A graph labeling assigns weights to vertices, edges, or both, subject to certain conditions. For example, a labeling of vertices is graceful or harmonious if the difference or sum, respectively, of labels on adjacent vertices is distinct for all edges, while a labeling is edge-magic if the sum of the labels on an edge and its incident vertices is constant for all edges. In this talk we will explore graph labelings in the context of computability theory, sharing a few initial findings and many directions for future research. (Received September 19, 2016)