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Answers

a)

In order to conduct the Monte Carlo Study, we need to find the size of the simulation. We use normal approximation to find the size.

$$N \geq 0.25\,(\frac{z_{\alpha/2}}{\varepsilon})^2$$

As the probability is 0.98, our $\alpha = 0.02$. Thus, $z_{0.01} = 2.326$ will be used. Also, $\varepsilon = 0.008$.

$$N \geq 0.25\,(\frac{2.326}{0.008})^2 = 21133.89$$

Result is approximately 21134. For certainty, N = 21135 is used as the size of the simulation.

Since number of chunks have binomial distribution, the algorithm in the textbook's Example 5.6 can be used.

```
n = 250; p = 0.62;
U = rand(n,1);
X = sum(U < p);
```

After finding the number of chunks, we measure the weight of each chunk, sum them and put the total weight to the total weight matrix. At the end of 21135 run, we calculate the estimated probability, expected weight and standard deviation.

According to the Monte Carlo Study, the probability that the total weight of the plastics produced by the factory in a week of five workdays exceeds 640 tons is 0.129075.

b)

Based on the Monte Carlo Study, total weight of the plastics produced in five days is 599.217869.

c)

Based on the Monte Carlo Study, using std(TotalWeight), we calculated the standard deviation as 36.019441.

Because we picked $\varepsilon = 0.008$ and $\alpha = 0.02$ in our study, we can say that results are accurate with the error margin of 0.008, with probability %98.