

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.

FYI: as some students begin to finish the exam and leave the room, the professor may ask some of the remaining students to relocate desks, to achieve a more even space distribution.

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

Evaluation

The weight of each question is detailed below. Partial credit may be awarded, and there is no penalty for guessing. NOTE: The professor may “curve” grades up to meet a desired minimum average score.

Question	Weight
#1 software	5%
#2 user experience	8%
#3 API Key security	8%
#4 built-in functions	3%
#5 built-in functions	3%
#6 built-in functions	6%

Question	Weight
#7 datatypes	12.5% (10 * 1.25 each)
#8 truth tables	12.5% (10 * 1.25 each)
#9 filepaths	5%
#10 sales data	9%
#11 rideshare data	17% (3 + 3 + 3 + 3 + 5)
#12 tweets data	11% (3 + 4 + 4)

NOTE: #10 and #12c are probably the hardest, so it might make sense to do those last.

Application Software within a Business Context

1. What is the role, or purpose, of **software** within the context of a computer-based information system?
2. For a business which produces customer-facing application software, why does the customer's **user experience** matter? In other words, how does a business benefit from providing a good experience to its customers? Ideally focus on benefits which can be measured in quantifiable (numerically measurable) terms.
3. When Python applications need to reference secret credentials like passwords and **API Keys**, what **security measures** can the developer take to prevent these credentials from being compromised when sharing their source code online? Ideally mention the names of specific files, modules, and packages involved in the process, and describe the role of each.

Python Programming

4. In Python, what does the `type()` function do, and why is it helpful?

5. In Python, what does the `dir()` function do, and why is it helpful?

6. In Python, what does the `breakpoint()` function do, and why is it helpful?

7. For each of the following example Python objects, what is its **datatype**? FYI: for nested objects, specify only the datatype of the parent (outermost) object.
 - a. `"Spring Break is on the horizon! :-D"` Datatype: _____
 - b. `True` Datatype: _____
 - c. `None` Datatype: _____
 - d. `"$3.14"` Datatype: _____
 - e. `[400, 800, 1200]` Datatype: _____
 - f. `243` Datatype: _____
 - g. `{"title": "My Book", "color": "silver"}` Datatype: _____
 - h. `[{"total": 1.00}, {"total": 5.99}]` Datatype: _____
 - i. `2.0` Datatype: _____
 - j. `{"numbers": ["z", "y", "m", "f", "q"]}` Datatype: _____

8. 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. <code>True or False</code> | Result: _____ |
| b. <code>True and False</code> | Result: _____ |
| c. <code>2 + 2 == 4</code> | Result: _____ |
| d. <code>2 + 2 != 4</code> | Result: _____ |
| e. <code>500 == "500"</code> | Result: _____ |
| f. <code>5 in [1, 2, 5]</code> | Result: _____ |
| g. <code>"Hello" in "Hello World"</code> | Result: _____ |
| h. <code>"H" not in "Hello"</code> | Result: _____ |
| i. <code>True and (2 + 2 == 4)</code> | Result: _____ |
| j. <code>(5 in [1,2,5]) or (5 in [1,2,3])</code> | Result: _____ |

9. Given a Python script located at filepath `"my-repo/app/my_script.py"` and a CSV file located at filepath `"my-repo/data/2020/sales.csv"`, **write Python code** which if written inside the script will reference the CSV filepath, store the filepath in a variable called `csv_filepath`, and then “print” the filepath. Ideally leverage the capabilities of a module to do this in a way which works across any operating system (Mac or Windows). FYI: this question is not asking you to read the data inside the CSV file - just to print the filepath.

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

```
sales_report = [  
    {"month": "Jan", "units_sold": 800},  
    {"month": "Feb", "units_sold": 1000},  
    {"month": "Mar", "units_sold": 900},  
    {"month": "Apr", "units_sold": 850},  
    {"month": "May", "units_sold": 900},  
    {"month": "Jun", "units_sold": 950},  
]
```

- a. **Define a function** called `top_month`, which accepts an input parameter called `all_months`, which when invoked as `top_month(sales_report)` will determine which month has the greatest number of units sold, and “print” a human-friendly message including the name of that month and the corresponding number of units sold (i.e. `"Top Month: Feb (1000 units)"`):

11. Given the Python variable called `trip` provided on page 9 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 Gerold"):
- 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 destination of the second stop (i.e. "Dupont Circle"):
- d. Loop through each of the trip's stops and "print" that stop's passenger name, one at a time (i.e. "Vishal", then "Clara", then "Lee", each on a separate 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.

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

- a. "Print" the screen name of the user who authored the first tweet (i.e. "sandwhoa"):
- b. Of all the tweets which include the phrase "@sandwhoa" in their full text, "print" the screen name of the user who authored that tweet, each on a separate line (i.e. "person2", then "person3"):
- c. Of all the tweets which include the phrase "@sandwhoa" in their full text, determine which tweet has the greatest number of likes, and then "print" the screen name of the user who authored that tweet (i.e. "person3"). FYI: Assume the tweet order can change at any time and has no relationship with the number of likes.

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 11**. 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": "Gerold",
    "last_name": "Johnson",
    "avg_rating": 3.8,
    "total_trips": 950
  },
  "vehicle": {
    "make": "Tesla",
    "model": "Cybertruck",
    "year": 2021,
    "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
    }
  ]
}
```

*This page is to be used in conjunction with **Question 12**. 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!*

```
tweets = [  
  {  
    "id": 100200297,  
    "full_text": "Look at this delicious sandwich!",  
    "img_url": "https://sandwhoa.com/sandwich.png",  
    "user": {"screen_name": "sandwhoa", "followers": 5000},  
    "likes_count": 150  
  },  
  {  
    "id": 100200298,  
    "full_text": "I love sandwiches",  
    "img_url": None,  
    "user": {"screen_name": "person1", "followers": 100},  
    "likes_count": 5  
  },  
  {  
    "id": 100200299,  
    "full_text": "@sandwhoa yumm...",  
    "img_url": None,  
    "user": {"screen_name": "person2", "followers": 200},  
    "likes_count": 10  
  },  
  {  
    "id": 100200300,  
    "full_text": "@sandwhoa that sandwich looks amazing!!",  
    "img_url": None,  
    "user": {"screen_name": "person3", "followers": 300},  
    "likes_count": 35  
  },  
  {  
    "id": 100200301,  
    "full_text": "I ate a great sandwich today",  
    "img_url": None,  
    "user": {"screen_name": "person4", "followers": 400},  
    "likes_count": 50  
  }  
]
```