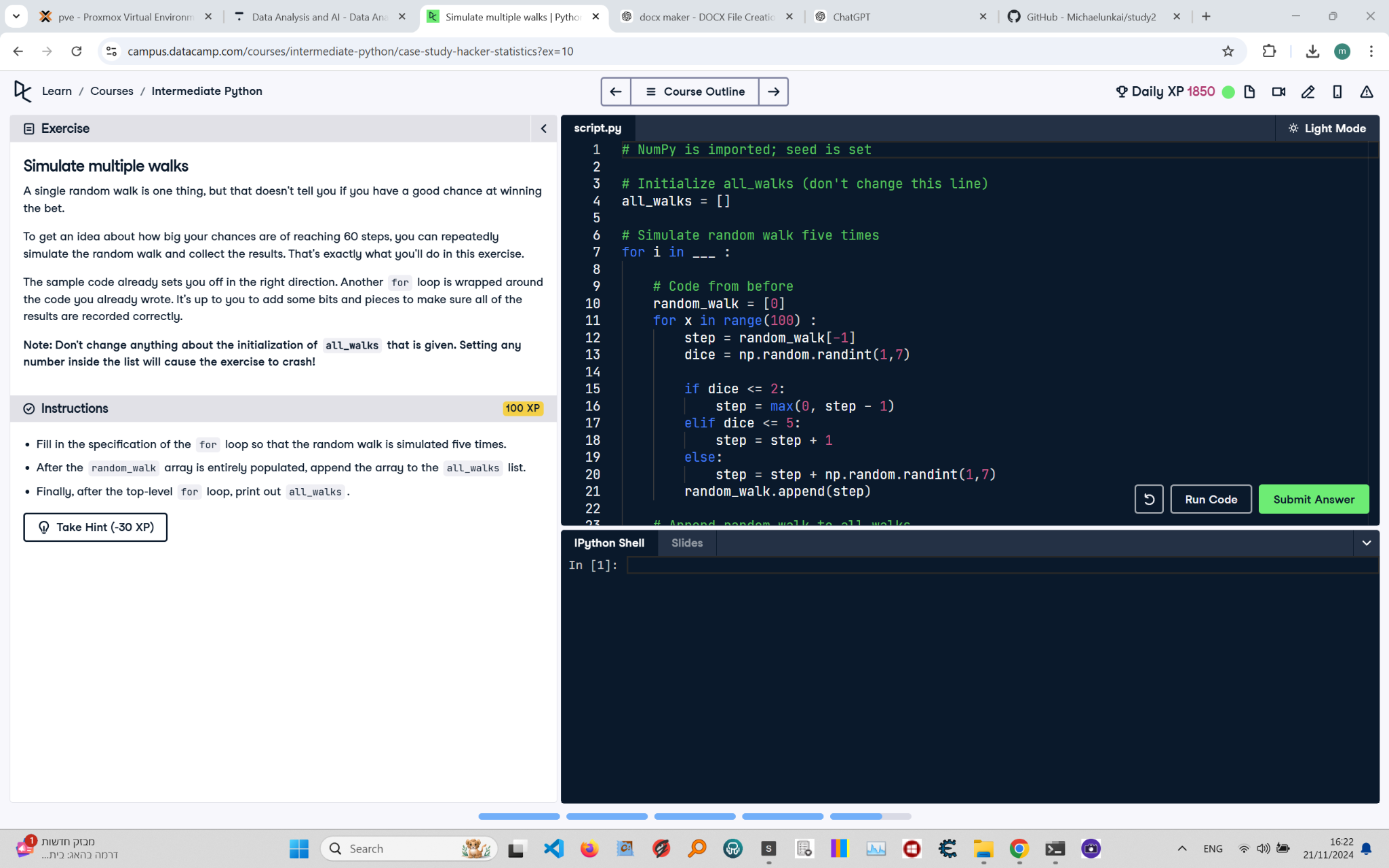
# Simulate Multiple Walks



Below is the exercise on 'Simulate Multiple Walks' from the Python course. The image includes the instructions, code, and task details.

Solution:

# NumPy is imported; seed is set  
import numpy as np  
np.random.seed(123)  
  
# Initialize all\_walks (don't change this line)  
all\_walks = []  
  
# Simulate random walk five times  
for i in range(5): # Loop runs 5 times  
 # Code from before  
 random\_walk = [0]  
 for x in range(100): # Loop runs 100 times for each walk  
 # Set step: last element in random\_walk  
 step = random\_walk[-1]  
   
 # Roll the dice  
 dice = np.random.randint(1, 7)  
   
 # Determine next step using max to prevent step from going below 0  
 if dice <= 2:  
 step = max(0, step - 1) # Move down but ensure step doesn't go below 0  
 elif dice <= 5:  
 step = step + 1 # Move up  
 else:  
 step = step + np.random.randint(1, 7) # Move up by a random value  
   
 # Append next\_step to random\_walk  
 random\_walk.append(step)  
   
 # Append random\_walk to all\_walks  
 all\_walks.append(random\_walk)  
  
# Print all\_walks  
print(all\_walks)

Explanation:

1. Import numpy as np and set the random seed using np.random.seed(123) to ensure reproducibility.

2. Initialize all\_walks as an empty list to store the results of multiple random walks.

3. Use a for loop to repeat the random walk simulation 5 times:

- For each walk, initialize random\_walk as a list containing the first step, 0.

- Use a nested for loop that runs 100 times to simulate the steps of each random walk:

- Get the current step as the last element of the random\_walk list using random\_walk[-1].

- Roll the dice using np.random.randint(1, 7) to generate a random integer between 1 and 6.

- Use max() to ensure that step doesn't go below 0 when dice <= 2. This prevents negative steps:

- If dice is 1 or 2, use max(0, step - 1) to decrease step by 1 but not below 0.

- If dice is 3, 4, or 5, increase step by 1.

- If dice is 6, roll the dice again and add the new result to step.

- Append the updated step to the random\_walk list.

- Append the completed random\_walk to the all\_walks list.

4. Print all\_walks to see the results of the 5 random walks.