Homework Assignment 3
600.335 / 435 Artificial Intelligence Spring 2019
Due: Wednesday April 11, 2019

Search

In this part of the assignment, you will implement search agent and answer some theoretical questions.

Question 1. Open the following google colaboratory notebook[1]. Follow all the steps specified in it. Include link to your solved notebook in your submission. Some parts of the notebook are optional and will not be graded.

Question 2. What is uninformed search and informed one. Name specific methods of both.

Question 3. Is depth-first search optimal if path costs are all equal? Is breadth-first optimal in this case?

Question 4. When is breadth-first search complete and optimal? What is the time and space complexity?

Question 5. Is breadth-first search optimal if cost of every step exceeds some small positive constant ϵ and costs are not equal? Why ? Is uniform-cost search optimal in this case?

Question 6. What is the time and space complexity of uniform-cost search? Under what conditions it is complete?

Logic

Translate the following English sentences into *propositional logic*

Question 7. A and B are both true.

Question 8. If A is true, then B must be true as well.

Question 9. If a student studies for a test, they will do well on it. We can also tell that if a student did well on a test, then they must have studied for it.

Question 10. If a student is completely dry and it is raining outside, it is because they have an umbrella or a hoodie and it is not raining heavily.

Question 11. Simplify and translate the following *propositional logic* sentence into English: $A \vee (A \wedge B) \iff \neg(A \wedge B \wedge C)$

Question 12. Is the following sentence valid? $A \vee B$

Question 13. Is the following sentence satisfiable? $A \implies B$

Question 14. Is the following sentence unsatisfiable? $(A \wedge (B \vee C)) \wedge ((A \wedge B) \vee (A \wedge C))$

[1] https://colab.research.google.com/drive/13JYbl5F4_f8LoV0F7yE1kwePtfhRftb9