# Problem Set #2

Perspectives on Computational Modeling
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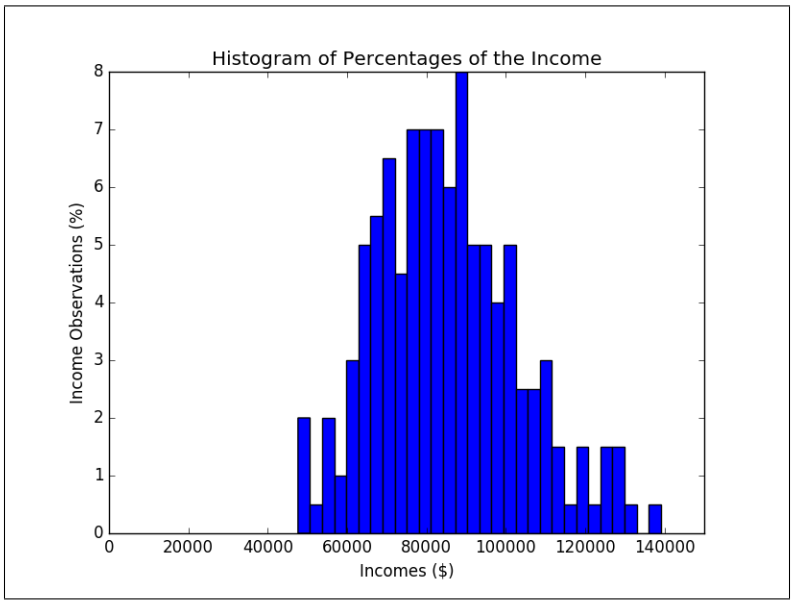
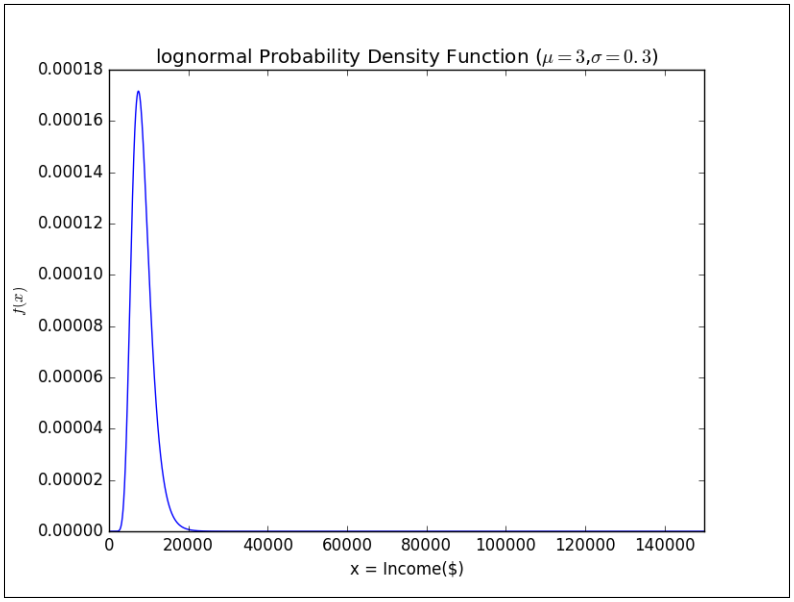
## Problem 1.

### Part (a). Histogram

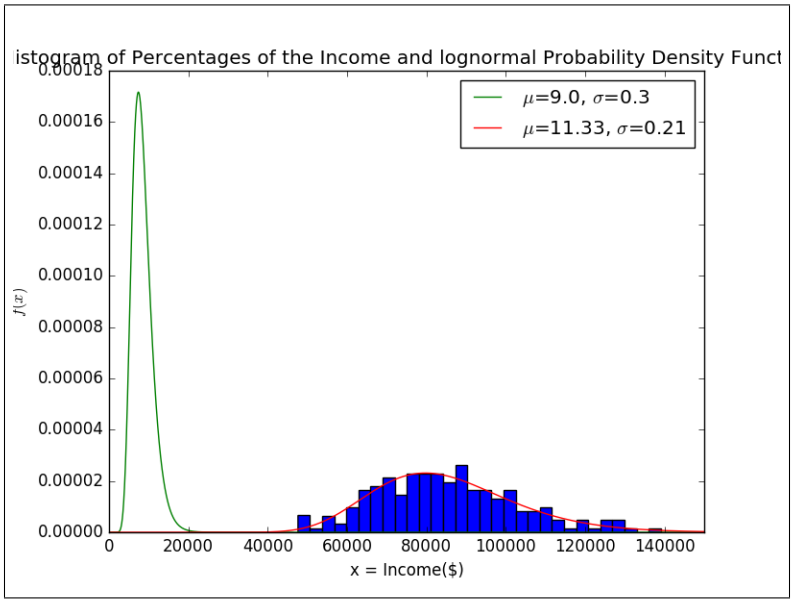



### Part (b). lognormal PDF



Log-likelihood value = -8298.63695601

**Part (c). MLE**




$\mu$ MLE = 11.3314403326
$\sigma$ MLE = 0.211674580757
Log-likelihood Value = -2239.534744
VCV = [[ 1. 0.]
[ 0. 1.]]

**Part (d). Chi-square Test** $\chi^2$ of $H_0$ with 2 degrees of freedom p-value = 0.0

**Part (e). Inference** The probability that you will earn more than $100,000

is 19.561800210962077% The probability that you will earn less than $75,000 is 30.79396097251101%

**Problem 2.**

**Part (a). MLE** $\beta_0$ MLE = 0.259082991468

$\beta_1$ MLE = 0.0141522942932
$\beta_2$ MLE = 0.389203982613

$\beta_3$ MLE = -0.0106002331579
$\sigma^2$ MLE = 0.0159045883926
Log-likelihood Value = 876.865053329
VCV = [[ 1. 0. 0. 0. 0.]
[ 0. 1. 0. 0. 0.]
[ 0. 0. 1. 0. 0.]
[ 0. 0. 0. 1. 0.]
[ 0. 0. 0. 0. 1.]]

**Part (b). Chi-square Test**$\chi^2$ of $H_0$ with 5 degrees of freedom p-value = 0.0