15-110 F25 Check6-1 - Written Portion

Name:

AndrewID:

Complete the following problems in the fillable PDF, or print out the PDF, write your answers by hand, and scan the results.

When you are finished, upload your check6-1.pdf to **Check6-1 - Written** on Gradescope. Make sure to upload your Check6-1 work for the Hw6 project as well!

Written Problems

#1 - Data Formats - 4pts

Can attempt after Data Analysis I lecture

For each of the following data formats, identify whether it would be best interpreted as a CSV file, a JSON file, or as plaintext. Select just one answer - the **best** answer.

```
{ "restaurants": [
       { "restaurant" : "Chipotle",
         "menu" :
              { "lunch" :
                    { "burrito" : 7.99,
                      "tacos" : 6.99,
                      "bowl" : 8.99 },
                "dinner" :
                    { "burrito" : 8.99,
                      "tacos" : 7.99,
                      "bowl" : 9.99 } } },
     { "restaurant" : "Sushi Fuku",
       "menu":
              { "lunch" :
                    { "bowl" : 8.99,
                      "sushi" : 10.99 },
                "dinner":
                    { "bowl" : 10.99,
                      "sushi" : 12.99 } } } ] }
```

- ☐ CSV
- ☐ JSON
- ☐ Plaintext

```
City,Longitude,Latitude
Los Angeles,34°03'N,118°15'W
New York City,40°42'46"N,74°00'21"W
Paris,48°51'24"N,2°21'03"E
```

- ☐ CSV
- ☐ JSON
- ☐ Plaintext

#2 - Parsing Data - 11pts

Can attempt after Data Analysis I lecture

You have been given a set of data about CMU classes in the following format (whitespace added for clarity):

```
Professor,      ClassNum,  Days,      Time
Cortina,        15104,     MWF,       09:05-09:55
Rivers,         15110,     MWF,       14:30-15:20
Xhakaj,         15110,     MWF,       15:35-16:25
Xhakaj,         15121,     TR,        11:50-13:10
```

Assume you've already split the string on `"\n"` and used the variable `row` to iterate through each class one line at a time.

How would you determine which department each class is in? Recall that the first two digits of the class number indicate the department.

- ☐ `row.split(',')[1][0:1]`
- ☐ `row.split(',')[1][0:2]`
- ☐ `row.split(',')[1][2:]`

How would you determine the start time and end time of a class and set those times as strings in the variables `start` and `end`? **Select all lines that are needed.** Assume that the code is run from the top selected line to the bottom selected line.

- ☐ `times = row.split(',')[0]`
- ☐ `times = row.split(',')[3]`

- ☐ `start = row.split('-')[0]`
- ☐ `start = times.index('-') - 1`
- ☐ `start = times.split('-')[0]`

- ☐ `end = times.index('-') + 1`
- ☐ `end = times.split('-')[1]`
- ☐ `end = start + "1:00"`

#3 - Components vs. Rules - 5pts

Can attempt after Simulation I lecture

Let's say we want to design a simulation that determines how many students will sign up for a course during registration week. The simulation's time loop will loop over each sign-up time slot in order.

We need to design the model for this simulation. For each of the following values, would this value work better as a **component** of the model, or as a **rule** of the model?

Current length of the course's waitlist

- ☐ Component
- ☐ Rule

Students are more likely to sign up if a class is required for their major

- ☐ Component
- ☐ Rule

Number of students who are required to take this class, and haven't taken it yet, organized by sign-up timeslot

- ☐ Component
- ☐ Rule

Students are less likely to sign up for a class if the waitlist is long

- ☐ Component
- ☐ Rule

Information on whether or not the course will be offered again in the following semester

- ☐ Component
- ☐ Rule

#4 - Simulation Code - 9pts

Can attempt after Simulation I lecture

We want to write code for a simulation that moves a circle from the left side of the screen to the right side of the screen in a 400px x 400px window.

For each part of the simulation (the Model, the View, and the Time Rules), select the single line of code that needs to be included in that part.

Hint: if you're not sure, try implementing this using the simulation starter code!

Which line of code should be included in the **model**, in `makeModel(data)`?

☐ `x = 5`
☐ `data["left"] = 5`
☐ `canvas.create_oval(x, y, x + 40, y + 40)`

Which line of code should be included in the **view**, in `makeView(data, canvas)`?

☐ `data["left"] = data["left"] + 5`
☐ `canvas.create_oval(200, 200, 200 + 40, 200 + 40)`
☐ `canvas.create_oval(data["left"], 200, data["left"] + 40, 200 + 40)`

Which line of code should be included in the **time rules**, in `runRules(data, call)`?

☐ `data["left"] = 5`
☐ `data["left"] = data["left"] + 5`
☐ `x = data["left"] + 5`

#5 - Machine Learning Categories - 16pts

Can attempt after Machine Learning lecture

For each of the following prompts, fill in the blanks with the type of **learning algorithm** that should be used and/or the type of **reasoning algorithm** that should be used.

You have a dataset that consists of student grades from past semesters of 15-110, including final grades. Use _____ learning to predict a student's **numerical** final grade based on their **numerical** exam scores with a _____ algorithm.

You have a dataset of weather patterns in different major cities around the world. Use _____ learning to propose **new groupings** of cities based on the **categorical** weather patterns with a _____ algorithm.

You have a dataset of athletes' descriptions (age, height, weight, etc) and the sport that they play. Use _____ learning to predict an athlete's **categorical** sport based on their **numerical** age, height, weight, etc. with a _____ algorithm.

To train a robot how to throw a basketball through a hoop through repeated practice and feedback, you'd want to use _____ learning.

To identify previously-unknown market trends based on stocks that go up and down together at similar times, you'd want to use _____ learning.