Stock Price Prediction Using Machine Learning

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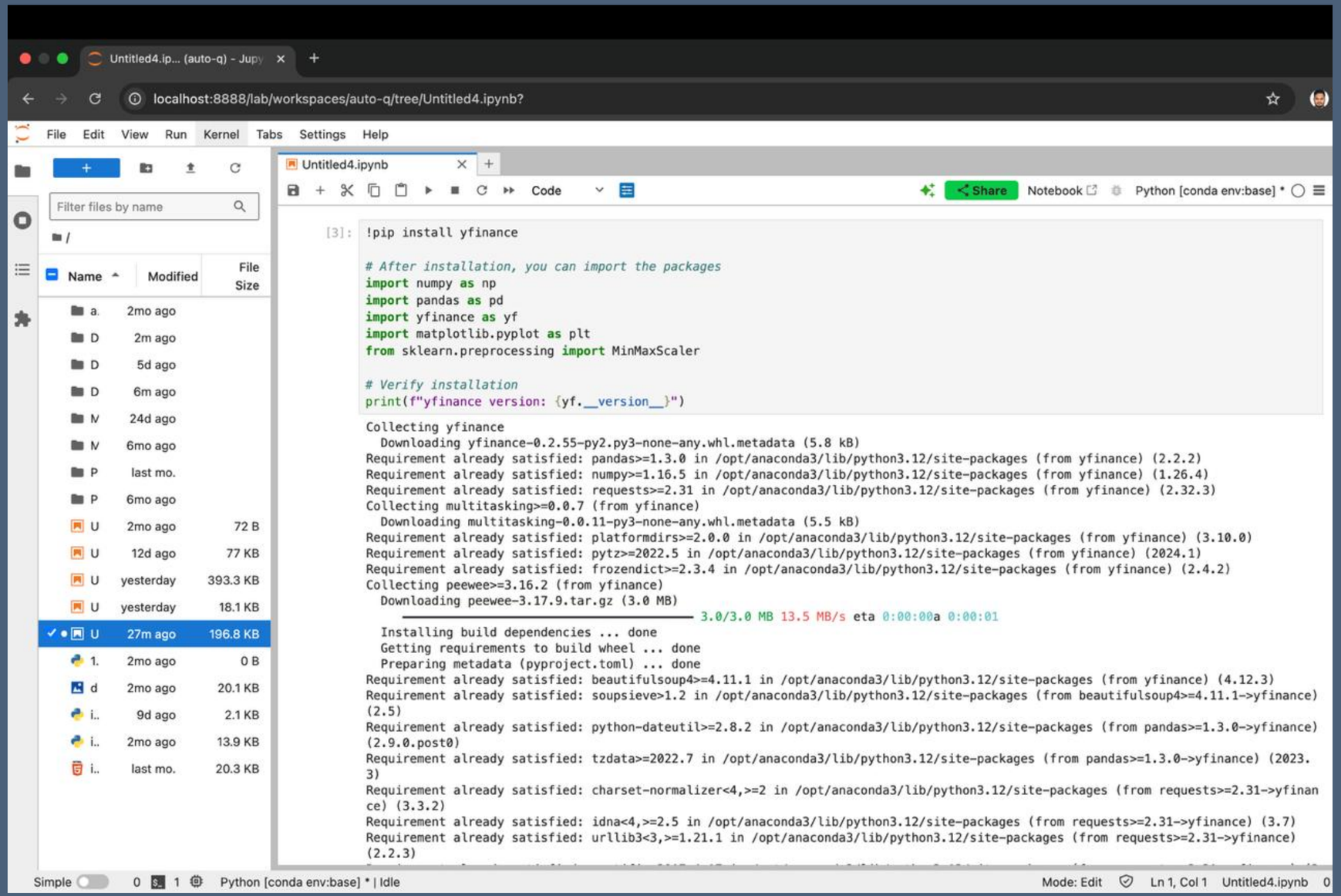
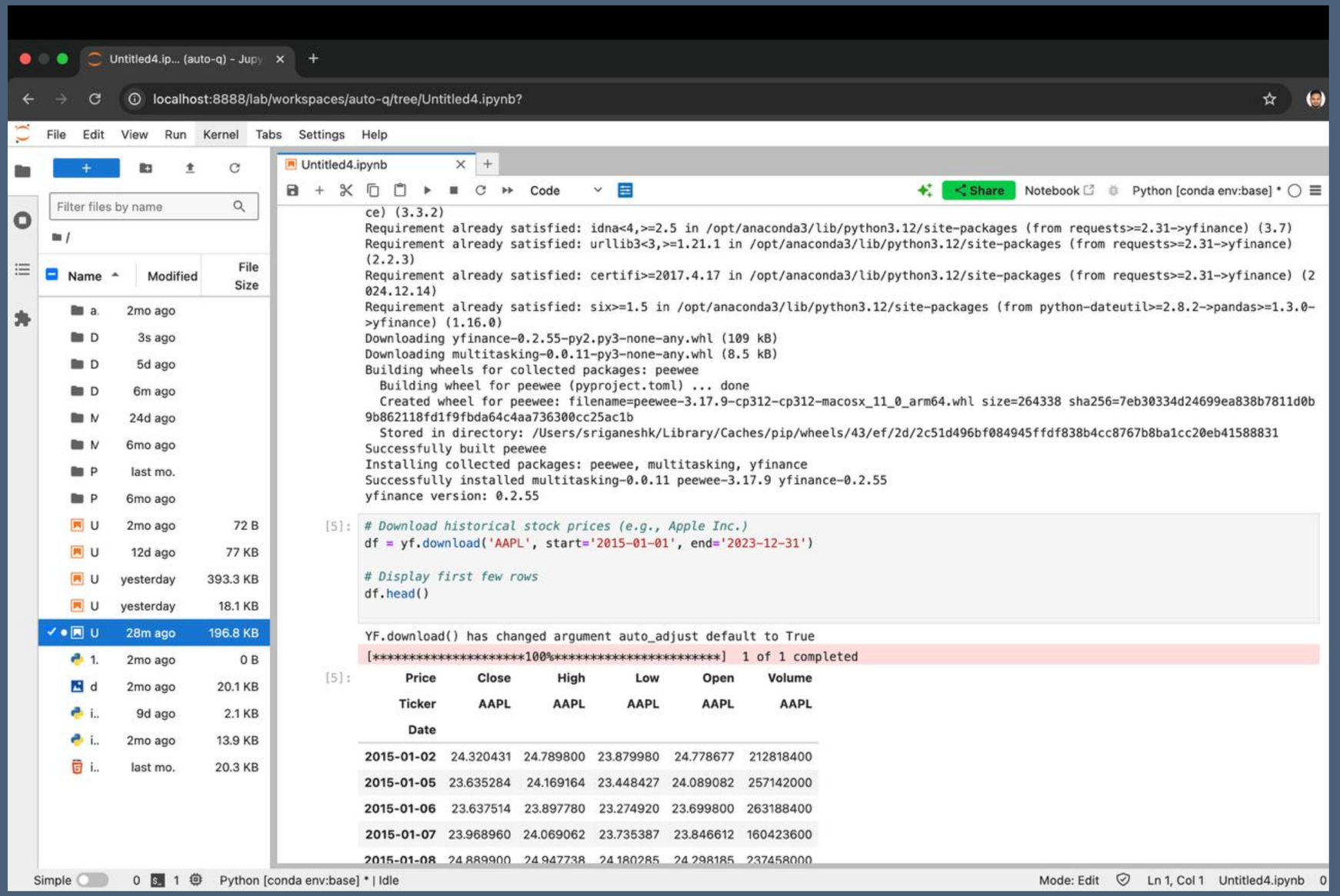
SGVS Thribhuvan Kambhamettu

