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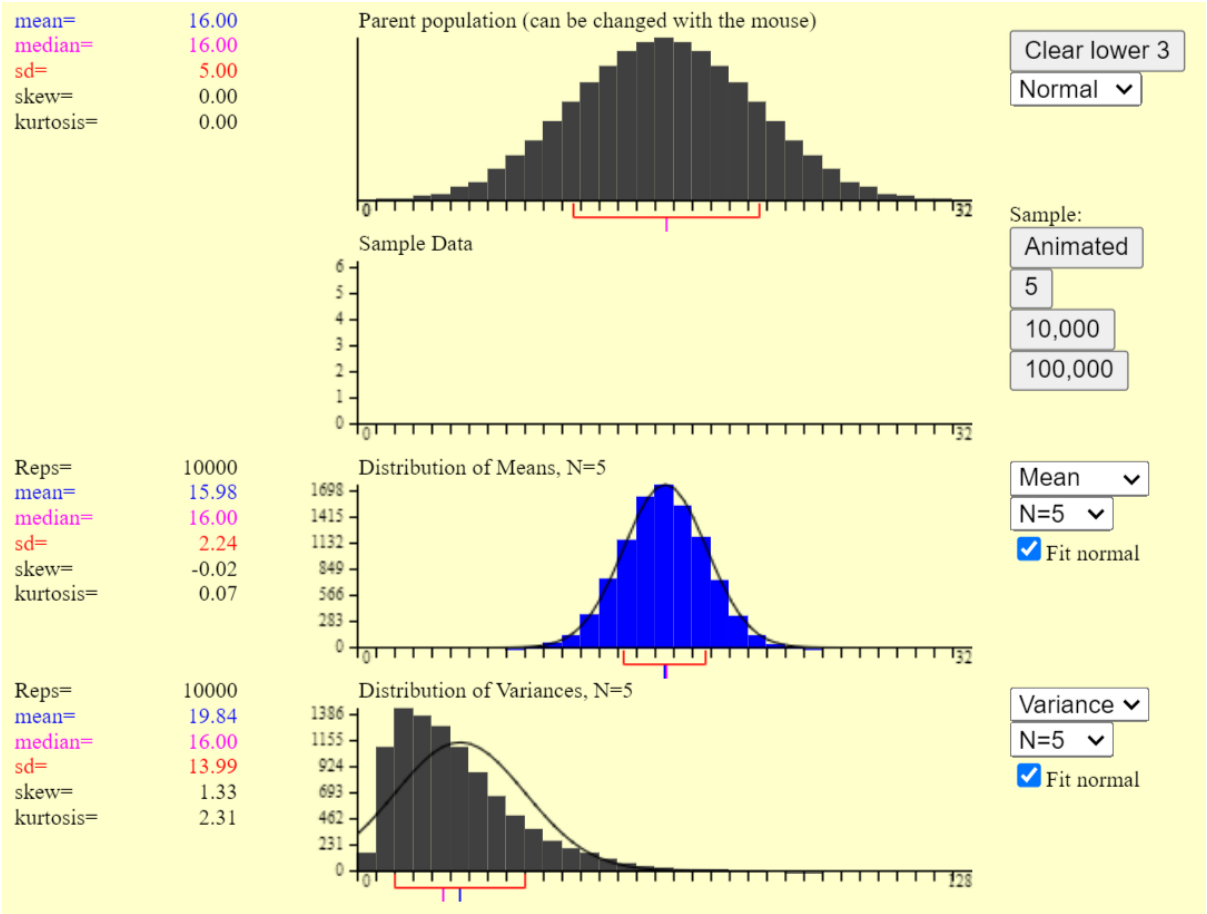
