ASSESSMENT 2
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CFG NANODEGREE -FULL STACK

1. PYTHON THEORY QUESTIONS- 10 POINTS

ANSWERS:

1. What is program?
   - Computer programs are written in a computer language for example: Python
   - Is a set of instructions written in a programming language that the computer can interpret to be used by end-users.
2. What is process?
   - Is the instance of a program that runs in a computer that depends also on the computer's operating system.
3. What is Cache?
   - It depends where it is hardware or software, it is a component that stores data for future requests for that data can be retrieved faster.
4. What is Thread and Multithreading?
   - Thread- is instructions that are designed to be executed and scheduled by the CPU independently.
   - Multithreading- the computer's ability of the OS to run a lot of programs concurrently.
5. What is GIL in Python and How does it work?
   - It is simple to use and provides a performance to upscale/increase single-threaded programs.
6. What is Concurrency and Parallelism and what are the differences?
   - Concurrency - application that is processing more than one task at the same time.
   - Parallelism - application where tasks are divided into smaller sub-tasks that are processed simultaneously.
   - Differences: Concurrency is about dealing with lots of things at once. Parallelism is about doing lots of things at once.
7. What do these stand for in programming: DRY, KISS, BDUF
   - DRY (DON'T REPEAT YOURSELF)
   - KISS (KEEP IT SIMPLE STUPID)
   - BDUF(BIG DESIGN UPFRONT)
8. What is Garbage collector? How does it work?
   - It deletes unwanted objects automatically to free the memory space.
     -It runs during program execution and is triggered when an object's reference count reaches zero.
9. What are 'deadlock' and 'livelock' in a relational database?
   - Deadlock - are not good in the system because it occurs when two or more different database tasks are waiting for each other and none of the task is willing to give up the resources that other task needs.
   - Livelock - occurs when read transactions are applied on table which prevents write transaction to wait indefinitely.
10. What is Flask and what can we use it for?

- Is kind of web framework in Python that have tools, libraries and technologies that allows us to build web applications.
- We can use it for: making web pages like a blog site, it is easy to create APIs, also supports unit testing, can easily integrated with database like mysql.

2. DISCUSS THE DIFFERENCE BETWEEN PYTHON 2 AND PYTHON 3

ANSWER:

PYTHON 2-old version of python will be discontinued

-In function can do: print “paula”

-In syntax: difficult to understand

-In iteration: xrange() can be used

-In exceptions: enclosed in notations

PYTHON 3- is an updated version of python programming that has been released

-In function can do: print(“paula”)

-In syntax: is simpler and easily understandable.

-In iteration: range() can be used

-In exceptions: enclosed in parenthesis

3. Write a function that can define whether a word is a Palindromeor not (a word, phrase, or sequence that reads the same backwards as forwards, e.g. *madam*)- 8 points

ANSWER: attached the python file: number3anspalindrome.py

4. Write tests for the newly created Palindrome function. Provide a brief explanation for your test case options. - 8 points

ANSWER: attached the python file: test_palindrome.py

5. Agile methodology, Scrum:name at least 3 types of meetings that are exercised by Agile teams and describe the objective of each meeting. 8 points

ANSWER:

- As I remember some of the types were: SPRINT PLANNING MEETING, BACKLOG REFINEMENT MEETING, SPRINT REVIEW MEETING
- Sprint Planning Meeting- This is one of the longest meeting where the team will be discussing the what to accomplish for each project and also assigning tasks to the team members, also setting the deadline as well. The team can also invite the product owner to be able to know his intentions/agenda and especially the product owner's expectation of the outcome.
- Backlog Refinement Meeting - This kind of meeting which the Product Owner prioritizes the most important Backlog Items/Tasks. The Product Owner and the Development team discusses the sprint goals as well.
- Sprint Review Meeting - This is the phase where the review what the team has accomplish during the Sprint.

6. Exception handling in Python,explain what each of the following blocks means in the program flow:

Try, except, else, finally

ANSWER:

TRY : This one tries to run the code added here

EXCEPT: This one will be executed when there is an exception indicated here

ELSE: If there nothing in this phase or no exceptions at all or errors, the code block here smoothly run

FINALLY: This is the last block of code, I think this will always run at the end

7. How can we connect a Python program (process) with a database? Explain how it works and how do we fetch / insert data into DB tables from a python program.

ANSWER:

1. Make a file in pycharm first for example: main.py
2. Open the terminal and run the command: python -m pip install mysql-connector-python
3. Then there will be a prompt that it is installed
4. Then write on the main.py : import mysql.connector
5. Then make a new file for example: config.py
6. In config.py, we can write what we will use to connect to the database:
   - HOST =' localhost' —the localhost name
   - USER = 'root' —name of the database user
   - PASSWORD = '00000000' —password for the database like in mysql workbench
7. Then now we can type inside the main.py: from config import HOST, USER, PASSWORD
8. As I remember we will make a function to connect to the database:

```
def _connect_to_db(database_name):

        connection = mysql.connector.connect(

            host=HOST,

            user=USER,

            password=PASSWORD,

            auth_plugin = 'mysql_native_password'

            database=database_name

        )

        return connection
```

9. Then add the: def main() -this is the main body function

10. Then at the end add the dunders: if __name__ == '__main__':

```
main()
```

-to run the function

11. Then we will make a function inside the main.py to fetch or insert data into the DB from a python program for example:

```
def get_all_bread_in_bakery():
    try:
        database_name = “bakery”          —Where we put the name of the database
        database_connection = connect_to_db(“bakery”)
        cursor = database_connection.cursor()    —-Where we connect to the database
        query = f “””SELECT * FROM bakery””     —-Where we write our queries
        cursor.execute(query)
        Results = cursor.fetchall()
        cursor.close()

    except:
        pass

finally:

    pass
```

8. Given two SQL tables below:

Authors and books.

- **The authors dataset has 1M+ rows**
- **The books dataset also has 1M+ rows**

Create an SQL query that shows the TOP 3 authors who sold the most books in total!

ANSWER: sql file attached with file name: number8answersqlquestion.sql

9. TWO NUMBER SUM:

- Write a function that takes in a non-empty array of distinct integers and an integer representing a target sum. If any two numbers in the input array sum up to the target sum, the function should return them in an array, in any order. If no to numbers sum up to the target sum, the function should return an empty array.

● Note that the target sum has to be obtained by summing two different integers in the array. You cannot add a single integer to itself in order to obtain the target sum.

● You can assume that there will be at most one pair of numbers summing up to the target sum.

Sample Input: numbers = [3, 5, -4 ,8, 11, 1, -1, 6] target_sum = 10
Sample Output: [-1, 11] the numbers can be in any order, it does not matter.

ANSWER: attached python file named: number9answertwonumbersum.py

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