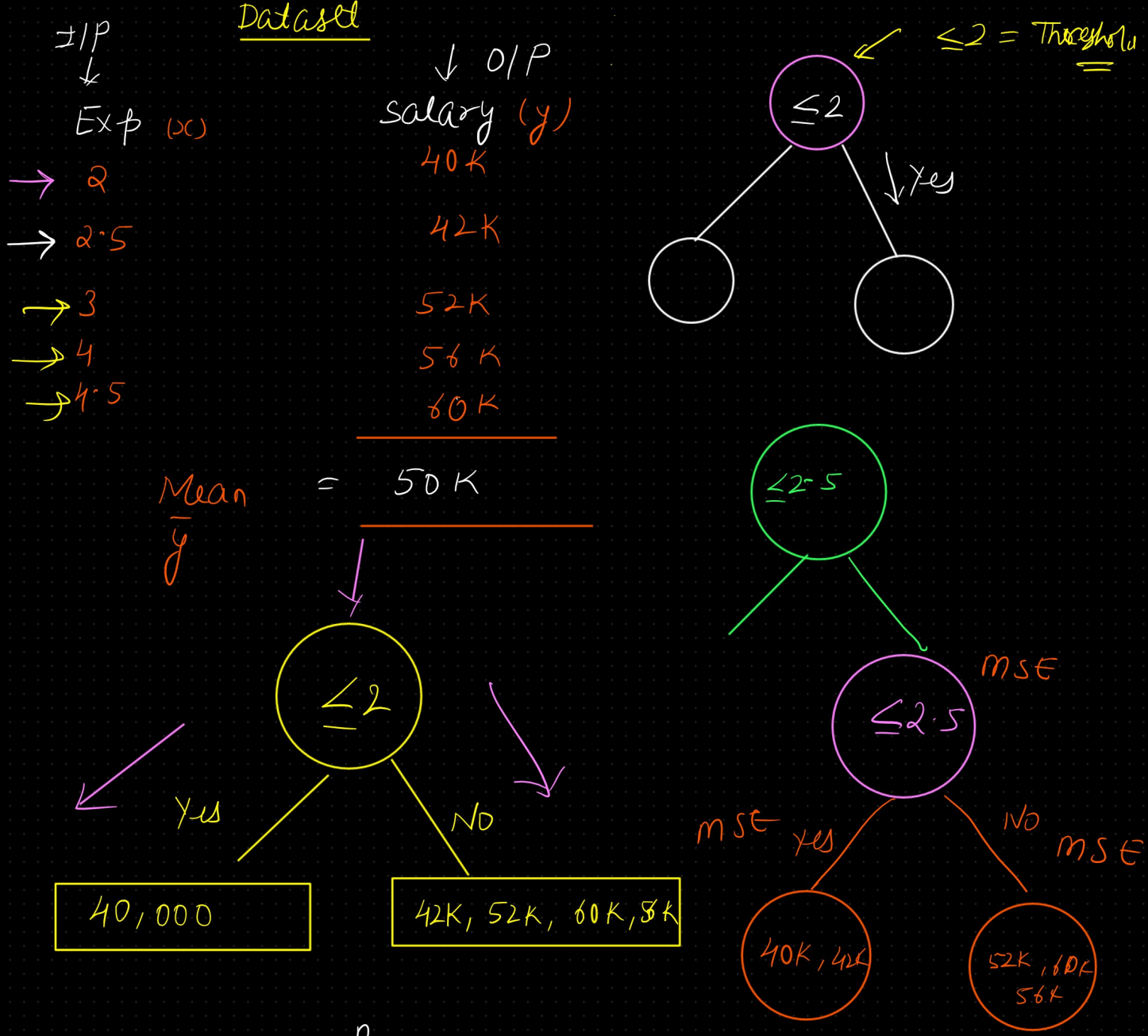
Decision Tree Regressor

A Decision Tree Regressor is a supervised learning algorithm used for regression tasks. It works by recursively partitioning the input space into regions, and for each region, it predicts the average (or median) value of the target variable.



$$MSE = \frac{1}{n} \sum_{i=1}^{n} (y_i - \bar{y})$$

↑ variance

Here's the intuition behind the algorithm:

- Partitioning: The algorithm starts with the entire dataset and selects a feature and a threshold to split the data into two subsets. It chooses the feature and threshold that minimize the variance of the target variable within each subset.

- Recursive Splitting: After the initial split, the process is repeated recursively on each subset until a stopping criterion is met. This could be a maximum tree depth, minimum samples in a node, or other criteria.

- Prediction: Once the tree is constructed, when given a new input instance, it traverses down the tree based on the feature values of the instance until it reaches a leaf node. The prediction for the instance is then the average (or median) of the target variable values of the training instances in that leaf node.