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](https://colab.research.google.com/drive/13JYb5F4_f8LoV0F7yElkwePtfbRfb9) 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 $\epsilon$ 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: $A \lor (A \land B) \iff \neg (A \land B \land C)$

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

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

**Question 14.** Is the following sentence unsatisfiable? $(A \land (B \lor C)) \land ((A \land B) \lor (A \land C))$

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1[https://colab.research.google.com/drive/13JYb5F4_f8LoV0F7yElkwePtfbRfb9](https://colab.research.google.com/drive/13JYb5F4_f8LoV0F7yElkwePtfbRfb9)