Question 8: Given a biased coin analogy, if a bit vector is 40 percent full, what are the odds that 5 bits randomly chosen all fall within the filled section. Simulate the results and compare to calculations.

Given: A bit vector that is 40 percent full, and the conditional of 5 bits randomly filled within a section.

Approach: If our bit vector is already 40 percent full, and we're looking for the probability of the bit being true 5 times consecutively. We can write our probability of P(5 in a row) as $(0.40)^5$. Where 0.40 is the bit vector as a percentage, and 5 is the conditional. With this, our odds being in favor are approximately 0.01024 percent. About 1 in 98 or 99 of all 5 randomly falling within the section.

Therefore: Based on our math, we can say the odds are about 0.01025 percent.