Final Exam

Instructions

Please write your name and university-issued email address below in the space provided.

Name: _____

Email Address: _____

You will have 75 minutes to answer the questions contained herein. You may submit the exam at any time within that period. Once you begin the exam, you may not leave the room until you submit it.

You are expected to not consult with any other source of information during the exam period. There should be no talking for any reason during the exam period. If you have a question about the exam material, raise your hand and wait for an opportunity to ask an instructor for clarification.

When you are ready, you may begin. Good luck!

Evaluation

The weight of each question is detailed below:

Question Number	Question Weight
1	3%
2	5%
3	3%
4	5%
5	4%
6	6%
7	2%
8	9%

Question Number	Question Weight
9	5%
10 (a, b, c, d)	12%
10 (e, f)	12%
11	10%
12	4%
13	7.5%
14	7.5%
15	5%

Partial credit may be awarded for any question, and there is no penalty for guessing. The professor may “curve” grades up to meet a desired minimum average score.

Application Software within a Business Context

1. What is an **information system**? Please define the term:

2. How can **businesses benefit from using computer-based information systems**? In other words, how can information systems provide value to a business? Please include benefits which can be measured in quantifiable terms.

3. What is the role, or purpose, of **software** within the context of a computer-based information system?

4. For a business which produces customer-facing application software, why does the customers' **user experience** matter? In other words, how do businesses benefit from providing a good experience to their customers? Please include benefits which can be measured in quantifiable terms.

Application Software Development

5. What is **version control** and what are some of its advantage(s) and disadvantage(s)?

    a. *Definition / Purpose*:

    b. *Advantage(s)*:

    c. *Disadvantage(s)*:

6. Why is it important to **exclude secret passwords and API Keys from an application's source code**? And what techniques can developers use to do so?

    a. *Importance (why?)*:

    b. Techniques (how?):

Python Programming

7. For any given Python variable named `x`, **write Python code** which will “print” that variable’s datatype:

8. For each of the following example Python objects, what is its **datatype**? There should be only one datatype per object. For nested objects, specify the datatype of the parent or outermost object.

    a. `{“title”: “My Book”, “color”: “purple”}` *Datatype*: _____

    b. `“Hello World”` *Datatype*: _____

    c. `False` *Datatype*: _____

    d. `3.14` *Datatype*: _____

    e. `[“a”, “e”, “c”, “b”, “d"]` *Datatype*: _____

    f. `243` *Datatype*: _____

    g. `4.0` *Datatype*: _____

    h. `None` *Datatype*: _____

    i. `{“numbers”: [400, 800, 1200]}` *Datatype*: _____

9. For each of the following example Python expressions, specify its **resulting value**. In other words, if you were to evaluate or “print” the expression, what would you see?

    a. `True and False` *Result*: _____

    b. `True or False` *Result*: _____

    c. `True != True` *Result*: _____

    d. `500 == 500` *Result*: _____

    e. `500 == “500”` *Result*: _____

10. Given the Python variable called `trip` provided on the last page of the exam booklet, **write Python code** which references that variable to perform each of the following tasks:

    a. "Print" a human-friendly message to denote the driver's first name (i.e. `"Your driver is Danny"`):

    b. "Print" the number of stops this trip makes (i.e. `3`):

    c. Assuming the stops will always be listed in ascending order of their stop sequence, "print" the name of the passenger who is traveling to the first stop (i.e. `"Vishal"`):

    d. Loop through each of the trip's stops and "print" that stop's destination, one at a time (i.e. `"Logan Circle"`, then `"Dupont Circle"`, then `"Georgetown University"`, each on its own line):

e. “Print” the total fare for this trip. The total fare is equal to the sum of all individual stop fares (i.e. `$17.98`). Don’t worry about rounding or adjusting the decimal places (i.e. format function not necessary), but do include a dollar sign.

