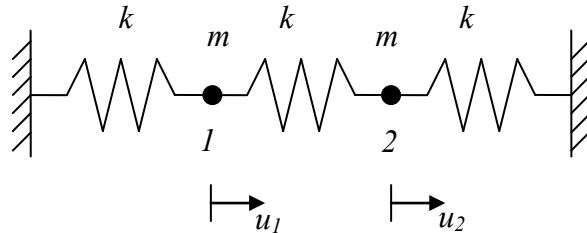## Home Exercise 3

The figure below shows a simple system with three springs (stiffness k) and two masses (mass m).

a) Determine the mass matrix m and the stiffness matrix k for the system.

b) Find the natural frequencies and modes for the system, expressed in terms of k and m. Check orthogonality.

c) Determine the free vibration response if the displacements $u_1 = 0$ and $u_2 = 0$ and the velocities $\dot{u}_1 = v_0$ and $\dot{u}_2 = 0$ for $t = 0$.