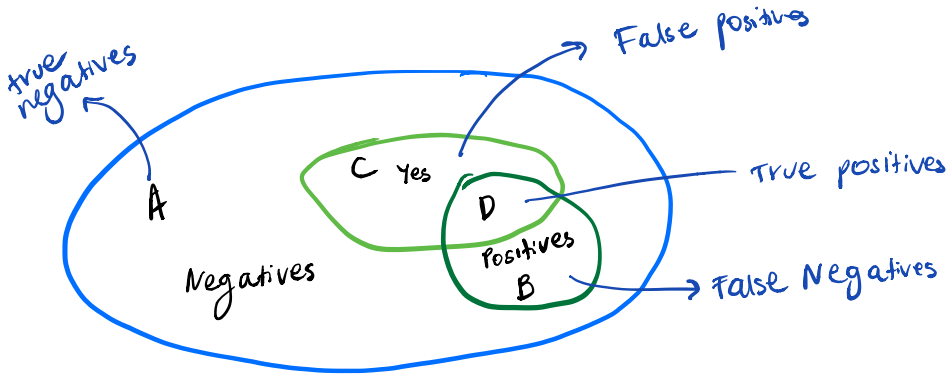
Evaluation Quiz

1. In this diagram, the negative instances are in the blue oval, the positive instances are in the darker green circle. Our classifier says the instances in the light green oval are positive, and all the others are negative.



2. Descriptions

   False Alarm rate: % of negatives we misclassified as positive
   Miss rate: % of positives we misclassified as negative
   Recall: % of positives we classified correctly
   Precision: % positive out of what we classified as positive

3. Equations

$$\text{Accuracy} = \frac{\text{correct}}{\text{total}} = \frac{TP + TN}{TP + TN + FP + FN}$$

$$\text{Classification error} = 1 - \text{Accuracy}$$

$$\text{False Alarm} \rightarrow \text{False positive rate} = \frac{FP}{FP + TN}$$

$$\text{Miss} \rightarrow \text{False Negative rate} = \frac{FN}{TP + FN}$$

$$\text{Recall} \rightarrow \text{True Positive Rate} = \frac{TP}{TP + FN}$$

$$\text{Precision} = \frac{TP}{TP + FP}$$

4. Error measure guidelines
    - Classification Error: not meaningful if classes are not balanced
    - Precision: use in conjunction with another measure, often Recall
    - Accuracy: not meaningful if classes are not balanced
    - Miss: use in conjunction with another measure, often False Alarm
    - False Alarm: use in conjunction with another measure, often Miss
    - Recall: use in conjunction with another measure, often Precision

5. The F1 measure

$$F1\text{-score} = \frac{2 \times \text{Recall} \times \text{Precision}}{\text{Precision} + \text{Recall}} = \frac{1}{\frac{1}{\text{Recall}} + \frac{1}{\text{Precision}}}$$

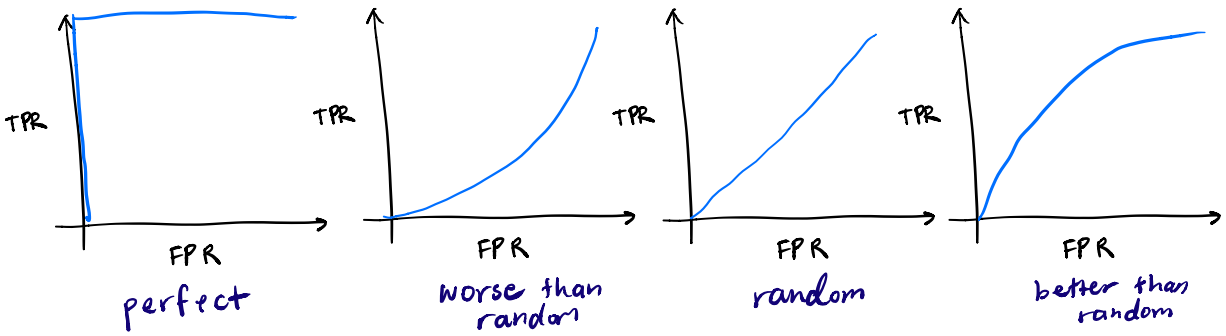
6. If we have the following performance on two classifiers A and B

	A	B
TP	30%	20%
FP	30%	15%

then which is better?

Impossible to decide --> either TP with FN or FP with TN to determine miss/false alarm.

7. Match up the following ROC curves with their interpretation



* TPR → true positive rate $\frac{TP}{TP+FN}$ FPR → false positive rate $\frac{FP}{FP+TN}$

8. Evaluation measures for regression task

YES - correlation coefficient, mean squared error, mean absolute error

NO - recall, accuracy, precision

9. Measure expression

root?

Mean Squared Error $\sqrt{\frac{1}{n}\sum_{i=1}^{n} f(x_i - y_i)^2}$

Mean Absolute Error $\frac{1}{n}\sum_{i=1}^{n} |f(x_i) - y_i|$

Correlation Coefficient $\sqrt{\sum_{i=1}^{n} (f(x_i) - \mu_f)^2 \sum_{i=1}^{n} (y_i - \mu_y)^2}$