Abstract. The 19th century mathematician William Hamilton was fascinated by the role \( \mathbb{C} \) played in two dimensional geometry, he began the discovery of the quaternions as an attempt to create a three dimensional analog with two imaginary units, instead he discovered a 4-dimensional analog in which each number \( x \), can be represented as \( a + bi + cj + dk \). The aim of this talk is to introduce some elementary properties of the quaternion algebra, \( \mathbb{H} \), and show their relation to some of the classic matrix groups and the projective space \( \mathbb{P}^3_{\mathbb{R}} \).