Importing Libraries in Jupyter Notebook

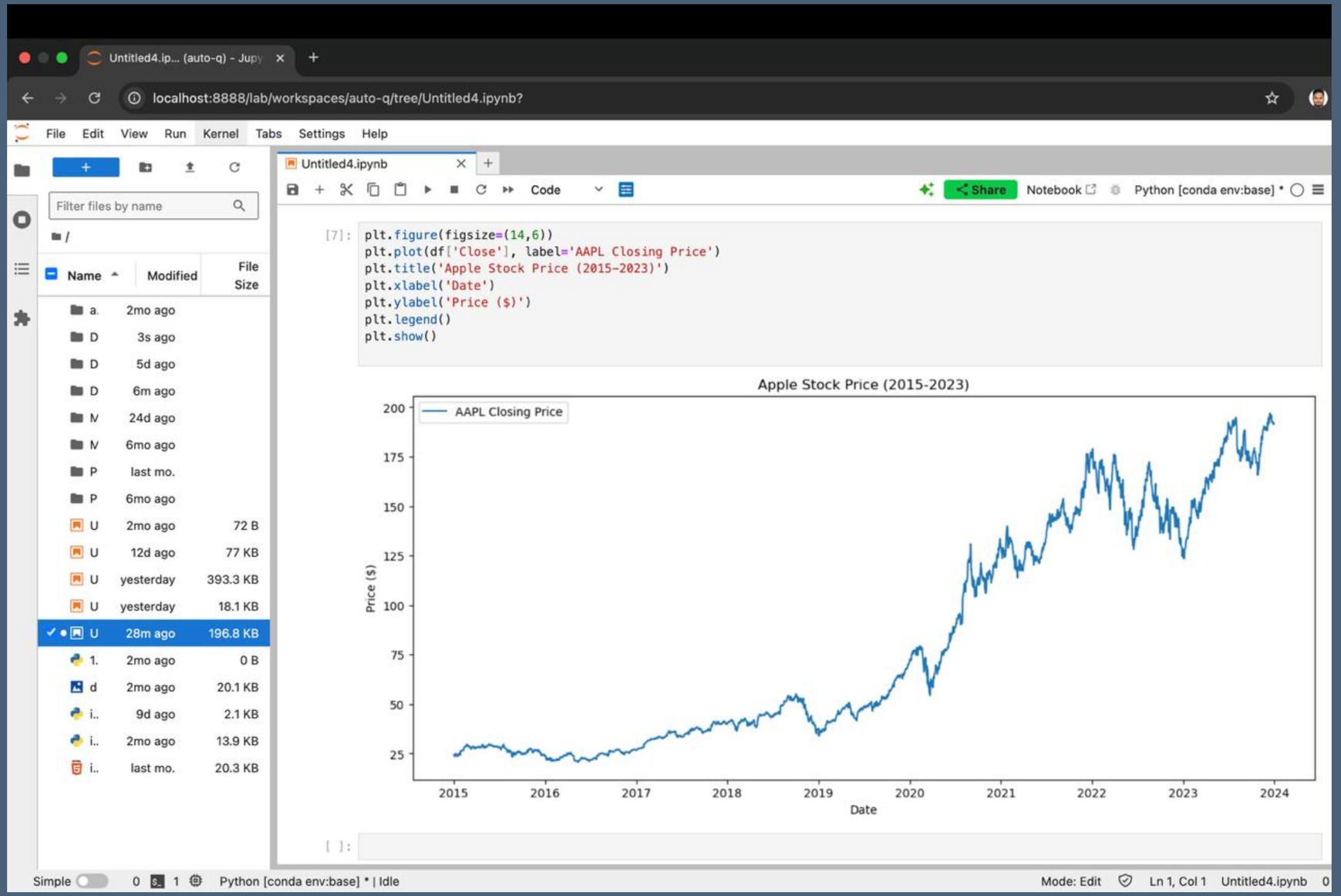


Here, we installed yfinance to check yahoo finance APIs

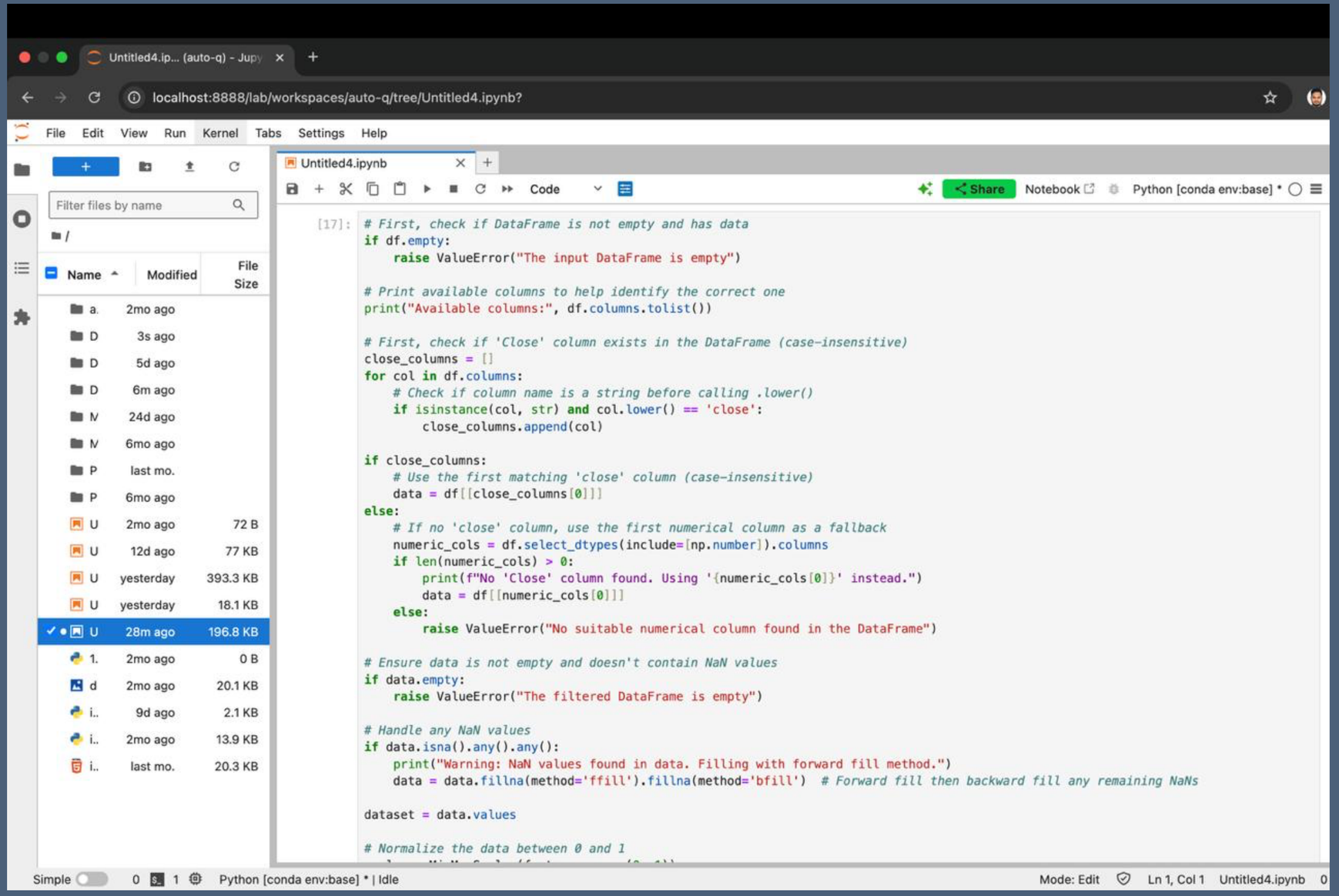
Downloading Historical Stock Price Eg: Apple Inc.