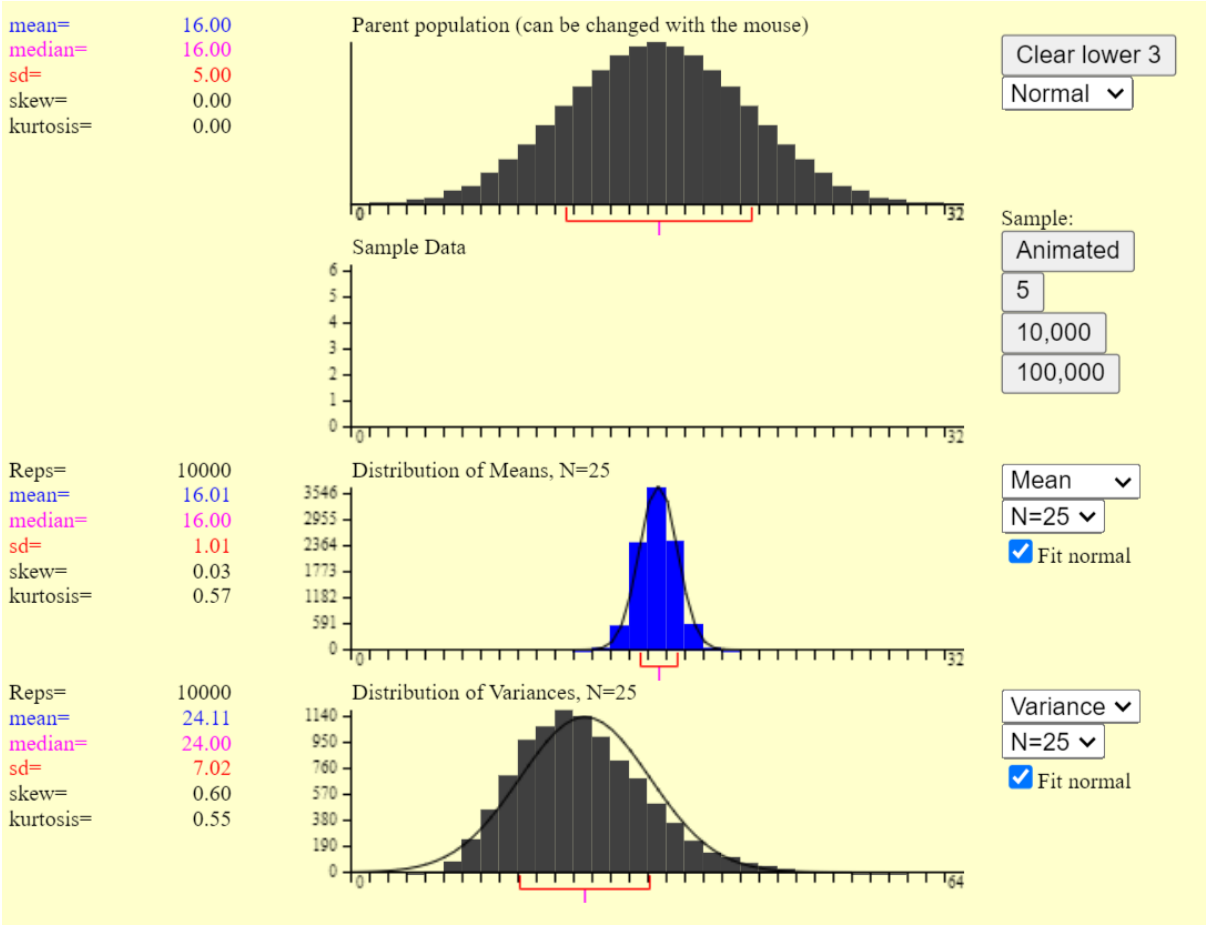
STAT-652: Lecture 2a

