### Exercise 1: Overfitting & underfitting

a) For the following situations, state whether you would rather expect under- or overfitting behavior.

   i) Large training set & linear regression learner
   ii) Noisy training data & high-degree polynomial regression learner
   iii) Few observations of many features & linear regression learner
   iv) Data with class overlap & LDA learner

b) Are overfitting and underfitting properties of a learner or of a fixed model? Explain your answer.

c) Should we aim to completely avoid both overfitting and underfitting?

### Exercise 2: Resampling strategies

a) Why would we apply resampling rather than a single holdout split?

b) Using `mlr3`, classify the `german_credit` data into solvent and insolvent debtors using logistic regression. Compute the training error w.r.t. MCE.

c) In order to evaluate your learner, compare test MCE using

   i) three times ten-fold cross validation (3x10-CV)
   ii) 10x3-CV
   iii) 3x10-CV with stratification for the feature `foreign_worker` to ensure equal representation in all folds
   iv) a single holdout split with 90% training data

   (Hint: you will need `rsmp`, `resample` and `aggregate`.)

d) Discuss and compare your findings from c) and compare them to the training error from b).

e) Would you consider LOO-CV to be a good alternative?