# Quiz M5.01

Note: For each question **make sure you select all of the correct options—** there may be more than one! Don't forget to use the sandbox notebook if you need.

## Question 1 (1/1 point)

From the presentation given in the video, for which kind of supervised learning tasks decision trees can be applied to:

- [x] a) classification tasks ✔
- [x] b) regression tasks ✔
- [ ] c) clustering tasks

✔

*Select all answers that apply*

**EXPLANATION**

solution: a) b)

Decision trees are supervised model. They can be applied to classification and regression tasks. Both models differ by their predictions: a decision tree regressor will predict the mean value of the training samples at a leaf while a decision tree classifier will predict the majority class of the training samples at a leaf.

Clustering is an unsupervised learning approach and we do not discuss it in this MOOC.

*You have used 1 of 2 submissions*

- [x] a) a binary decision considering a single feature at a time
- [ ] b) a binary decision considering a combination of all the input features
- [ ] c) multiple binary decisions considering a single feature
- [ ] d) a binary decision considering a non-linear combination of all input features

EXPLANATION

solution: a)

Split nodes in decision trees only consider a single feature at a time to split the data points of the training set in two non-overlapping subsets.

*You have used 1 of 1 submissions*

## Question 3 (1/1 point)

Which aspect of the decision tree learning procedure is most typically used to control the underfitting/overfitting trade-off?

- [ ] a) The number of children of a split node
- [ ] b) The magnitude of the weight coefficients
- [x] c) The maximum depth of the decision tree

EXPLANATION

solution: c)

Limiting the depth of a decision tree limits the complexity of the learned decision function and therefore impacts the underfitting/overfitting trade-off.

Shallow trees typically underfit, while deep trees often overfit. Other mechanisms for avoiding the tree to grow can also be helpful in controlling the complexity of the decision function of the model. For instance it is also possible to set the maximum number of leaf nodes of the tree or the minimum number of samples in a given leaf node before considering a new split.

In most decision tree implementations and in scikit-learn in particular, the number of children of a split nodes is always two (binary decisions).

Decision trees do not have weight coefficients as for linear models. Instead, each split node stores the value of the threshold. The leaf nodes store the average value of the data points of the training set that reached that leaf (for regression problems) or the relative class frequencies of the data points that reached that leaf (for classification problems).

*You have used 1 of 1 submissions*

YOUR EXPERIENCE

According to you, this whole 'Intuitions on tree-based models' lesson was:

- ○ **Too easy, I got bored**
- ○ **Adapted to my skills**
- ○ **Difficult but I was able to follow**
- ○ **Too difficult**

Submit

- ~~less than 30 minutes~~
- **30 min to 1 hour**
- **1 to 2 hours**
- **2 to 4 hours**
- **more than 4 hours**
- **I don't know**

Submit

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