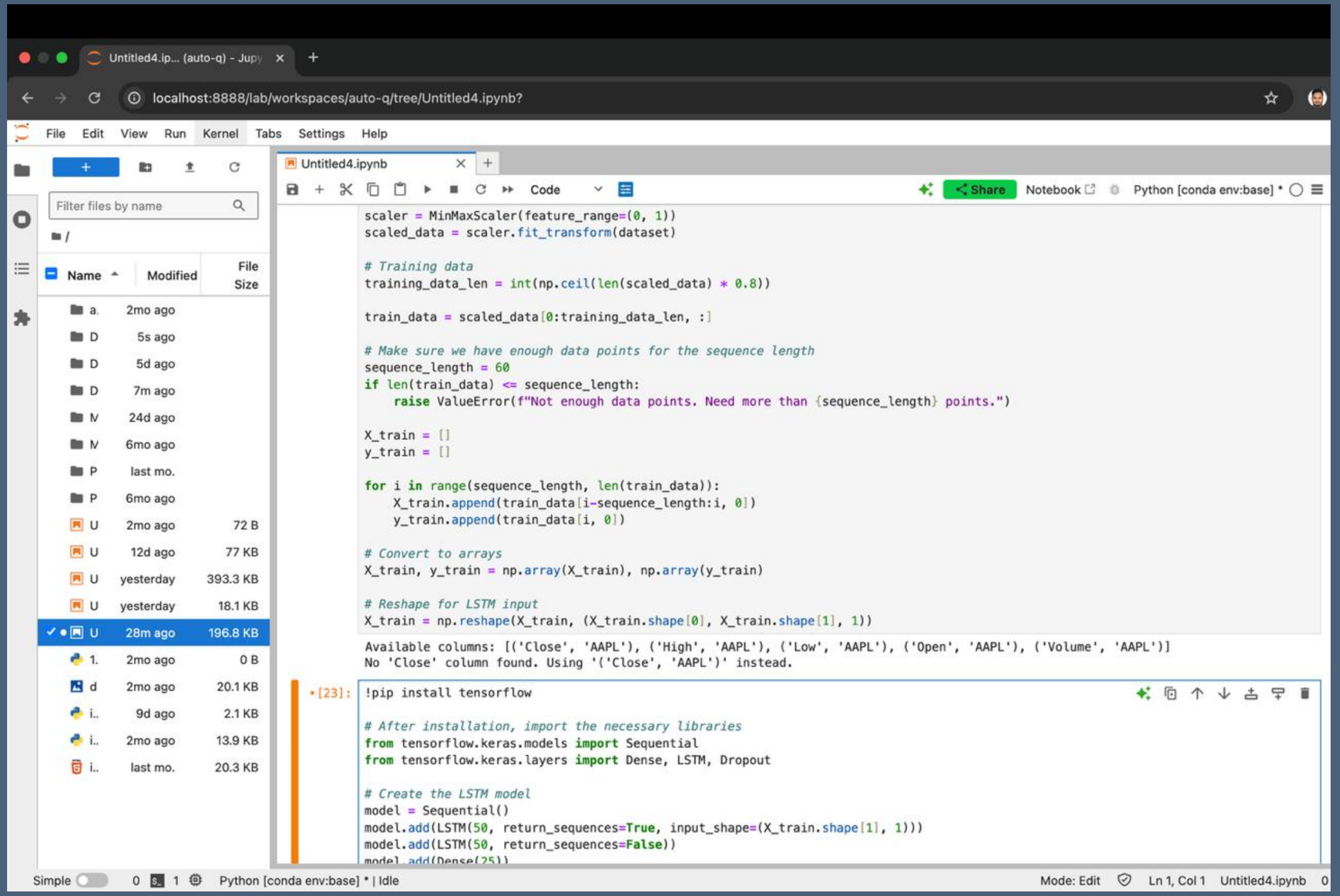


Visulisation



Checking The Dataframe




Untitled4.ip... (auto-q) - Jupy
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Code
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Python [conda env:base] *
scaler = MinMaxScaler(feature_range=(0, 1))
scaled_data = scaler.fit_transform(dataset)
# Training data
training_data_len = int(np.ceil(len(scaled_data) * 0.8))
train_data = scaled_data[0:training_data_len, :]
# Make sure we have enough data points for the sequence length
sequence_length = 60
if len(train_data) <= sequence_length:
raise ValueError(f"Not enough data points. Need more than {sequence_length} points.")
X_train = []
y_train = []
for i in range(sequence_length, len(train_data)):
X_train.append(train_data[i-sequence_length:i, 0])
y_train.append(train_data[i, 0])
