Final Exam

Instructions

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

Name: _____

Email Address: _____

You will have 90 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 the professor for clarification.

Please do not unstaple the exam or re-order its pages in any way. When you are ready, you may begin. Good luck!

Evaluation

The weights of all questions sum to 100%. The relative weight of each question is detailed in the tables below:

Question Number	Question Weight
1	5%
2	10%
3	6%
4	6%
5	2%
6	12%
7	3%
8	2%
9	10%

Question Number	Question Weight
10	9%
11	5%
12	6%
13	6%
14	5%
15	5%
16	4%
17	4%

Fundamentals of Software Development

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

2. What are the two major **categories** of computer software? (*Hint: not "client-side vs server-side")*. Define and provide three real-world examples of each.

    a.

    b.

3. Please describe the advantages and disadvantages of practicing software **version control**.

    a. *Advantages (at least two)*:

    b. *Disadvantage(s) (at least one)*:

4. Please describe the advantages and disadvantages of writing automated software **tests**.

    c. *Advantages (at least two)*:

    d. *Disadvantage(s) (at least one)*:

Python Programming

5. What is **Python**?

6. For each of the **Python Datatypes** in the left column, draw a straight line to match it with its respective example in the right column:

a. Dictionary	i. `2335`
b. String	ii. `{“title”: “My Book”, “color”: “purple”}`
c. List	iii. `True`
d. Integer	iv. `3.14`
e. Boolean	v. `“Hello World”`
f. Float	vi. `[1, 2, 3, 4, 5, 6, 7]`

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

8. For any given Python variable named `x`, **write Python code** which will output a list of functions available to be called on that variable:

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

```
person = {
    “first”: “Santa”,
    “last”: “Claus”,
    “spouse”: “Mrs. Claus”,
    “message”: “Ho Ho Ho”,
    “stops”: [“New York”, “Denver”, “San Francisco”]
}
```

   a. Output the person’s full name (i.e. `“Santa Claus”`):

   b. Output the number of stops this person makes (i.e. `3`):

   c. Output the name of the first stop this person makes (i.e. `“New York”`):

   d. Output the name of the last stop this person makes, irrespective of the actual number of stops the person makes (i.e. `“San Francisco”` or whatever the last stop happens to be, in the event more stops get added or removed later):

   e. Loop through each of the person’s stops and output, or “print”, that stop’s name, one at a time (i.e. `“New York”`, then `“Denver”`, then `“San Francisco”`, each on its own line):

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

a. Assuming the identifier, or `“id”` of each book is and will always be unique, and assuming the sort order of books can change at any time, output the title of the book whose identifier is equal to `4` (i.e. `“Book D”`), irrespective of book order:

b. Output the number of books which have a `“color”` attribute value equal to `“blue”` (i.e. `2`), irrespective of the actual number of books or their actual attribute values:

c. Assuming the `“year”` attribute represents the year a given book was published, output the number of books published after the year `1950` (i.e. `3`), irrespective of the actual number of books or their actual attribute values:

11. Given the desired invocation of the Python `calculate_area()` function below, assuming its purpose is to produce a result representing the area of some rectangle, and assuming a rectangle's area is calculated by multiplying its length by its height, **write Python code** to define the `calculate_area()` function such that it will produce the desired result (i.e. `8`):

```
# DESIRED INVOCATION:
area = calculate_area(length=4, width=2)

# DESIRED RESULT:
print(area) #> 8
```

12. Please list three built-in **Python Modules** you "imported" during the course of the semester, and briefly explain the utility of, or the reason why you were using, each.

    a.

    b.

    c.

13. Please list three open source **Python Packages** you "imported" during the course of the semester (or are otherwise aware of), and briefly explain the utility of each.

    a.

    b.

    c.

Software within a Business Context

14. How can a business or organization receive value through the usage, or **consumption**, of software products and services? Please provide three specific real-world examples.

15. How can a business or organization receive value through the delivery**,** or **production**, of software products and services? Please provide three specific real-world examples.

16. For a business or organization which **consumes** software products and services, what are the advantages and disadvantages of that software being **open source**?

17. For a business or organization which **produces** software products and services, what are the advantages and disadvantages of that software being open source?