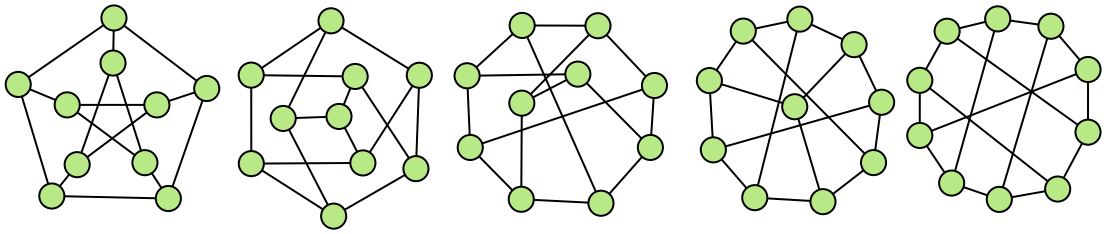
Exercise 9. Exercises for the course "Discrete Mathematics" (2021)

Exercise 1. *(Petersen graph)*

Are all the graphs below isomorphic to each other? Which ones are/are not? Why?

Hint: Try to move around the vertices of the graphs using a pencil and an eraser, or on a whiteboard.



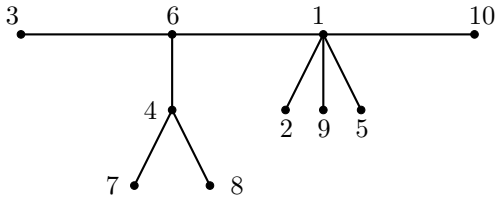
Exercise 2. Find the trees that have the following Prüfer sequences:

$$(4, 4, 3, 1, 1); (4, 2, 1, 1, 3)$$

Exercise 3.

(1) Describe which Prüfer codes correspond to stars (i.e. to trees where one vertex is connected to all other vertices)
(2) Describe what trees correspond to Prüfer codes containing exactly 2 different values.
(3) And which trees have all distinct values in their Prüfer codes?

Exercise 4. What is the Prüfer code of the following tree?



Exercise 5. Let v be a vertex of a labelled tree T. Suppose v has degree d, then show that the label of v appears in the Prüfer code of T exactly $d - 1$ times.