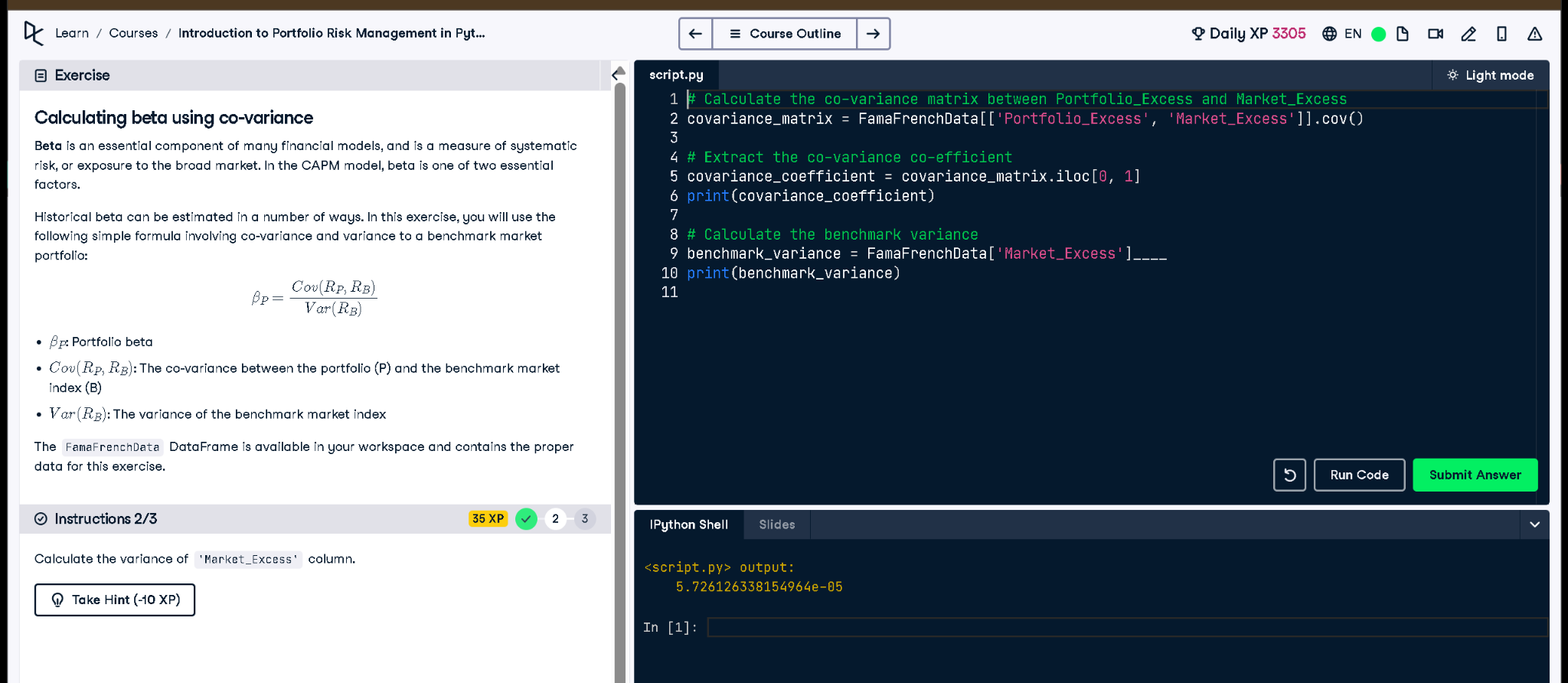
# Calculating Beta Using Co-variance



## Python Code

# Calculate the co-variance matrix between Portfolio\_Excess and Market\_Excess  
covariance\_matrix = FamaFrenchData[['Portfolio\_Excess', 'Market\_Excess']].cov()  
  
# Extract the co-variance co-efficient  
covariance\_coefficient = covariance\_matrix.iloc[0, 1]  
print(covariance\_coefficient)  
  
# Calculate the benchmark variance  
benchmark\_variance = FamaFrenchData['Market\_Excess'].var()  
print(benchmark\_variance)

## Explanation (in Simple Words)

This code calculates how much the portfolio and the market move together (covariance), then gets the market’s own movement range (variance). These two values are needed to compute the beta, which shows how risky the portfolio is compared to the market. Higher beta means more market-related risk.