Question 1:

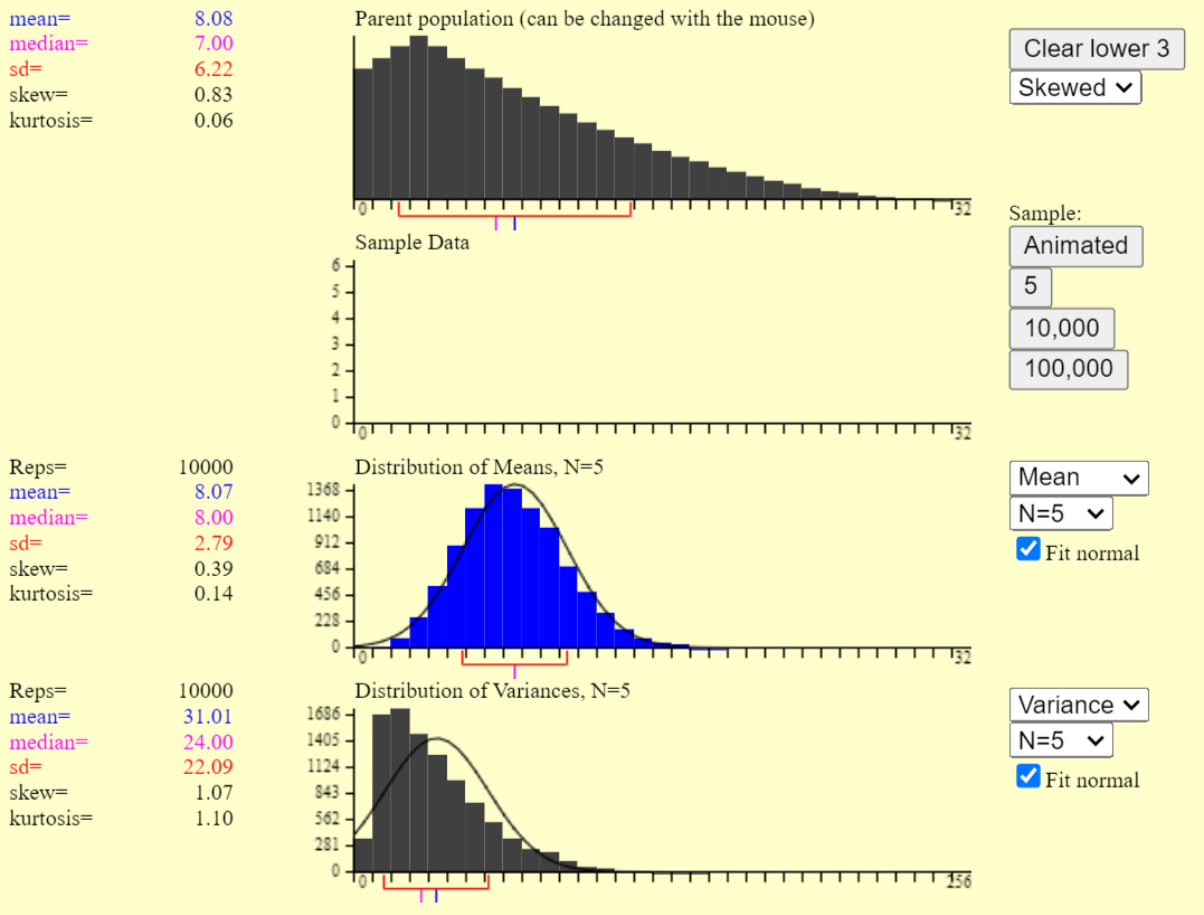
a) Start with the normal distribution that is represented on the initial screen as your "parent population". Select "Mean" in the third plot, "Variance" in the fourth plot, and "N=5" for both. Run 10,000 samples through this simulation. Take a screenshot of the results showing all four plots, including the statistics on the left and the settings on the right. Present it as your response. No comment needed yet.



