Student Information

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CODE:

```
Z = norminv(0.99);
no_sim = ceil(0.25* ((Z / 0.03)^2));

total = zeros(1,no_sim);
for N = 1:no_sim
    lambda = 50; % Parameter
    U = rand; % Generated Uniform variable
    i = 0; % Initial value
    F = exp(-lambda); % Initial value, F(0)
    while (U >= F); % The loop ends when U < F(i)
        i = i + 1;
        F = F + exp(-lambda) * lambda^i/gamma(i+1);

    end;
    noBulk = i;

    wBulk = 0;
    for i = 1:noBulk
        wBulk += sum( -1/0.1 * log(rand(60,1)) );
    end;


    lambda = 40; % Parameter
    U = rand; % Generated Uniform variable
    i = 0; % Initial value
    F = exp(-lambda); % Initial value, F(0)
    while (U >= F); % The loop ends when U < F(i)
        i = i + 1;
        F = F + exp(-lambda) * lambda^i/gamma(i+1);
    end;
    noContainer = i;

    wContainer = 0;
    for i = 1:noContainer
        wContainer += sum( -1/0.05 * log(rand(100,1)) );
    end;
```

```
    lambda = 25; % Parameter
    U = rand; % Generated Uniform variable
    i = 0; % Initial value
    F = exp(-lambda); % Initial value, F(0)
    while (U >= F); % The loop ends when U < F(i)
        i = i + 1;
        F = F + exp(-lambda) * lambda^i/gamma(i+1);

    end;
    noOil = i;

    wOil = 0;
    for i = 1:noOil
        wOil += sum( -1/0.02 * log(rand(120,1)) );
    end;

    total(N) = wOil + wContainer + wBulk;

end;

fprintf("probability = %g\n",sum(total>300000)/1509);
fprintf("mean = %g\n", mean(total));
fprintf("standard deviation = %g\n",std(total));
```

Output:

```
octave:11> source("hey.m")
probability = 0.106693
mean = 258786
standard deviation = 32770
```

a)

To find the size of the Monte Carlo simulation we use the formula:

$$N \geq 0.25 \cdot (\frac{z_{\alpha/2}}{\epsilon})^2$$

$$N \geq 0.25 \cdot (\frac{z_{0.01}}{0.03})^2$$

Which results in 1504.

c)

Can't make a comment on the accuracy of the standard deviation estimator since we don't know the actual standard deviation. But can say this:
The estimated standard deviation of 32770 tons indicates the variability or spread of the total weight of cargo unloaded at the port in a day. A larger standard deviation suggests a wider range of possible values around the mean. In this case, the standard deviation is large relative to the mean. Which suggests that the total weight can vary significantly from day to day.