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Christopher E Brown* (cbrown@callutheran.edu). *A Model for Arranging Melodies for Ukulele.*

Like many stringed instruments, the ukulele has the property that most notes can be played in multiple ways. Given these choices, a melody might be played in a number of ways, called arrangements. We discuss an edge-weighted directed graph model for a set of arrangements and apply Dijkstra's algorithm to find an optimal arrangement of a given melody. Using this technique, we then show that the ukulele is more suitable to playing melodies in the campanella style, a baroque technique, and we show that optimal campanella arrangements derived from this model exhibit characteristics seen in expert human arrangements. Throughout, we comment on how this project was used in an introductory scientific computing and modeling course. (Received August 29, 2012)