# SBE II: Homework 6

## Experiment-3:

A categorical distribution is one that has discrete states, or in other words that which is bimodal with a minimal overlap between modes. The reason this is termed categorical is that the response will belong to, more or less, one of (in this case, two) discrete categories, as opposed to a sliding value across a spectrum.

In the case of these experiments performed, all of the plots in experiment 1 are non-categorical. The reason for this is that both of the values being compared are random variables sampled from similar distributions, resulting in the probability of detection being a continuous and gradual distribution, which increases as the means of the random variables, separate.

In the case of experiment 2 however, the curves are representative of a categorical distribution. The reason for this is that the random variable being sampled is now being compared to a constant threshold value.

We can observe from the above experiments that when sampling two random variables with Gaussian distributions, a continuous distribution is observed. However, when sampling a single random variable and comparing it to a static threshold we are able to observe a categorical response instead.