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2016
MCM/ICM
Summary Sheet

(Your team's summary should be included as the first page of your electronic submission.)

Type a summary of your results on this page. Do not include the name of your school, advisor, or team members on this page.

The current refugee crisis in Europe is a complex humanitarian issue that requires coordination between numerous countries to apply a solution to the problem. In our report, we describe a model to optimize a distribution of refugees travelling on prescribed routes from multiple countries along the boundary of Europe to safe haven countries accepting refugees in Europe. We define a directed graph where nodes represent countries, and where edges are possible paths for refugees to take to obtain asylum. We consider any particular refugee's journey to be a simple path in the graph, because refugees should not be recommended to take cyclic routes. An adjacency matrix may be used to relate the described graph to a linear and quadratic programming model. We chose to develop a modified linear programming model because optimization is computationally feasible. The optimal solution optimizes safety and efficiency by minimizing a risk parameter and minimizing the collective length of the routes for all refugees in the system.