The following questions are for you to check whether you have understood the contents of the lecture. Please reply to the questions alone (for yourself) and by writing on this sheet of paper. As soon as you and your neighbor are both done, you might want to discuss your answers. Your answers will not be collected or graded. It’s a pure self-test for your convenience. If you are not able to easily answer the questions or if you have doubts regarding the correctness of your replies, please take a few minutes to read in the book or the slides in order to revisit the corresponding points.

1. Advection is a special case of flow. The other case is called convection. What is the difference? Explain in one sentence! (K1)

2. What property does the velocity field have to fulfill for advection to be incompressible? Either explain in words or give the condition as mathematical expression! (K1)

3. Where does the Lagrangian CFL condition come from, i.e., what is its physical basis? Explain in one sentence in your own words! (K1)

4. We have revisited the topic of remeshing. Recall when and why remeshing is needed and state the precondition and reason in your own words! (K1)
5. How does remeshing work? Give a pseudo-algorithm with the main steps for the case of compressible advection! (K2)

6. There are two interpretations of interpolation: particle clouds and assignment functions. Describe them in your own words! What do we imagine the particles to “carry around” in either interpretation? How is the interpolation weight determined? (K2)

Particle cloud:

Assignment function:

7. Draw the particle clouds of the first three members of the interpolation function hierarchy and name them! (K1)

0th order:

1st order:

2nd order: