This paper discusses the implementation of an explicit density-based solver, that utilises the central-upwind schemes for the simulation of cavitating bubble dynamic flows. It is highlighted that, in conjunction with the Monotonic Upstream-Centered Scheme for Conservation Laws (MUSCL) scheme they are of second order in spatial accuracy; essentially they are high-order extensions of the Lax–Friedrichs method and are linked to the Harten Lax and van Leer (HLL) solver family. Basic comparison with the predicted wave pattern of the central-upwind schemes is performed with the exact solution of the Riemann problem, for an equation of state used in cavitating flows, showing excellent agreement. Next, the solver is used to predict a fundamental bubble dynamics case, the Rayleigh collapse, in which results are in accordance to theory. Then several different bubble configurations were tested. The methodology is able to handle the large pressure and density ratios appearing in cavitating flows, giving similar predictions in the evolution of the bubble shape, as the reference.