# Problem Set 2

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## 1 Question 1

## 2 Part (a)

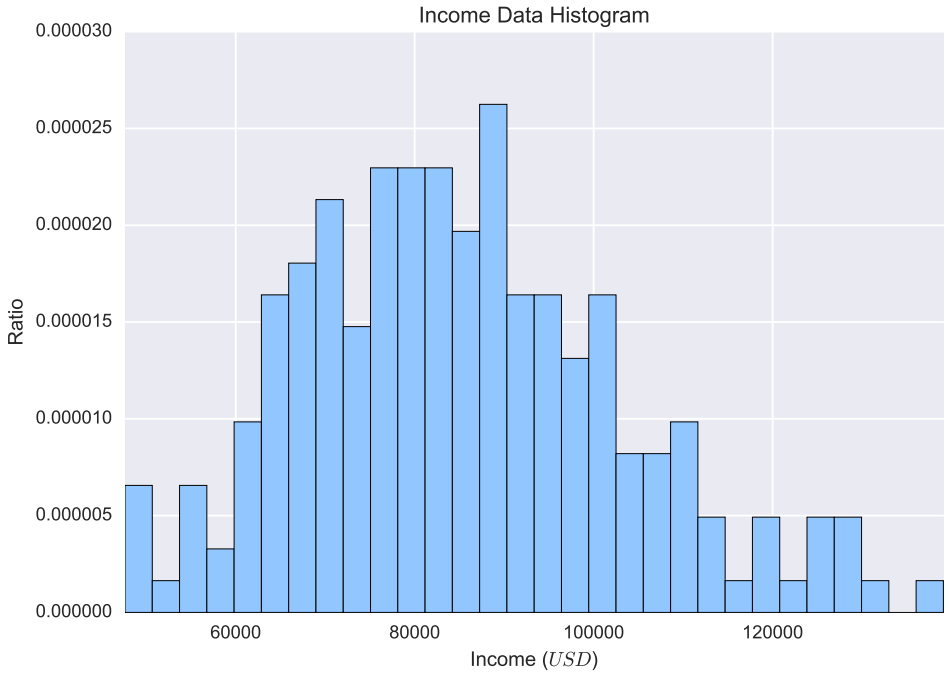


**Figure 1:** Question 1 (a) histogram

## 3 Part (b)

The Log-likelihood of mu = 9.00 and sigma = 0.30, is -8298.64

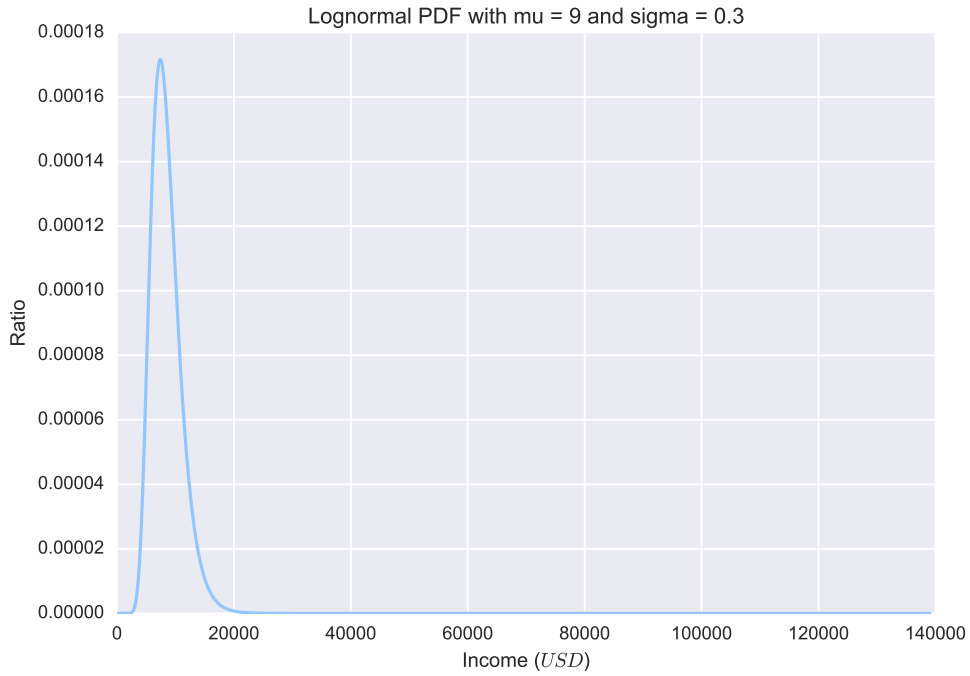


**Figure 2:** Question 1 (c) histogram

# 4 Part (c)

The optimizer gives mu = 11.33 and sigma = 0.21, with a log-likelihood of -2239.53. The associated var-covar matrix is:

```
[  2.22922149e-04   9.27073415e-06]
[  9.27073415e-06   1.64466141e-04]
```

