

4511W, Fall-2019
ASSIGNMENT 1 :

Assigned: 09/10/19 Due: 09/17/19 at 11:55 PM (submit via Canvas, you may take a picture of handwritten solutions, but you must put them in a pdf) Submit only pdf or txt files

Written/drawn:

Problem 1. (15 points)

Read this article (a bit old):

<http://spectrum.ieee.org/automaton/robotics/artificial-intelligence/how-google-self-driving-car-works>

Based off the article, describe the sensors of google's self driving car. Classify the environment/actions for this problem based on the first 6 categorizations we went over in class (and are in the book) (you may skip known vs. unknown).

Problem 2. (30 points)

For each of the following scenarios, describe what are the possible (1) states and (2) actions for each state. Then also specify a (3) sample initial state and (4) all the possible goal states. Write a short sentence or two justifying why you choose this representation (i.e. why you think this is efficient/sufficient).

Situation 1: You walk into class and are looking for a spot to sit down. You may assume that you have no preference of neighbors, you can see fine from the back of the class, and other such simplifying assumptions.

Situation 2: You are playing the card game “Uno” with some other people. Write your answers assuming it is your turn to play only. You can ignore the scoring and verbal component of the game. Also assume this is the “standard” game, where the only non-numerical cards are: skip, reverse, draw two, wild, wild draw four.

If you are unsure about the rules of the game, read up here:

[https://en.wikipedia.org/wiki/Uno_\(card_game\)](https://en.wikipedia.org/wiki/Uno_(card_game))

... or watch here (first half):

https://www.youtube.com/watch?v=jxKtz0s_lBc

Situation 3: You are a mail carrier (snail-mail) and need to deliver a bunch of letters to a number of buildings in the city.

Problem 3. (20 points)

When playing a complex strategy based board game (e.g. Go, Chess or Checkers), what type of agent program (simple reflex, model-based reflex, goal or utility) would you attempt to write? Write a few sentences supporting why this program classification is correct (i.e. a very brief description of the program and how it relates to the classification). Then write a few more sentences to justify why this choice of program (and thus the type of classification) is most appropriate.

Problem 4. (20 points)

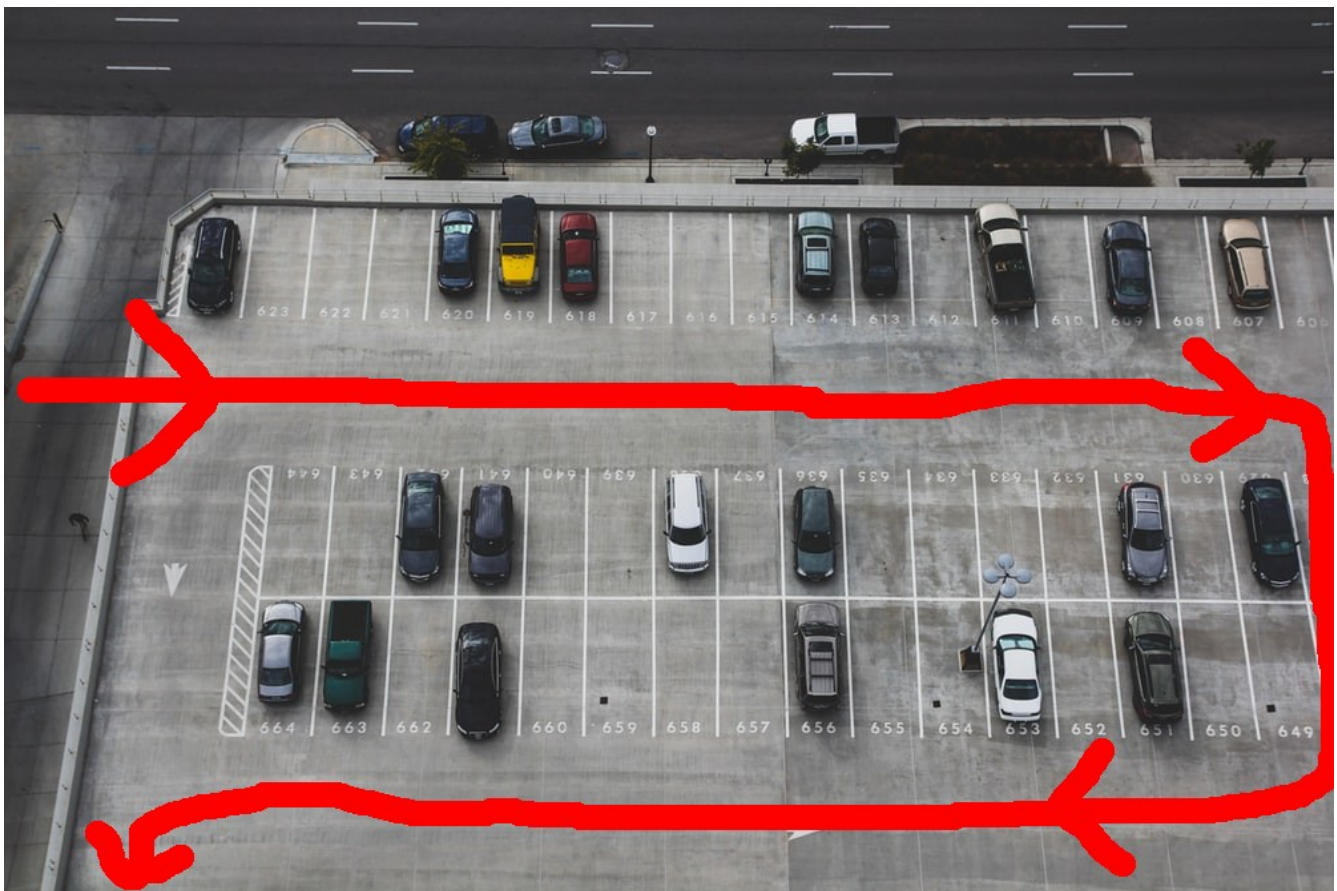
For each of the following, state whether the task is being done rationally or not (no “limited rationality”

option). Provide a few sentences justifying your choice. (Note: this is the strict artificial intelligence definition of “rational”.)

Situation 1: You play a “game” where you roll two 6-sided dice and guess the sum. (You win if you guess the sum of the face on the two dice correctly.) You always guess 7.

Situation 2: You were shopping at a grocery store and a watermelon fell on your head and you get a concussion. Instead of seeking medical help of any kind, you unwisely finish up shopping. When leaving the store, you realize you have completely forgotten where you parked your car in the rectangular parking lot, and even what your car looks like. The only thing you remember is your license plate number (which you can only see if you are next to the car in the aisle). You try to find your car in this “snake” pattern shown below (assuming you enter the parking lot in a corner):

Your goal is to find your car as quickly as possible (on average/expected value). Clarify your assumptions you are making that have an impact on rationality.



Programming (python/lisp):

The book provides code for the algorithms presented. For this class, we will use the python version of the code. Download the python code here:

<https://github.com/aimacode/aima-python>

The code requires python3 to run. For this assignment, you only need to get the code base and then run the provided file (put in the base directory with things like “README.mb”). The file is here:

<http://www-users.cselabs.umn.edu/classes/Fall-2019/csci4511/assignments/hw1.py>

Problem 5. (15 points)

Write a single sentence describing what “hw1.py” is doing and copy-paste the output after the program has finished.