# Convert to arrays
X_train, y_train = np.array(X_train), np.array(y_train)
# Reshape for LSTM input
X_train = np.reshape(X_train, (X_train.shape[0], X_train.shape[1], 1))
Available columns: [('Close', 'AAPL'), ('High', 'AAPL'), ('Low', 'AAPL'), ('Open', 'AAPL'), ('Volume', 'AAPL')]
No 'Close' column found. Using '('Close', 'AAPL')' instead.
[23]:
!pip install tensorflow
# After installation, import the necessary libraries
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense, LSTM, Dropout
# Create the LSTM model
model = Sequential()
model.add(LSTM(50, return_sequences=True, input_shape=(X_train.shape[1], 1)))
model.add(LSTM(50, return_sequences=False))
Simple
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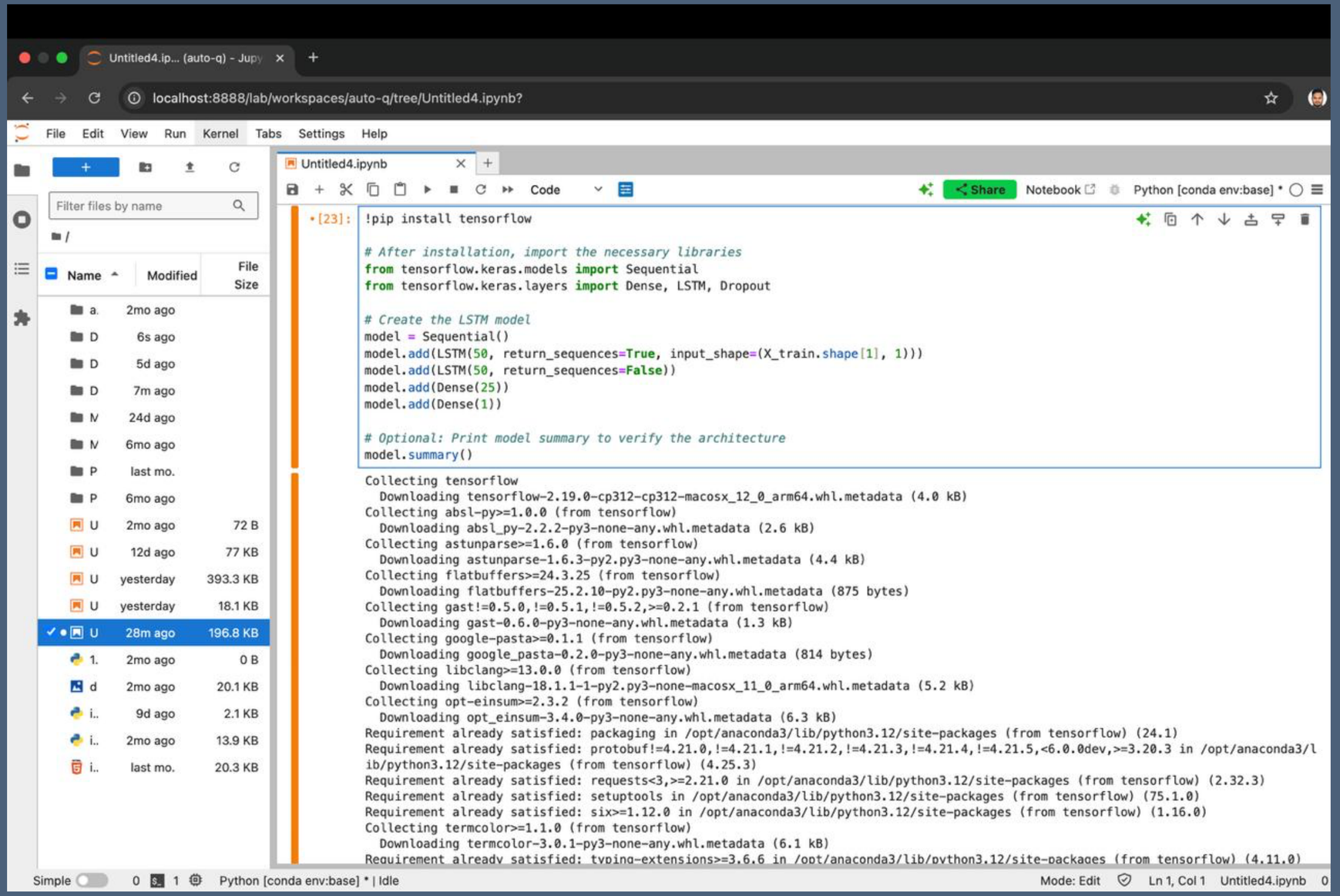
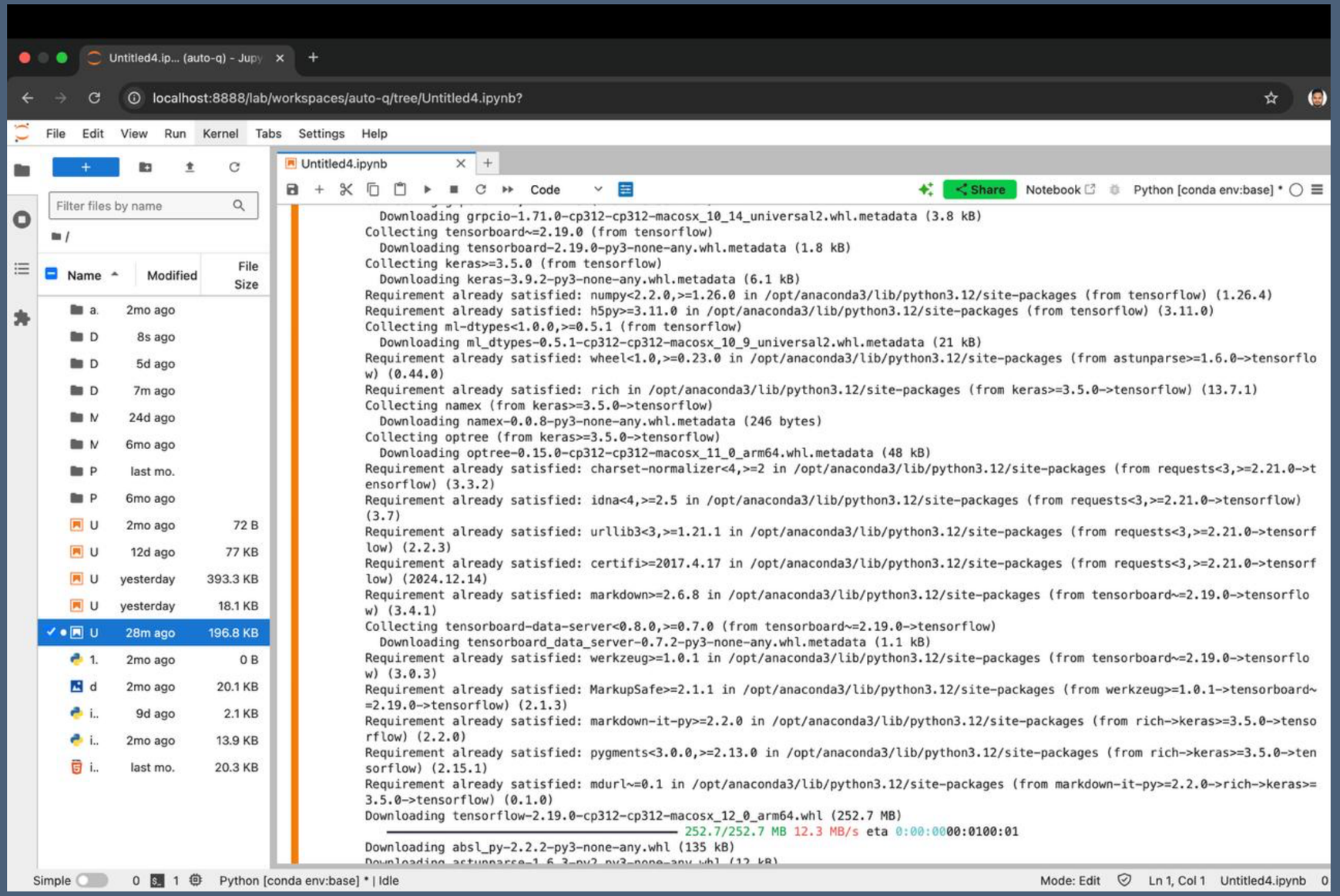
Installing Tensorflow

