**Chapter 1**

Read the enclosed article:

20 Popular Machine Learning Metrics. Part 1: Classification & Regression

Evaluation Metrics

And then resolve the following exercise:

In this folder there is a file called "CANCER\_TABLE" , This file has 1000 records.   
 Each record represents a biopsy taken from a test subject. The first column in the table represents the diameter of the biopsy, and the second column represents whether the subject was tested for cancer during a period of up to a year after the biopsy was performed.   
 The "Marvel-Sabres" company offered a model that said: "If the tumor diameter is more than 7 cm, then the subject will be sick in the coming year and otherwise not". In this exercise we will analyze this model's performance.

1. Compute and display confusion matrix
2. Calculate the TP,TN,FP,FN metrics. What is their business meaning?
3. Give business meaning to the TPR and FPR.
4. Calculate recall, accuracy and precision.
5. Calculate F1 score.

After analyzing your model, "Marvel-Sabres" offered an upgrade to the model: instead of a classified model, the company will provide a model that ranks the biopsies by their chances to represent a cancer patient (in the coming year). A higher ranking biopsy represents a higher likelihood that it is taken from a person who gets cancer in the coming year.

1. Why would such a model be good? Market it to a customer.
2. Draw a ROC curve without using scikit-Learn or any other structured function of python that does so.
3. Calculate the AUC. Is the model good in terms of this criterion? Give business meaning to the client.
4. Turn the rating model into a classification model using the ROC curve. Explain your answer well.
5. Again calculate confusion matrix.
6. Again calculate accuracy, precision, recall, TP, FP, TN, FN, TPR, FPR for the new model.
7. Compare the measures figured out in the previous section to those of the initial model. What model would you recommend?
8. Repeat section 7 when you use the scikit-Learn library functions while writing a minimum code on your part.