Data Representation and Models *(find and work with a partner)*

1. Consider the tennis dataset shown below. What is n (number of data points)? What is p (number of features)?

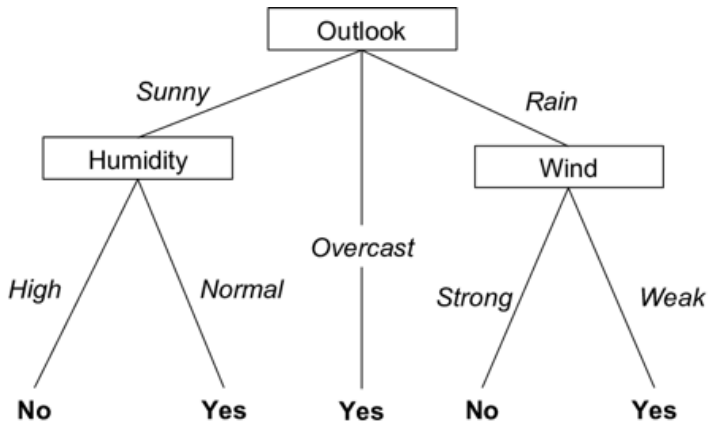
Day	Outlook	Temperature	Humidity	Wind	PlayTennis (y)
$\boldsymbol{x}_1$	Sunny	Hot	High	Weak	No
$\boldsymbol{x}_2$	Sunny	Hot	High	Strong	No
$\boldsymbol{x}_3$	Overcast	Hot	High	Weak	Yes
$\boldsymbol{x}_4$	Rain	Mild	High	Weak	Yes
$\boldsymbol{x}_5$	Rain	Cool	Normal	Weak	Yes
$\boldsymbol{x}_6$	Rain	Cool	Normal	Strong	No
$\boldsymbol{x}_7$	Overcast	Cool	Normal	Strong	Yes
$\boldsymbol{x}_8$	Sunny	Mild	High	Weak	No
$\boldsymbol{x}_9$	Sunny	Cool	Normal	Weak	Yes
$\boldsymbol{x}_{10}$	Rain	Mild	Normal	Weak	Yes

Data and model from Machine Learning by Tom Mitchell (Table 3.2)

2. How would you *featurize* this data? In other words, if you needed each feature to be numerical, how would you map the current feature values to numerical values?

3. Using your response from the previous question, what would the *feature vector* become for $\boldsymbol{x}_1$?

4. In the model below, the children of each node divide the data into partitions. Label each node (both internal nodes and leaves) with the counts of "No" and "Yes" labels based on the partition. For example, the counts for the node labeled *Outlook* would be [4,6]. Does this model perfectly classify all examples?



5. What label (i.e. play tennis or not) would you *predict* for the feature vector [Rain, Hot, High, Strong]?