Solve the following problems from the custom textbook:

**Problem 1:** Problem 14 (Clark Property Management) on page 181. Follow the method described in class and in the book to map the random numbers in the table into the number of AC compressor failures per year.

This is problem 15-14 in the hard-cover editions.

*Clark Property management is responsible for the maintenance, rental, and day-to-day operation of a large apartment complex on the East side of New Orleans. Gorge Clark is especially concerned about the cost projections for replacing air conditioner compressors. He would like to simulate the number of compressor failures each year over the next 20 years. Using data from a similar apartment building he manages in a New Orleans suburb, Clark establishes a table of relative frequency of failures during a year as shown in the following table:*



*He decides to simulate the 20-year period by selecting two-digit random numbers from the third column of Table 15.5, starting with the random number 50.*

*Conduct the simulation for Clark. Is it common to have three or more consecutive years of operation with two or fewer compressor failures per year?*

|  |  |
| --- | --- |
|  | Based on the 20-year projection, there will be no periods of three or more years with two or less failures per each year. |

**Problem 2:** Compute the mean and variance of the number of AC compressor failures per year indicated by the relative frequencies given in Problem 14. Compare these values to the sample mean and sample variance from your simulation in Problem 1.



**Problem 3:** Problem 18 (Port of New Orleans) on Page 182.

This is problem 15-18) in the hard-cover editions.

For these problems submit a brief description of how you set up your simulation. This description must explain how you generated the random events in your simulation and any formulas that you used in your simulation.

*An increase in the size of the barge unloading crew at the Port of New Orleans (see section 15.5) has resulted in a new probability distribution for daily unloading rates. In particular, Table 15.11 may be revised as show here:*



1. *Resimulate 15 days of barge unloading and compute the average number of barges delayed, average number of nightly arrivals, and average number of barges unloaded each day. Draw random numbers from the bottom of row Table 15.5 to generate daily arrivals and from the penultimate row to generate daily unloading rates*
2. *How do these simulated results compare with those in the chapter?*

Assumptions:

Barges arrive at night of the day before.

Starting with no barges in port.

Columns:

M = rand-arrivals()

N = rand-unloading()

O = # nightly arrivals

P = Daily Unloading Rate

Q = # barges left from previous day

R = # to be unloaded

S = #barges unloaded

Formulas:

Nightly Arrivals: VLOOKUP(M2/100,$H$2:$J$7,3)

For daily unloading rates, this is equivalent to :

((N2/100)>0)\*1+((N2/100)>$D$2)\*1+((N2/100)>$D$3)\*1+((N2/100)>$D$4)\*1+((N2/100)>$D$5)\*1+((N2/100)>$D$6)\*1

# barges left from previous day : Rx-Sx

# to be unloaded = Q3+O3

#barges unloaded = MIN(R2,P2)



The averages are noticeably better, and the average number of delayed ships has reduced from 1.33 to 0.4.