Quiver representations play an increasingly important role in many areas of mathematics. Indeed, this predominantly algebraic topic has seen applications ranging from mathematical physics to data analysis. Conceptually, a quiver may be seen as simply a directed graph. A representation of such a graph then means assigning a vector space to every node, and a linear map between the source and target spaces of any arrow. We will introduce quiver representations and study some important concepts, such as maps between representations, the path algebra and indecomposable representations. Our main goal will be to prove Gabriel's theorem: a result that classifies all quivers with only finitely many indecomposable representations. It turns out these are exactly all graphs that, when one forgets about the direction of the arrows, equal the ADE Dynkin diagrams. As prerequisites we only assume knowledge of linear algebra and some familiarity with the most basic algebraic concepts.