Lab Assignment 2: Where's Croc

Completion Date: 14th October

This is the second lab assignment in the AI course. It should be performed in **the same group** of 2-4 people that you were in for the first lab assignment.

Assignment Overview

Game Overview

You are a ranger in Wollomunga national park, in outback Australia. Crocodiles in this park have sensors attached that say where they are and the water conditions (calcium, salinity and alkalinity levels) of the water the crocodile is current swimming in. The park consists of 40 waterholes, each of which is reachable only from its neighbors. The park has records of the calcium, salinity and alkalinity distributions in each waterhole. The sensor on one crocodile, 'Croc', has broken. It no longer says where he is, however it does still provide water condition readings. You need to find Croc. There are also two Swedish backpackers in the park, wandering around at random visiting waterholes. If they end up in the same waterhole as Croc, they will be eaten. Your score is the number of moves it takes to find Croc.

Your Task

Design a program to compete on the Where's Croc game. The program files are available on the course homepage.

1. Practical Implementation
   You will compete in the Where's Croc. You will be expected to **use hidden Markov models and associated algorithms** to work out where Croc is given the sequence of observable variables given to you in the game. Read the runWheresCroc help documentation in the DeliveryMan package for more detail. The hidden Markov model will permit you to model the dynamic probabilities of Croc being at different water holes. This is important, but not the only important matter in performing well in the game. You will have to think about what else is important and how you can perform as well as possible.
   You will provide:
   - An R script with a function that can be passed to runWheresCroc.

   We will see how all groups perform, and your performance will be one factor influencing your grade.

2. Report (5-10 pages)
   You will provide a report. It will include:
   - A theoretical overview of hidden Markov models, including an explanation of the current state estimation algorithm.
   - A discussion of the hidden Markov model you used, including a discussion of the observable variables you utilized, the parameters of your transition and emission matrices, and your initial state.

- A discussion of additional strategies you made use of to improve your performance, including your route finding algorithm for moving between locations and your choice of locations to move to. Explain why you used these strategies.

Each of the dot points above will be worth 5 points, for a total report grade out of 20. Grade boundaries will be:

Grade	Points
3	10
4	14
5	17

The course assistant will be responsible for grading the assignment.