1. Results and Heuristic Descriptions

Heuristic 1: Pure Distance Calculation

Blue Mountains, Lake Evendim, Fornost, Rivendell, Caradhras, Carrock, Esgaroth, Iron Hills

This calculation simply utilized the distance between points as the heuristic calculation.

Heuristic 2: Warm Wimps

Blue Mountains, Michel Delving, Brandy Hall, Bree, Fornost, Rivendell, Caradhras, Carrock, Esgaroth, Iron Hills

This calculation prioritized safety over other aspects. The heuristic were applied additively to the SLD from goal, so that this heuristic would always be greater than in the case for heuristic 1. The risk level was implemented as multiplier; $(SLD * 6 * (\frac{risk}{risk_{max}} * 100))$, so that the maximum possible effect of risk would be $(6 * SLD)$. Road quality and winter travel were additively calculated, where the effect of road quality was $2 * (Quality_{max} - Quality)$, and the effect of winter travel was just $(WinterTravel_{max} - WinterTravel)$.

Heuristic 3: Armed Merchants

Blue Mountains, Michel Delving, Brandy Hall, Bree, Weathertop, Rivendell, Moria, Gladden Fields, Esgaroth, Iron Hills

This calculation prioritized road quality first, then winter travel, then risk. The heuristic were applied additively to the SLD from goal, so that this heuristic would always be greater than in the case for heuristic 1. The road quality was implemented as multiplier; $(SLD*4*(\frac{Quality_{max}-Quality}{Qualty_{max}}*100))$, so that the maximum possible effect of risk would be $(4 * SLD)$. Then, winter travel was implemented additively, where the effect was $(4 * (WinterTravel_{max} - WinterTravel))$. Risk was disregarded, as this scenario assumed that these merchants were extremely brave.

2. Analysis of Heuristic Calculations

All of the results produced are logical. The purely distance dependent calculation was shorter than the other two, and this is expected, as the other two did not optimize purely for distance. Heuristic 2 and 3 also performed as expected. Moria was not touched in heuristic 2, as an travel to and from implies a high risk level. However, Moria was traveled through by heuristic 3, as the risk was not as accounted for. The differences were minor, as I intentionally wanted to prioritize distance, for the most part. In another implementation, perhaps the effect on distance would be multiplicative rather than additive, so that the effect of my heuristic calculation would greatly increase.