**IE 716 Project Proposal**

**Team Name:** Hill Climbers

**Team Members:** Om Prabhu (19D170018), Ritwik Gupta (put roll no here)

**Project Topic:** Exploiting symmetry in integer programming problems

**Project Description:**

One way to speed up the solution process of integer programming problems is to exploit any elements of symmetry or parallelism that exist within the problem. This enables us to identify and eliminate redundant constraints, making the problem much simpler to solve. In this project, we plan to review existing literature on symmetry within integer problems and some symmetry-breaking techniques. Some specific topics we plan to cover are symmetry in common cases such as the knapsack problem or the travelling salesman problem, as well as clique constraints encountered in graph modelling. We will also be investigating its strengths and limitations in terms of the ability to find high-quality solutions in an efficient manner. Finally, we plan on studying how symmetry-breaking compares against other techniques such as best-first, depth-first and resolution search. To best highlight these differences, we will analyse different types of integer programming examples.