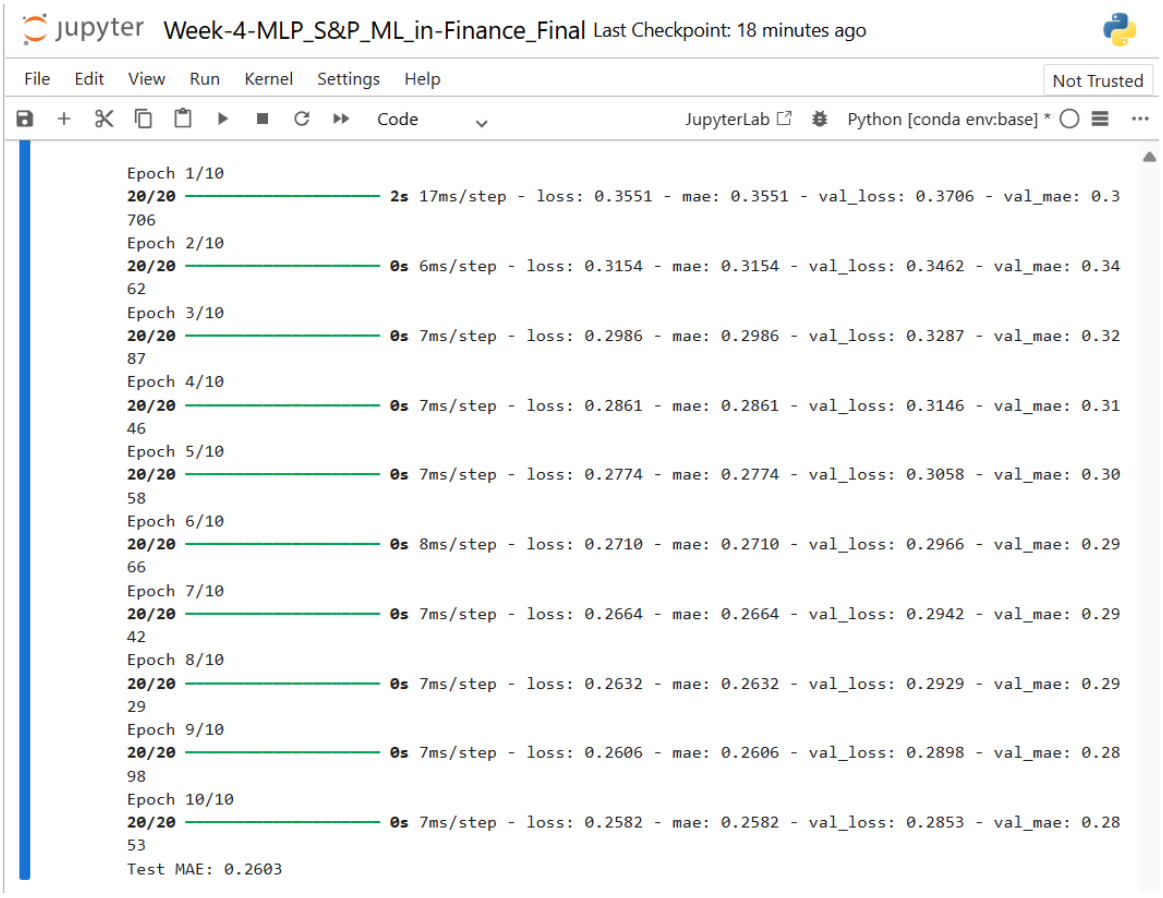
Model: "sequential_1"

Layer (type)	Output Shape	Param #
dense_5 (Dense)	(None, 10)	110
dense_6 (Dense)	(None, 5)	55
dense_7 (Dense)	(None, 1)	6

Total params: 171 (684.00 B)

Trainable params: 171 (684.00 B)

Non-trainable params: 0 (0.00 B)




```
Epoch 1/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 2s 17ms/step - loss: 0.3551 - mae: 0.3551 - val_loss: 0.3706 - val_mae: 0.3
706
Epoch 2/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 0s 6ms/step - loss: 0.3154 - mae: 0.3154 - val_loss: 0.3462 - val_mae: 0.34
62
Epoch 3/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 0s 7ms/step - loss: 0.2986 - mae: 0.2986 - val_loss: 0.3287 - val_mae: 0.32
87
Epoch 4/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 0s 7ms/step - loss: 0.2861 - mae: 0.2861 - val_loss: 0.3146 - val_mae: 0.31
46
Epoch 5/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 0s 7ms/step - loss: 0.2774 - mae: 0.2774 - val_loss: 0.3058 - val_mae: 0.30
58
Epoch 6/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 0s 8ms/step - loss: 0.2710 - mae: 0.2710 - val_loss: 0.2966 - val_mae: 0.29
66
Epoch 7/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 0s 7ms/step - loss: 0.2664 - mae: 0.2664 - val_loss: 0.2942 - val_mae: 0.29
42
Epoch 8/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 0s 7ms/step - loss: 0.2632 - mae: 0.2632 - val_loss: 0.2929 - val_mae: 0.29
29
Epoch 9/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 0s 7ms/step - loss: 0.2606 - mae: 0.2606 - val_loss: 0.2898 - val_mae: 0.28
98
Epoch 10/10
20/20 ━━━━━━━━━━━━━━━━━━━━ 0s 7ms/step - loss: 0.2582 - mae: 0.2582 - val_loss: 0.2853 - val_mae: 0.28
53
Test MAE: 0.2603
```