CE213 Artificial Intelligence Assignment 1 (2015)

Module Supervisor: John Gan

This assignment is worth 20% of the marks for the module

DEADLINE: 11:59 am, Tuesday 17th November 2015 (WEEK 8)

THE PROBLEM:

For this assignment you are asked to modify a provided program to solve the "corn, goose and fox" problem, which is described as follows:

> *A farmer is taking a sack of corn, a goose, and a fox to market.*
> *He has to cross a river.*
> *There is a rowing boat but it is only large enough to carry the farmer (rowing the boat) and any one of the three things he is taking. Luckily, the goose or fox will not run away when the farmer is not present.*
> *Unfortunately there are two problems:*
> *The goose will eat the corn if the farmer is not present.*
> *The fox will eat the goose if the farmer is not present.*
> *How does the farmer get everything across the river?*

The provided program contains source files of 3 Java classes and is available at http://orb.essex.ac.uk/ce/ce213/restricted/Assignment1/ProvidedCode.zip, which is for solving the following sliding tile puzzle:

> *It consists of three white tiles, three black tiles and an empty space arranged in a row on a board with seven locations. The diagram below shows the initial configuration.*

B	B	B		W	W	W

> *The objective of the puzzle is to rearrange the tiles into the following formation, in which all the black tiles are to the right of all the white tiles:*

W	W	W		B	B	B

> *Moves are made by:*
> 1. *Sliding a tile into an adjacent empty space.*
> 2. *Jumping a tile over one other tile into the empty space.*
> 3. *Jumping a tile over two other tiles into the empty space.*
>
> *Note that you cannot move tiles outside the original seven locations.*

TASKS:

1. For the provided program:

   a) Compile and run the provided program.
   b) Check and understand the generated text file.
   c) Comment on each line in the provided method possibleMoves.
   d) Comment on each line in the provided method solve.
   e) Modify the provided method solve to implement a different blind search strategy; Compile and run the program again and check the generated text file.

2. Modify the provided program (three source files) for solving the "corn, goose and fox" problem:

The output of your modified program should list all the moves that make up your solution to the "corn, goose and fox" problem, followed by the number of moves and the number of nodes expanded. For example, the first three moves of a solution might appear like (R/L represents that an item is on the right/left bank of the river):

```
[RRRR]
[RLRL]
[RLRR]
```

And the last three lines of the solution might be:

```
[LLLL]
7 Moves
10 Nodes expanded
```

The output should be directed to a text file.

3. For the modified program for solving the "corn, goose and fox" problem:

a) Compile and run the modified program
b) Check the generated text file and ensure the generated solution is correct
c) Comment on each line in the modified method possibleMoves
d) Comment on each line in the modified method solve

SUBMISSION:

The assignment should be submitted through the online coursework submission system (FASER). You should submit a single zip file called "CE213 Assignment 1 (your name)", containing the following:

*Source files for the 3 Java classes that comprise your **modified** program for the "corn, goose and fox" problem, containing sufficient comments as specified in the Tasks section.*

*A text file containing the output produced by your **modified** program for the "corn, goose and fox" problem.*

*A folder called "ProvidedCode" with source files of the 3 **provided** Java classes for the sliding tile puzzle, containing sufficient comments as specified in the Tasks section and the modification in the method solve for implementing a different blind search strategy.*

ASSESSMENT CRITERIA:

Correctness of the modified program (including the modification specified in task 1) 40%
Quality of the modified program 20%
Quality of comments on the modified program 20%
Quality of comments on the provided program 20%

LATE SUBMISSION AND PLAGIARISM

Please refer to the Undergraduate Students' Handbook for details of the School policy regarding late submission and University regulations regarding plagiarism.

PROBLEMS:

If any problems arise in the assignment, you can discuss them with me via e-mail (**jqgan@essex.ac.uk**) or during the classes.