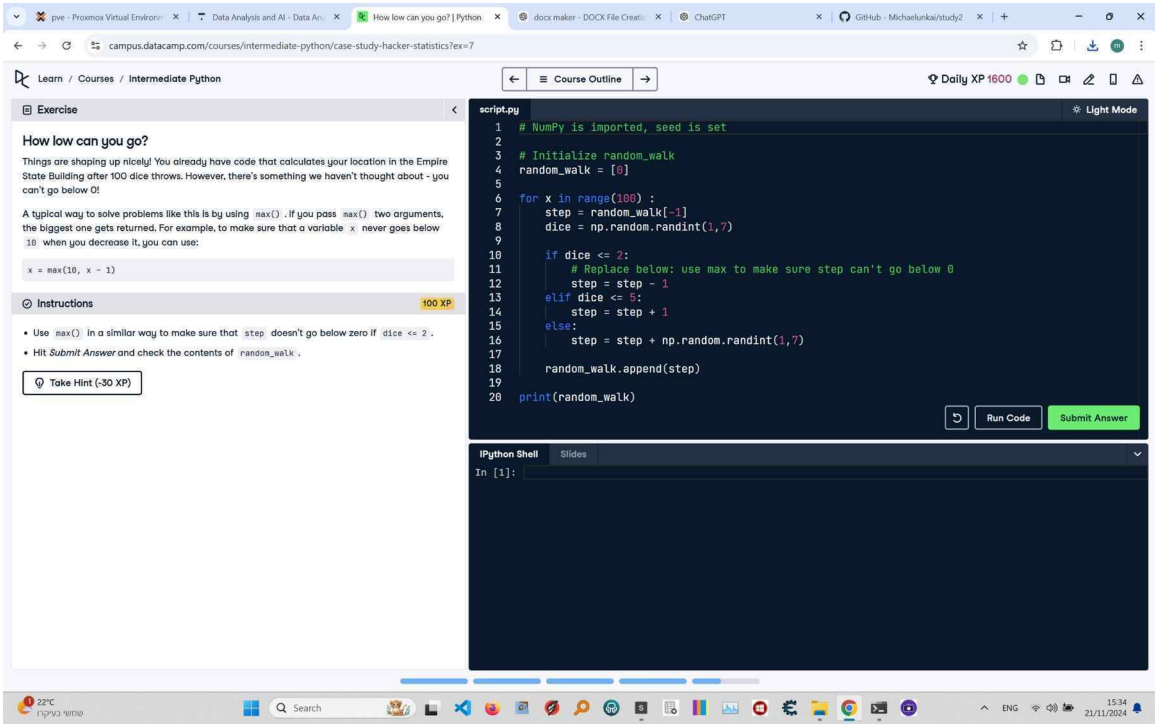
How Low Can You Go?



Below is the exercise on 'How Low Can You Go?' 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 random_walk
random_walk = [0]

# Complete the for loop
for x in range(100):  # Loop runs 100 times
    # 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)

# Print out random_walk
print(random_walk)
```

Explanation:

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

2. Initialize random_walk as a list containing the first step, 0.

3. Use a for loop that runs 100 times to simulate the steps of the 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.

4. Append the updated step to the random_walk list.

5. Print the final random_walk list after completing the loop.