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Python [conda env:base] *
Downloading grpcio-1.71.0-cp312-cp312-macosx_10_14_universal2.whl.metadata (3.8 kB)
Collecting tensorboard~=2.19.0 (from tensorflow)
Downloading tensorboard-2.19.0-py3-none-any.whl.metadata (1.8 kB)
Collecting keras>=3.5.0 (from tensorflow)
Downloading keras-3.9.2-py3-none-any.whl.metadata (6.1 kB)
Requirement already satisfied: numpy<2.2.0,>=1.26.0 in /opt/anaconda3/lib/python3.12/site-packages (from tensorflow) (1.26.4)
Requirement already satisfied: h5py>=3.11.0 in /opt/anaconda3/lib/python3.12/site-packages (from tensorflow) (3.11.0)
Collecting ml-dtypes<1.0.0,>=0.5.1 (from tensorflow)
Downloading ml_dtypes-0.5.1-cp312-cp312-macosx_10_9_universal2.whl.metadata (21 kB)
Requirement already satisfied: wheel<1.0,>=0.23.0 in /opt/anaconda3/lib/python3.12/site-packages (from astunparse>=1.6.0->tensorflow) (0.44.0)
Requirement already satisfied: rich in /opt/anaconda3/lib/python3.12/site-packages (from keras>=3.5.0->tensorflow) (13.7.1)
Collecting namex (from keras>=3.5.0->tensorflow)
Downloading namex-0.0.8-py3-none-any.whl.metadata (246 bytes)
Collecting optree (from keras>=3.5.0->tensorflow)
Downloading optree-0.15.0-cp312-cp312-macosx_11_0_arm64.whl.metadata (48 kB)
Requirement already satisfied: charset-normalizer<4,>=2 in /opt/anaconda3/lib/python3.12/site-packages (from requests<3,>=2.21.0->tensorflow) (3.3.2)
Requirement already satisfied: idna<4,>=2.5 in /opt/anaconda3/lib/python3.12/site-packages (from requests<3,>=2.21.0->tensorflow) (3.7)
Requirement already satisfied: urllib3<3,>=1.21.1 in /opt/anaconda3/lib/python3.12/site-packages (from requests<3,>=2.21.0->tensorflow) (2.2.3)
Requirement already satisfied: certifi>=2017.4.17 in /opt/anaconda3/lib/python3.12/site-packages (from requests<3,>=2.21.0->tensorflow) (2024.12.14)
Requirement already satisfied: markdown>=2.6.8 in /opt/anaconda3/lib/python3.12/site-packages (from tensorboard~=2.19.0->tensorflow) (3.4.1)
Collecting tensorboard-data-server<0.8.0,>=0.7.0 (from tensorboard~=2.19.0->tensorflow)
