**CS1571**
**Fall 2019**
**10/2 Homework**

**Simran Gidwani**

Take a look at:

- Reflect back on the search algorithms we've covered in this class. The following visualizations of many of the search algorithms we've discussed might help: https://aimacode.github.io/aima-javascript/3-Solving-Problems-By-Searching/
- Read Chapters 7.1-7.5 of the textbook

Then, answer the following questions.

1. In the assignment, you are using CSP Search to solve a Sudoku problem and A* Search to solve a route-finding problem. What are the characteristics of the route finding problem that make it more suitable for A*. Check all that apply.

   ____ It represents a configuration search instead of a path search.

   _X___ It is possible from any state to estimate the path cost to the goal.

   _X___ The final solution is subject to particular constraints.

   __X__ An initial state, possible actions, and transition model are specified.

2. (4 pts) Translate the following English expressions into logical expressions, given the following atomic sentences:

   $P$ = The weather is sunny.
   $Q$ = The weather is warm.
   $R$ = George is running outside.
   $S$ = George is running on the treadmill.

| English Sentence | Logical Expression |
|---|---|
| George is not running on the treadmill. | $\neg S$ |
| The weather is sunny and the weather is warm. | $P \wedge Q$ |
| If the weather is warm, George is running outside. | $R \Rightarrow Q$ |
| If George is running on the treadmill, the weather is not warm. | $S \Rightarrow \neg Q$ |
| George is running outside or George is running on the treadmill. | $R \vee S$ |

3. (4 pts) Add two new logical expressions to the knowledge base that you know to be true, based on the inference rules described in the textbook. Assume the only sentences in the knowledge base are the five sentences in the table above. An example of an inference rule is Modus Ponens.

   Sentence 1:

   | $R \Rightarrow \neg P$ (If George is running outside, the weather is not sunny |
   |---|

   Sentence 2:

   | $(Q \wedge \neg P) \Rightarrow R$ (If the weather is warm and not sunny, George is running outside) |
   |---|