1. The Argyris, or Hermite quintic, finite element uses $\mathcal{P}_5$ for the shape functions and the assembled finite element space belongs to C^1. Design a C^1 finite element for triangular meshes whose shape function space is $\mathcal{P}_6$. Clearly state what are the degrees of freedom associated to each vertex, edge, and triangle of the mesh. Carefully draw an element diagram (like the one in Figure 6.4 of the notes). Prove that the DOFs are unisolvent. Verify that the element belongs to C^1.

2. Draw the diagram for the next element of this family, i.e., with shape functions in $\mathcal{P}_7$.