The objective of the present work is to illustrate and discuss how numerical models can be used to simulate different physical phenomena that have a great impact on the comfort of buildings: acoustics and solar radiation, in order to:

1) get estimations of the noise level, temperature and natural light on any facade as functions of the noise sources in the street and the local climate,

2) evaluate the sensitivity of these quantities with respect to some basic shape features,

3) and propose an approach to optimize the shape considering different requirements on the levels of noise (to minimize), temperature and/or natural light at the ground floor (to maximize).