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Requirement already satisfied: MarkupSafe>=2.1.1 in /opt/anaconda3/lib/python3.12/site-packages (from werkzeug>=1.0.1->tensorboard~=2.19.0->tensorflow) (2.1.3)
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Requirement already satisfied: pygments<3.0.0,>=2.13.0 in /opt/anaconda3/lib/python3.12/site-packages (from rich->keras>=3.5.0->tensorflow) (2.15.1)
Requirement already satisfied: mdurl~=0.1 in /opt/anaconda3/lib/python3.12/site-packages (from markdown-it-py>=2.2.0->rich->keras>=3.5.0->tensorflow) (0.1.0)
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Downloading absl_py-2.2.2-py3-none-any.whl (135 kB)
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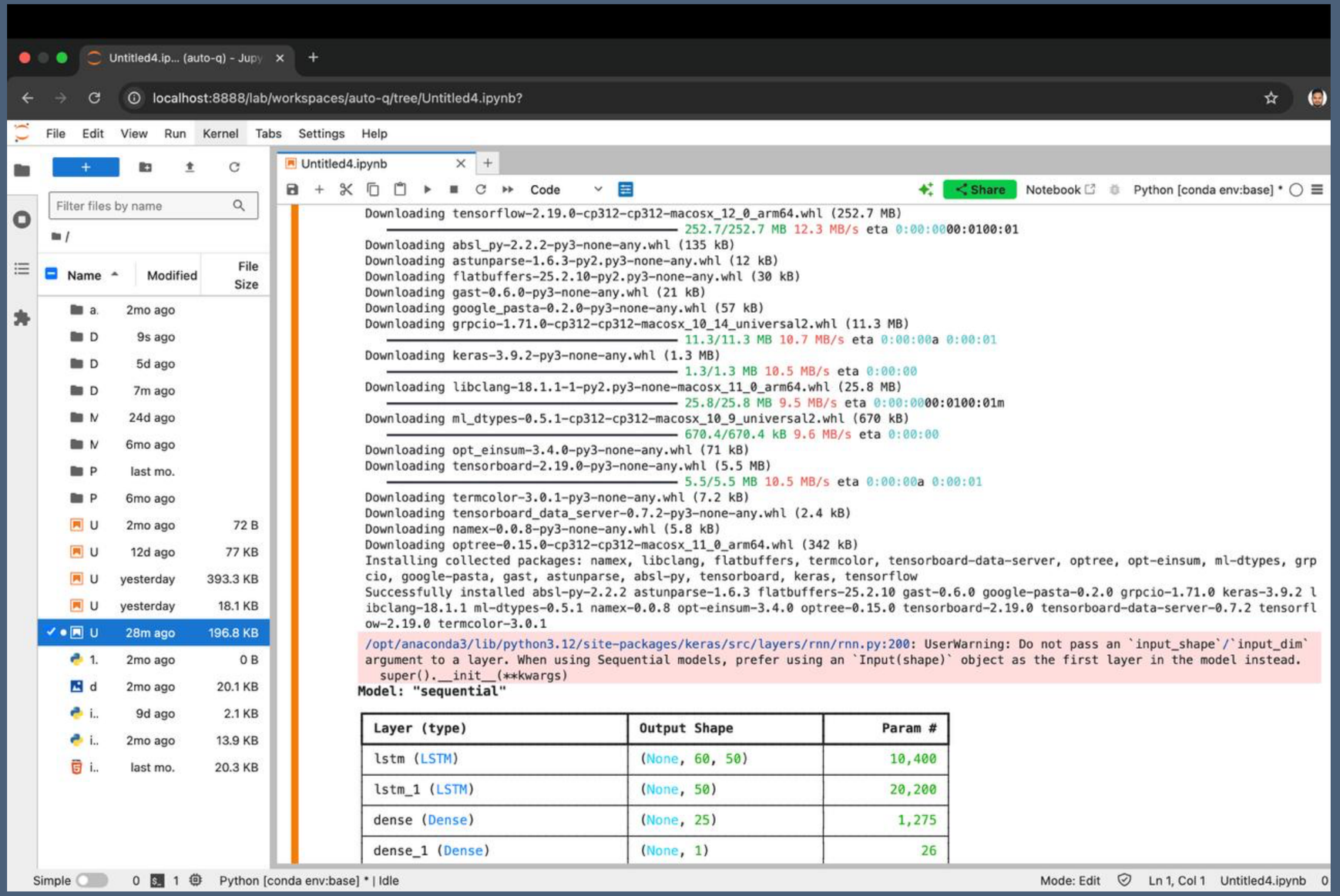
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M 24d ago
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P last mo.
P 6mo ago
U 2mo ago 72 B
U 12d ago 77 KB
U yesterday 393.3 KB
U yesterday 18.1 KB
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Downloading astunparse-1.6.3-py2.py3-none-any.whl (12 kB)
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Downloading gast-0.6.0-py3-none-any.whl (21 kB)
Downloading google_pasta-0.2.0-py3-none-any.whl (57 kB)
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11.3/11.3 MB 10.7 MB/s eta 0:00:00a 0:00:01
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Downloading opt_einsum-3.4.0-py3-none-any.whl (71 kB)
Downloading tensorboard-2.19.0-py3-none-any.whl (5.5 MB)
5.5/5.5 MB 10.5 MB/s eta 0:00:00a 0:00:01
Downloading termcolor-3.0.1-py3-none-any.whl (7.2 kB)
Downloading tensorboard_data_server-0.7.2-py3-none-any.whl (2.4 kB)
Downloading namex-0.0.8-py3-none-any.whl (5.8 kB)
Downloading optree-0.15.0-cp312-cp312-macosx_11_0_arm64.whl (342 kB)
Installing collected packages: namex, libclang, flatbuffers, termcolor, tensorboard-data-server, optree, opt-einsum, ml-dtypes, grpcio, google-pasta, gast, astunparse, absl-py, tensorboard, keras, tensorflow
Successfully installed absl-py-2.2.2 astunparse-1.6.3 flatbuffers-25.2.10 gast-0.6.0 google-pasta-0.2.0 grpcio-1.71.0 keras-3.9.2 libclang-18.1.1 ml-dtypes-0.5.1 namex-0.0.8 opt-einsum-3.4.0 optree-0.15.0 tensorboard-2.19.0 tensorboard-data-server-0.7.2 tensorflow-2.19.0 termcolor-3.0.1