f. Define a custom function called `driver_promo` such that when it is invoked it will return (NOT “print”) a promotional message about the driver. The function should accept an input parameter object called `driver`, which is assumed to resemble the structure of the driver object in the provided data structure, although its values will likely differ. The function’s logic should adhere to the following conditions… In the event the given driver’s average rating is greater than 4.5, then the message should include language about the driver’s average rating (i.e. `“Your driver has an average rating of R”`, where R refers to the actual average rating value). Otherwise, the message should include language about the number of trips the given driver has completed (i.e. `“Your driver has completed T trips”`, where T refers to the actual number of trips). Write the function definition below (not necessary to also invoke the function):

11. Given the Python `books` variable below, **write Python code** which references that variable to perform each of the following tasks:

```
books = [
    {“id”:1, “title”:”Book A”, “color”:”green”, “year”:1901},
    {“id”:2, “title”:”Book B”, “color”:”red”, “year”:1957},
    {“id”:3, “title”:”Book C”, “color”:”green”, “year”:1988},
    {“id”:4, “title”:”Book D”, “color”:”blue”, “year”:1923},
    {“id”:5, “title”:”Book E”, “color”:”yellow”, “year”:2017}
]
```

    a. Assuming the identifier, or `“id”` attribute, of each book is and will always be unique, and assuming the order of books may vary, “print” the title of the book whose identifier is equal to `4` (i.e. `“Book D”`):

    b. Assuming the `“year”` attribute represents the year a given book was published, “print” the number of books published before the year `1990` (i.e. `4`):

Python Concepts

12. Developers can use **Python modules and packages** to extend the functionality of their Python programs. What's one way in which using a module is similar to using a package? And what's one way in which using a module is different than using a package?

    a. *Similarity*:

    b. *Difference*:

13. Please list five **Python modules** you have used, or otherwise become aware of, over the course of the semester. And briefly explain the utility of, or the reason for using, each:

    a. *Module name*: _____ *Purpose*:

    b. *Module name*: _____ *Purpose*:

    c. *Module name*: _____ *Purpose*:

    d. *Module name*: _____ *Purpose*:

    e. *Module name*: _____ *Purpose*:

14. Please list five **Python packages** you have used, or otherwise become aware of, over the course of the semester. And briefly explain the utility of, or the reason for using, each:

    a. *Package name*: _____ *Purpose*:

    b. *Package name*: _____ *Purpose*:

    c. *Package name*: _____ *Purpose*:

    d. *Package name*: _____ *Purpose*:

    e. *Package name*: _____ *Purpose*:

15. Which Python package or module do you prefer to use for **processing data in Comma-separated Values format**? Why and how did you arrive at this preference? You are encouraged to describe your experiences using either or both options. NOTE: both options are viable and will be considered “correct”.

    a. *Package or Module name:* _____

    b. *Reason*:

This page has been left intentionally blank. Feel free to make notes on it. Its contents will not be evaluated.

*This page is to be used in conjunction with **Question 10**. Feel free to detach this page and make notes on it. Its contents will not be evaluated. If you do detach it, write your name on it and remember to return it along with the rest of your exam booklet!*

```
trip = {
    "driver": {
        "first_name": "Danny",
        "last_name": "Dreyfus",
        "avg_rating": 3.6,
        "total_trips": 950
    },
    "vehicle": {
        "make": "Toyota",
        "model": "Prius",
        "year": 2015,
        "color": "silver"
    },
    "rideshare": True,
    "pickup_location": "Union Station",
    "stops": [
        {
            "sequence": 1,
            "passenger": "Vishal",
            "destination": "Logan Circle",
            "fare": 3.99
        },
        {
            "sequence": 2,
            "passenger": "Clara",
            "destination": "Dupont Circle",
            "fare": 5.99
        },
        {
            "sequence": 3,
            "passenger": "Lee",
            "destination": "Georgetown University",
            "fare": 7.99
        }
    ]
}
```