# 5 Part (d)

The probabilty that the data came from the distrubution in Part (b) is: 0.0000000000

# 6 Part (d)

The probabilty that I will earn more than 100000 USD is 0.196 and that I will earn less than 75000 USD is 0.308

# 7 Part (a)

The estimated values with a log-likelihood of 876.865 are:

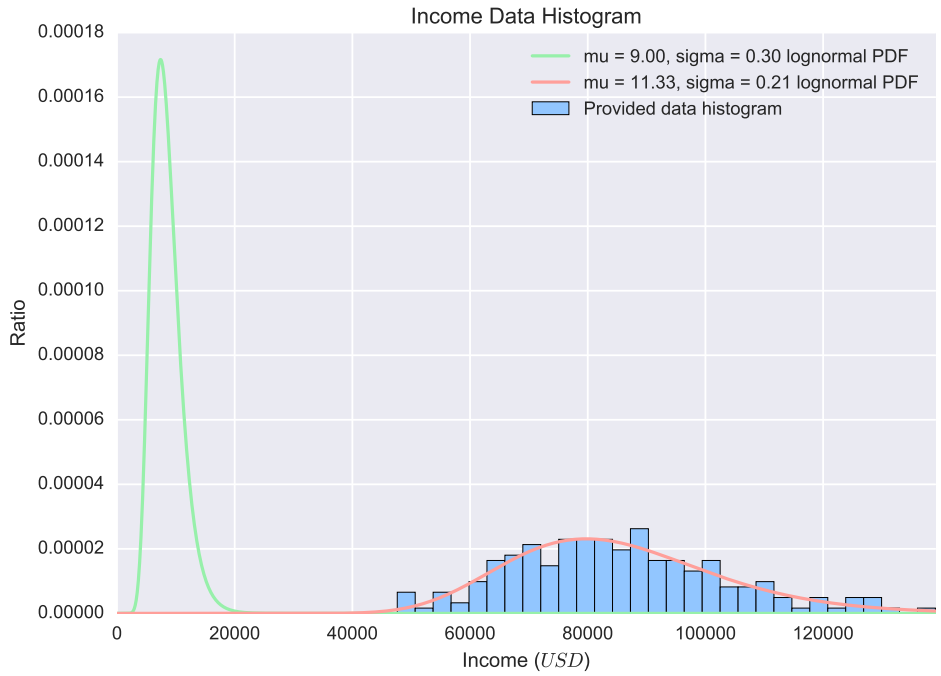


**Figure 3:** Question 1 (c) histogram

```
Beta_0 = 0.252
Beta_2 = 0.013
Beta_3 = 0.401
sigma = -0.010
```

The var-covar matrix is:

```
[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]
```

The probabilty that Beta_0 is 1, Beta_1, Beta_2 and Beta_3 are 0 and sigma is .1, is: 0.0000000000