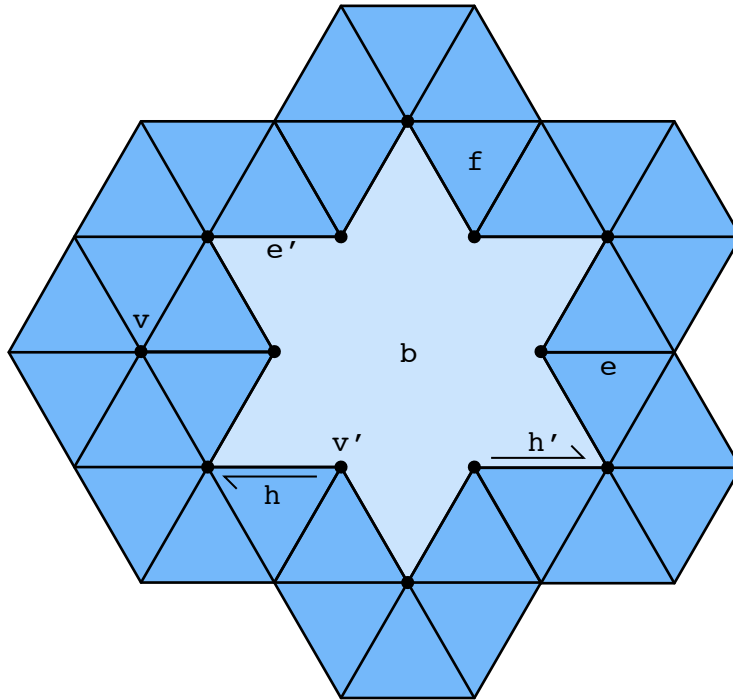


### Halfedge Mesh with Boundary



The figure above depicts a halfedge mesh with boundary. Dark blue regions indicate interior faces, whereas light blue regions indicate virtual boundary faces. In the HalfedgeMesh data structure, a mesh element is considered to be part of the boundary if it is contained entirely in a boundary face. For instance, in the figure above the region  $b$  is a virtual boundary face, which means that vertex  $v'$ , edge  $e'$ , and halfedge  $h'$  are all part of the boundary; their `isBoundary()` methods will return true. In contrast, vertex  $v$ , edge  $e$ , face  $f$ , and halfedge  $h$  are not part of the boundary, and their `isBoundary()` methods will return false. Notice also that the boundary face  $b$  is not a triangle: it has 12 edges.

Importantly, the edge degree and face degree of a boundary vertex is not the same. Notice, for instance, that vertex  $v'$  is contained in three edges but only two interior faces. By convention, `Vertex::degree()` returns the face degree, not the edge degree. The edge degree can be computed by finding the face degree, and adding 1 if the vertex is a boundary vertex.