/opt/anaconda3/lib/python3.12/site-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `Input(shape)` object as the first layer in the model instead.
super().__init__(**kwargs)
Model: "sequential"
Layer (type) Output Shape Param #
lstm (LSTM) (None, 60, 50) 10,400
lstm_1 (LSTM) (None, 50) 20,200
dense (Dense) (None, 25) 1,275
dense_1 (Dense) (None, 1) 26
Simple 0 1 Python [conda env:base] * | Idle
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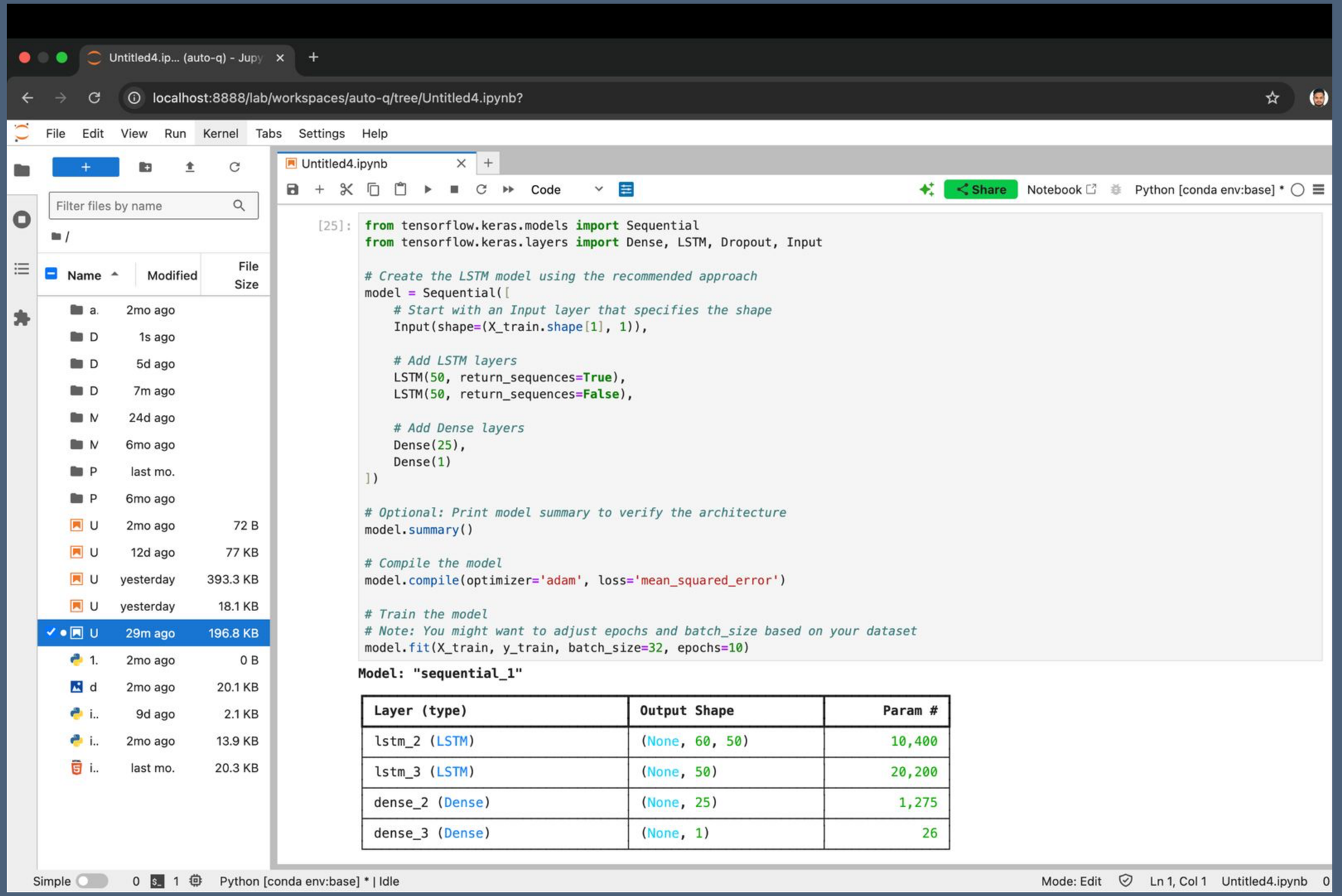
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D 5d ago
D 7m ago
M 24d ago
M 6mo ago
P last mo.
P 6mo ago
U 2mo ago 72 B
U 12d ago 77 KB
U yesterday 393.3 KB
U yesterday 18.1 KB
U 29m ago 196.8 KB
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d 2mo ago 20.1 KB
i.. 9d ago 2.1 KB
i.. 2mo ago 13.9 KB
i.. last mo. 20.3 KB
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Code
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Python [conda env:base] *
[25]:
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense, LSTM, Dropout, Input
# Create the LSTM model using the recommended approach
model = Sequential([
# Start with an Input layer that specifies the shape
Input(shape=(X_train.shape[1], 1)),
Add LSTM layers
LSTM(50, return_sequences=True),
LSTM(50, return_sequences=False),
Add Dense layers
Dense(25),
Dense(1)
])
# Optional: Print model summary to verify the architecture
model.summary()
# Compile the model
model.compile(optimizer='adam', loss='mean_squared_error')
# Train the model
# Note: You might want to adjust epochs and batch_size based on your dataset
model.fit(X_train, y_train, batch_size=32, epochs=10)
Model: "sequential_1"
Layer (type) Output Shape Param #
lstm_2 (LSTM) (None, 60, 50) 10,400
lstm_3 (LSTM) (None, 50) 20,200
dense_2 (Dense) (None, 25) 1,275
dense_3 (Dense) (None, 1) 26
Simple 0 1 Python [conda env:base] * | Idle
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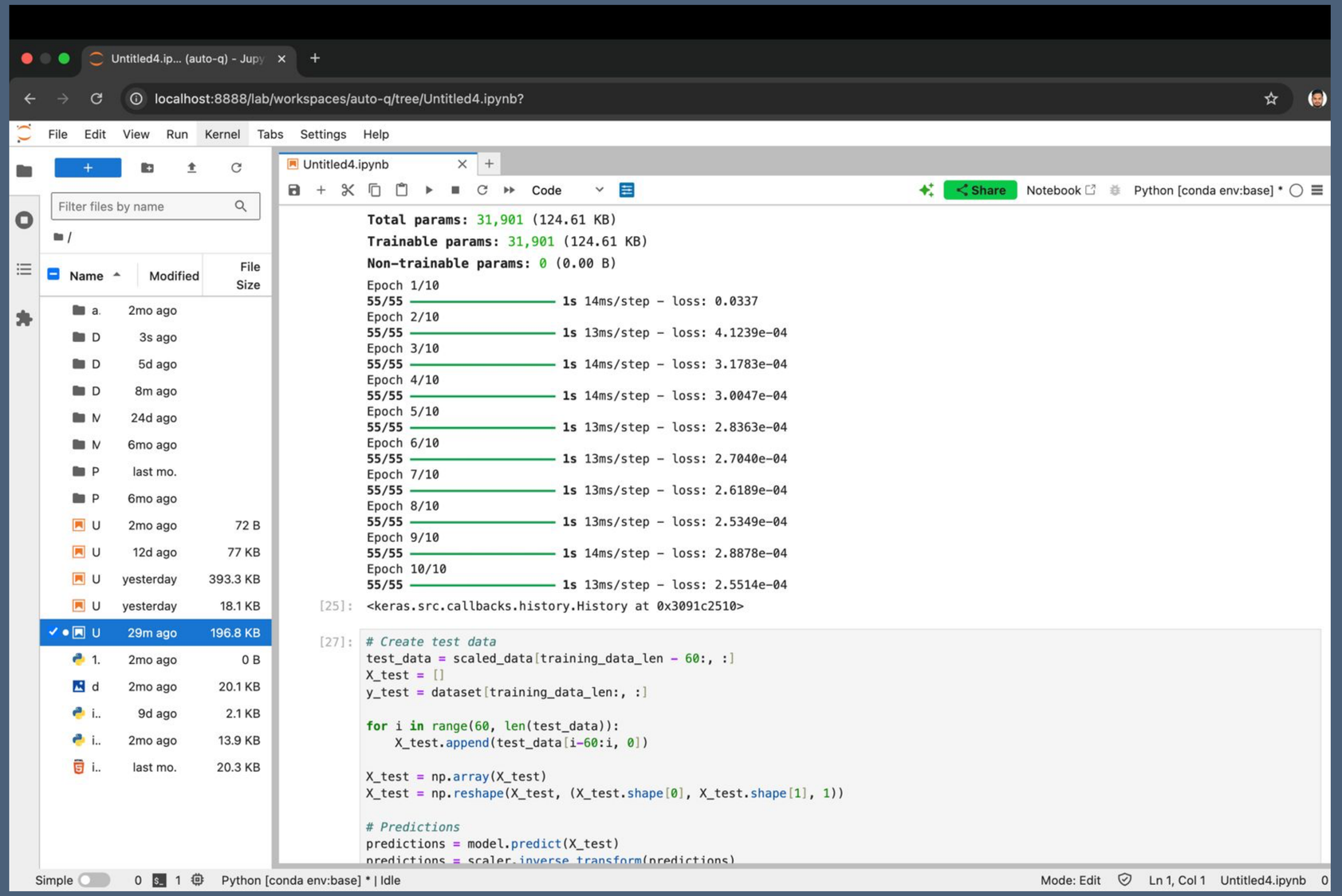
Creating Test Data



