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import random

# Function to generate random time between arrivals based on given probabilities

def time\_between\_arrivals():

rand\_num = random.uniform(0, 1)

if rand\_num < 0.5:

return 5

elif rand\_num < 0.8:

return 10

else:

return 15

# Function to generate random service time of the doctor based on given probabilities

def doctor\_service\_time():

rand\_num = random.uniform(0, 1)

if rand\_num < 0.3:

return 4

elif rand\_num < 0.8:

return 8

else:

return 12

# Function to simulate a single patient's journey through the doctor's office

def simulate\_patient():

nurse\_service\_time = 7

arrival\_time = 0

total\_wait\_time = 0

# Arrival time of the first patient is 0

for \_ in range(10\_000): # Simulate 10,000 patients

arrival\_time += time\_between\_arrivals()

service\_start\_time = max(arrival\_time, total\_wait\_time)

doctor\_time = doctor\_service\_time()

total\_wait\_time += nurse\_service\_time + doctor\_time

average\_time = total\_wait\_time / 10\_000

return average\_time

# Perform Monte Carlo simulation

average\_time = simulate\_patient()

print("Average time a patient spends in the doctor's office:", average\_time)

**Conclusion:** Average time a patient spends in the doctor's office: 14.6624

In [ ]:



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