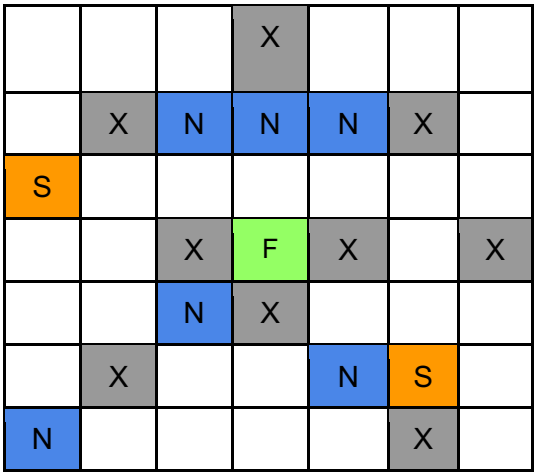
This is the Document detailing the Final Project, to be completed by all applicants in order to complete the course in its entirety.
The project consists of building an AI agent from scratch, capable of traversing a predetermined environment, despite the inherent stochasticity.
Agents like this can be employed in mazes/difficult to traverse terrains to help make better decisions regarding the routes to be taken.

Slippery Lake Environment :



The following is the environment that we intend to solve using Q-Learning.
The symbols mean the following :
(white) : Standard slippery surfaces : The intended direction is taken with probability 0.8, and the two adjacent directions are taken with probability 0.1 each.
X(grey) : Pitfalls, the search fails as soon as the agent reaches here
N(blue) : Non-slippery surface, the intended action is taken with probability 1
S(orange) : Super-Slippery Surface : The intended direction is taken with probability 0.5, and the two adjacent directions are taken with probability 0.25 each.
F(green) : Final Goal. The search succeeds once the agent reaches here.

The dynamics of the slippery environment works as follows :
When on a white tile, suppose the agent decides to take one step north. The next state will be the intended one with probability 0.8, but the agent may end up on the tiles to the east or west of the current one, with probability 0.1 each(not that the agent will never end up south, since you done slip backwards).
Similar dynamics apply for S and N tiles, but with different probabilities.

Our final goal is to find a policy that maximizes our chances of reaching the Final Goal F, in the minimum number of steps, and without touching any of the existing pitfalls, starting from any of the white tiles. We will employ Q-Learning for the process.