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a.	2mo ago	
D	13s ago	
D	5d ago	
D	8m ago	
M	24d ago	
M	6mo ago	
P	last mo.	
P	6mo ago	
U	2mo ago	72 B
U	12d ago	77 KB
U	yesterday	393.3 KB
U	yesterday	18.1 KB
U	29m ago	196.8 KB
1.	2mo ago	0 B
d	2mo ago	20.1 KB
i..	9d ago	2.1 KB
i..	2mo ago	13.9 KB
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Untitled4.ipynb

Code Share Notebook Python [conda env:base] *

```
15/15 ━━━━━━━━━━━━━━━━━━━━ 0s 8ms/step
```

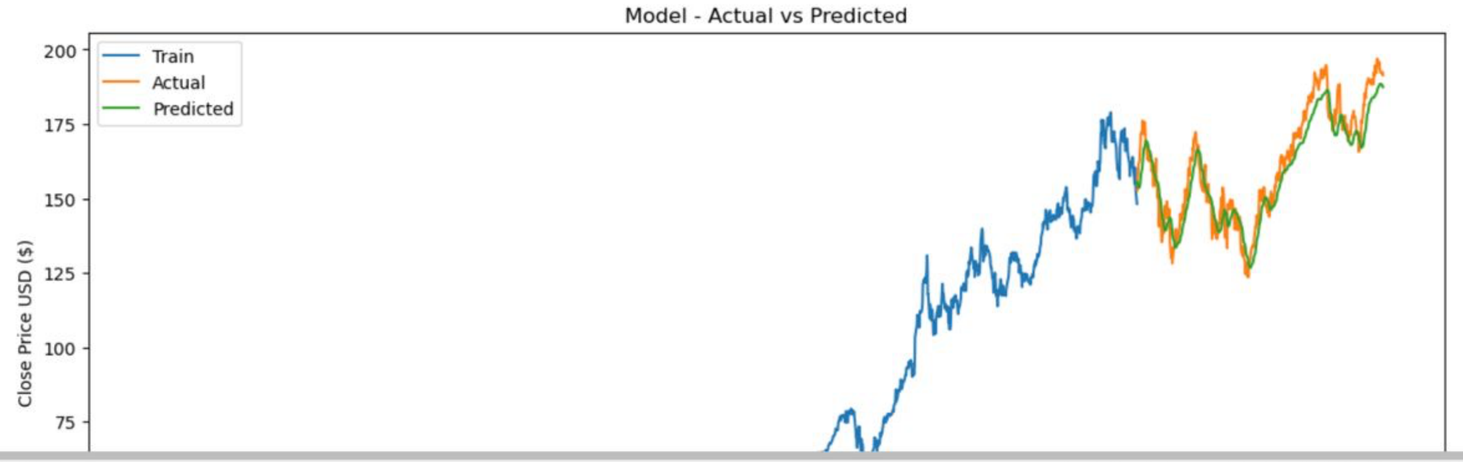
[37]:

```
# Instead of:
# valid['Predictions'] = predictions

# Use .loc to avoid the SettingWithCopyWarning
valid.loc[:, 'Predictions'] = predictions

# Alternatively, if you want to ensure you're working with a copy:
valid = valid.copy()
valid['Predictions'] = predictions

plt.figure(figsize=(14,6))
plt.title('Model - Actual vs Predicted')
plt.xlabel('Date')
plt.ylabel('Close Price USD ($)')
plt.plot(train['Close'])
plt.plot(valid[['Close', 'Predictions']])
plt.legend(['Train', 'Actual', 'Predicted'])
plt.show()
```



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Untitled4.ip... (auto-q) - Jupy

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a.	2mo ago	
D	4s ago	
D	5d ago	
D	8m ago	
M	24d ago	
M	6mo ago	
P	last mo.	
P	6mo ago	
U	2mo ago	72 B
U	12d ago	77 KB
U	yesterday	393.3 KB
U	yesterday	18.1 KB
U	29m ago	196.8 KB
1.	2mo ago	0 B
d	2mo ago	20.1 KB
i..	9d ago	2.1 KB
i..	2mo ago	13.9 KB
i..	last mo.	20.3 KB

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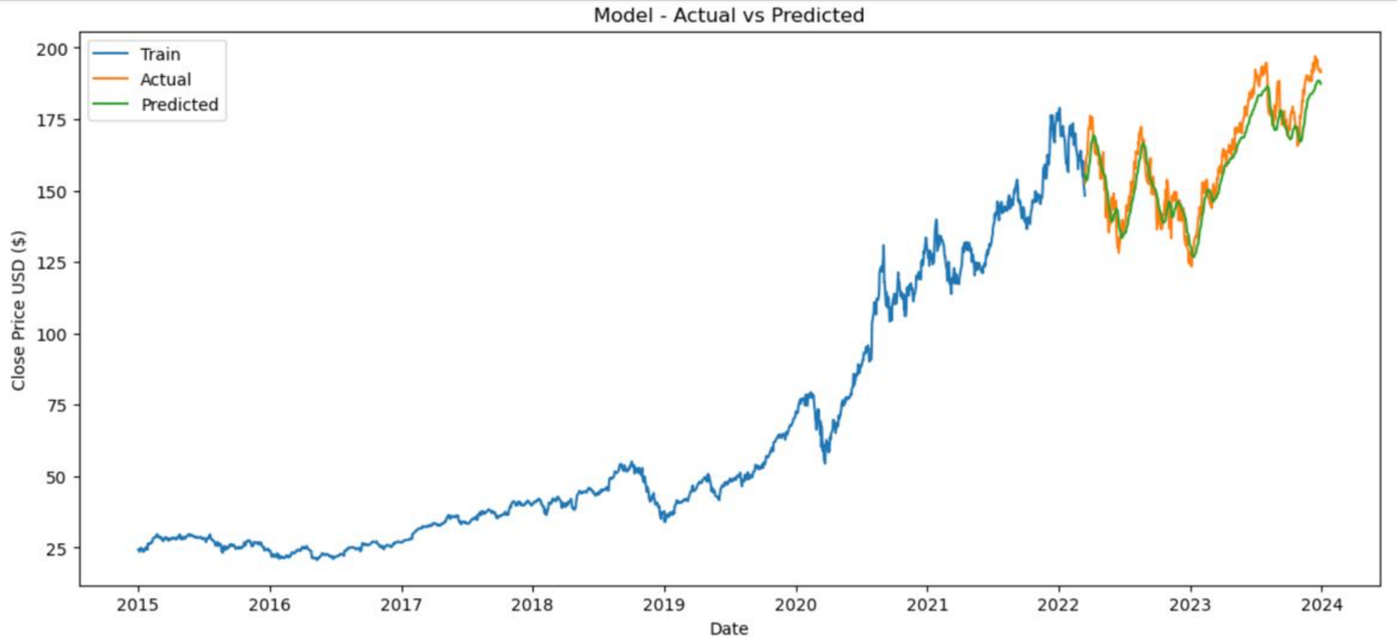
Code Share Notebook Python [conda env:base] *



[39]:
```
last_60_days = data[-60:].values
last_60_days_scaled = scaler.transform(last_60_days)

X_input = np.reshape(last_60_days_scaled, (1, 60, 1))
predicted_price = model.predict(X_input)
predicted_price = scaler.inverse_transform(predicted_price)

print(f"Predicted next day closing price: ${predicted_price[0][0]:.2f}")
```

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 27ms/step
Predicted next day closing price: $187.06
```

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