From Bertsekas and Tsitsiklis, *Introduction to Probability, 2nd Ed.*

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10. MATLAB Problem

**Sum of a Bionomial Number of Independent Uniform Random Variables**

Suppose you live in a small town of a hundred people and you own a small store. Every normal day (excluding Sundays of course) each person in the town has the probability $p = 0.25$ of visiting your store. A person that visits your store will spend money distributed uniformly from 0 to 50 dollars. The amount of money spent in your store on any normal day is $Y$.

a) Analytically compute the following: mean of $Y$, standard deviation of $Y$ (consider page 242 in the book).

b) Simulate this problem in the following fashion (turn in your code):

Do the following loop 10,000 times

—Generate the number of people, $n$, that visit your store every day by a Binomial random variable.
—Sum together $n$ random variables with uniform distributions from 0 to 50.
—Store the sum of money - this is one outcome of the random variable $Y$.

After the loop is complete, then compute the mean and standard deviation of the outcomes for $Y$.

c) Plot a histogram representing the pdf of $Y$.

d) Do the simulated values you computed in part b) match the values in part a)?