Brenden Davey

CIS 421 Artificial Intelligence

Assignment 3 Writeup

Heuristic 1:

Blue Mountains -> Lake Evendim -> Fornost -> Rivendell -> North Pass -> Carrock -> Esgaroth -> Iron Hills

only the distance between locations is used in the heuristic calculation

Heuristic 2:

Blue Mountains -> Michel Delving -> Brandy Hall -> Bree -> Weathertop -> Rivendell -> Caradhras -> Carrock -> Esgaroth -> Iron Hills

We have a longer path with this version of the heuristic because it takes into consideration the distance, road quality, risk level, and winter travel. This version specifically avoids risky roads, and roads with a poor quality, but they do not care about winter weather at all. The calculation is done with

```
(distance * 5 * (riskLevel / 100)) + (3 * 100 - roadQuality) + (25 - winter);
```

so the longer the risky road, the worse it is to travel, and the worse the road quality, the worse it is to travel. Winter has a very minimal effect.

Heuristic 3:

Not winter:

Blue Mountains -> White Towers -> Michel Delving -> Hobbiton -> Brandy Hall -> Bree -> Weathertop -> Rivendell -> Caradhras -> Carrock -> Wood Elves -> Erebor -> Iron Hills

Pretty long path, but this group cares heavily about road quality, and winter travel, while being brave and not caring at all how dangerous it is.

```
(distance * 4 * (100 - roadQuality / 100)) + (4 * winterTravel)
```

So the longer the poor quality road, the worse it is to travel, and the worse it is in the winter to travel, the less chance it will be traveled.

Winter version:

Blue Mountains -> Michel Delving -> Brandy Hall -> Bree -> Weathertop -> Rivendell -> North Pass -> Carrock -> Esgaroth -> Iron Hills

A bit shorter route with this one because when it's not winter, there's less to worry about.

```
(distance * 4 * (100 - roadQuality) / 100) + (1 * winterTravel)
```

Again, the longer the poor quality road, the worse it is to travel, and the worse it is in the winter to travel, the less chance it will be traveled, but significantly less. Winter still effects because after all, we've seen what winter does to Potsdam roads

Each heuristic traveled pretty different from each other, but pretty much exploring as you'd expect with what they were considering when making their choices. Some choices seem strange to make, but I believe the distance multiplied in to count for more on longer roads could be the reason why heuristic 2 that dislikes poor quality roads would take the road with the worst quality. The longer distances multiplied by the riskLevel differences out-weighted the dislike for poor quality roads. For heuristic 2, long risky roads are usually completely avoided, and for heuristic 3, long poor-quality roads are usually completely avoided. Overall, the behaviours were pretty well what I expected. Also, the purely distance based heuristic found the shortest route, as you'd expect.