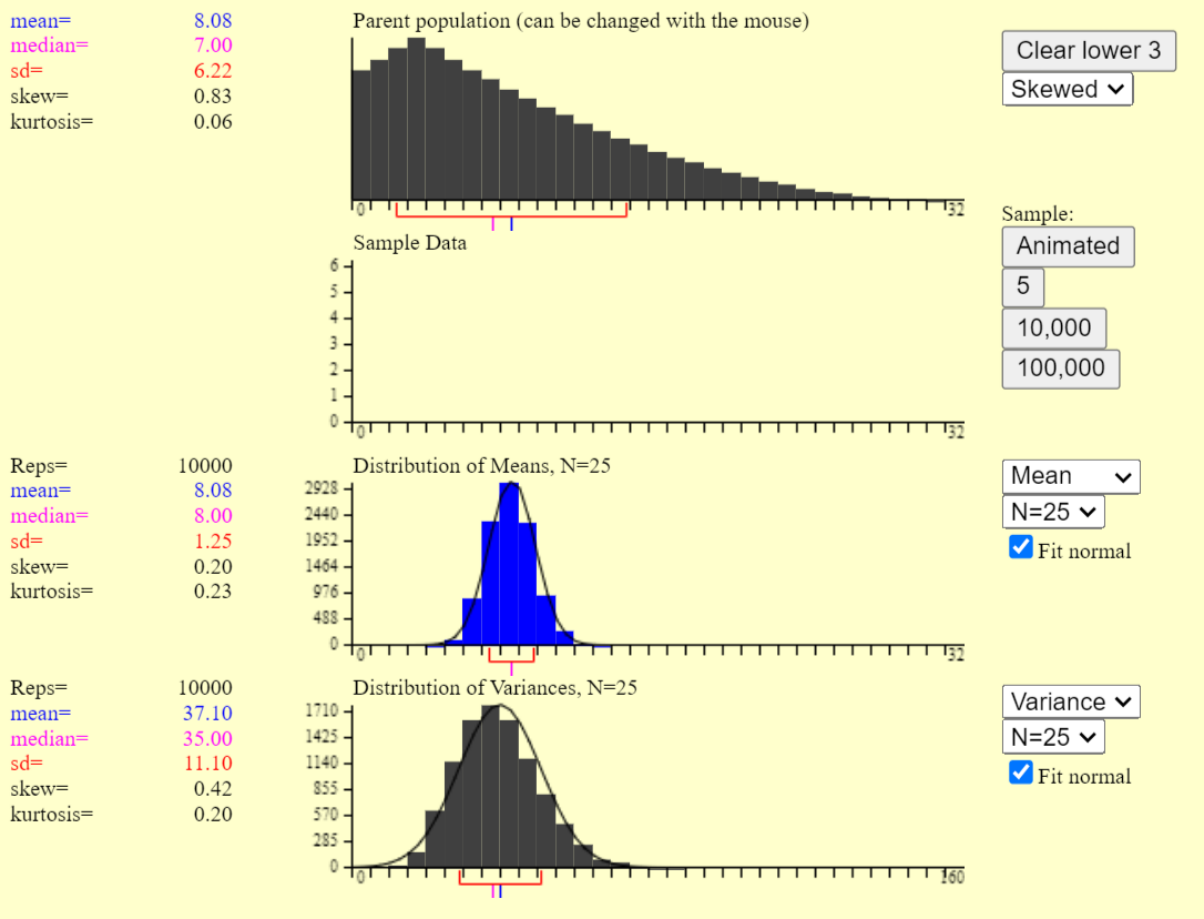
b) Clear everything and repeat with "N=25" in both places.



c) Clear everything and repeat with “Skewed” in the first plot and “N=5” in the third and fourth.



d) Clear everything and repeat with “Skewed” in the first plot and “N=25” in the third and fourth.



e)

i) Do different statistics computed on the same samples have to have the same sampling distribution?

ANS: No, we can see that in every graph a sampling distribution of the variance is right-skewed compared to more center-balanced sampling distribution of the mean.

ii) What effects does increasing sample size have on the sampling distributions of statistics?

ANS: The larger the sample size is, the smaller the standard error (SE). The sampling distribution of both mean and variance becomes better fit as sample sizes increase. (sd, skew, kurtosis shown in graph a. vs b. and graph c. vs d.)

iii) What effects does changing the parent distribution (the distribution from which data are sampled) from normal to skewed have on the sampling distributions of statistics?

ANS: Regardless of parent population distribution, the sampling distribution of the mean approximates normal distribution (the larger the sample size, the closer the sampling distribution of the mean would be a normal distribution.)