CSE 412A Spring 2022 Introduction to Artificial Intelligence

Exercise 1

- You have approximately as many minutes as there are points.
- Mark your answers ON THE EXERCISE ITSELF. If you are not sure of your answer you may wish to provide a *brief* explanation. All short answer sections can be successfully answered in a few sentences AT MOST.
- For True/False questions, please *circle* your answer.

First name	
Last name	
WUSTL ID	

For staff use only:

Q1.	Modeling Search Problems	/10
	Total	/10

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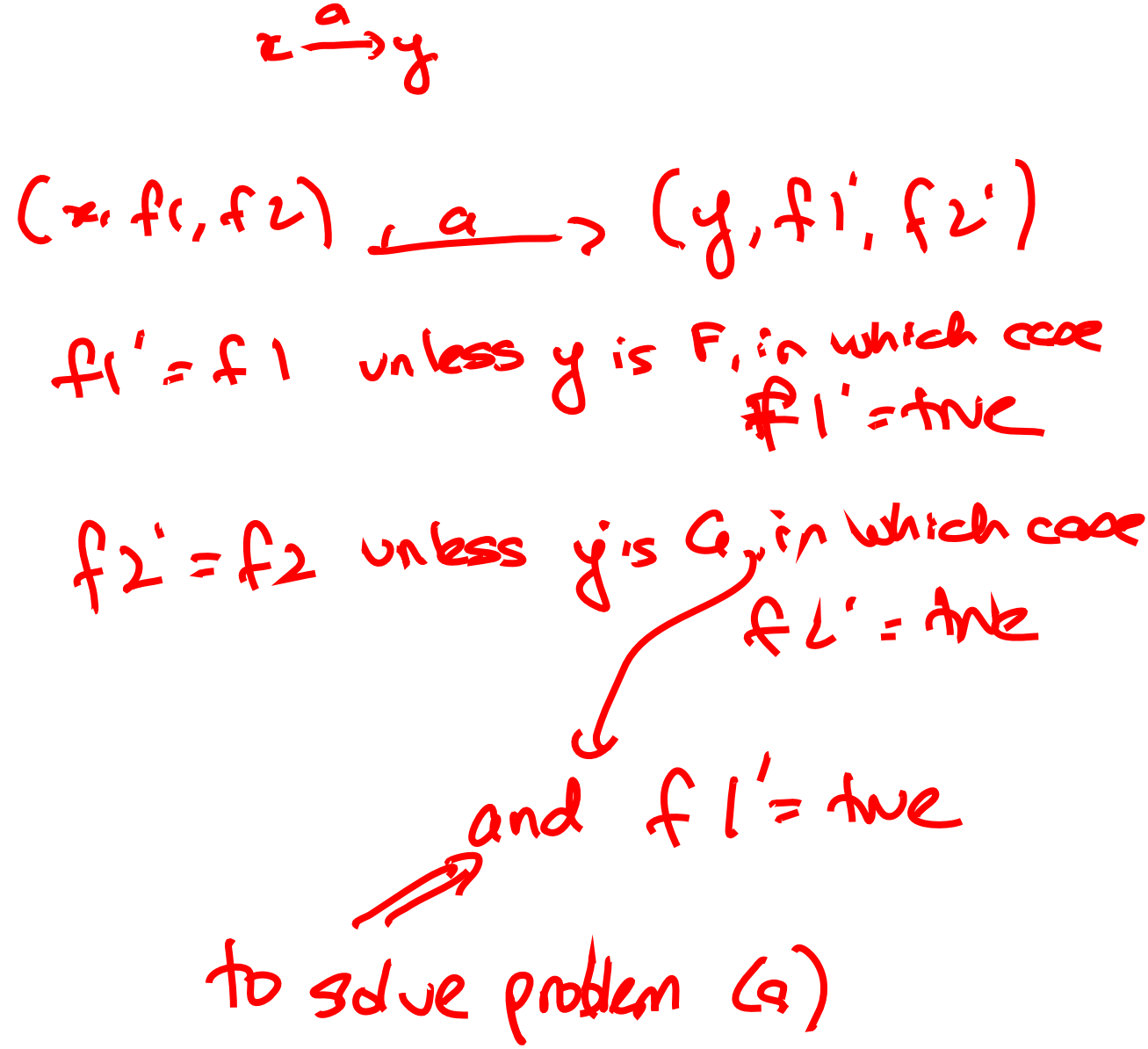


Q1. [10 pts] Modeling Search Problems

Recall that in the recorded lectures, we modeled the path-finding problem as a search problem through the following mapping:

- **States:** Locations
- **Actions and Successors:** Movements to neighboring locations
- **Cost:** Length of movement
- **Start and Goal States:** Start and goal locations
- **Solution:** Sequence of movements that transforms the start state to a goal state (i.e., a path from the start state to a goal state)

Then, an optimal solution corresponds to a solution with the smallest cost. Or, in other words, a path with the shortest length.

(a) [5 pts] Now, imagine that you want to find a path that traverses through two different goal locations *in a specific order*. For example, in the graph in the previous question, you want to find a path from A that first goes through F and then through G. How would you model this problem as a search problem?

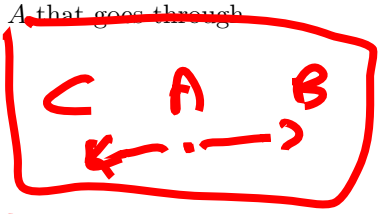
Model as two search problems P_1 & P_2

P_1: start state = A, goal state = F

P_2: start state = F, goal state = G

Solution to your problem = concatenation of sol. to P_1 & sol. to P_2.

(b) [5 pts] Now, imagine that you want to find a path that traverses through two different goal locations *in any order*. For example, in the graph in the previous question, you want to find a path from A that goes through both F and G in any order. How would you model this problem as a search problem?



state = (curr, flagF, flagG)

goal state = (F, true, true), (G, true, true)

start state = (A, false, false)