ASSESSMENT

Python and MySQL
assessment test 2 hours

NO	TASK	POINTS
1	Theory questions	20
2	Concept question	8
3	Coding question	8
4	Coding question	8
5	Concept question	8
6	Concept with practical example	8
7	Concept question	8
8	SQL practical question	10
9	Coding question	22
	TOTAL	**100**

1. Python theory questions	**10 points**

1. What is the program?

   A program is a set of instructions given to a computer, these instructions are then turned into a program
2. What is the process? A process is an instance of a program running in a computer. It is close in meaning to task, a term used in some operating systems.

3. What is Cache? A cache memory is a supplementary memory system that temporarily stores frequently used instructions and data for quicker processing by the central processing unit of a computer.

4. What is Thread and Multithreading? The program's ability to enable more than one user at a time, without needing multiple copies running on the computer is called multithreading

5. What is GIL in Python and how does it work? Gil is a lock on the python interpreter that ensures that only thread can be in a state of execution.

6. What is Concurrency and Parallelism and what are the differences? Concurrency means that two tasks can start and run and complete at the same time. Parallelism is when tasks run at the same time.

7. What do these stand for in programming: DRY, KISS, BDUF dry stands for to don't repeat yourself and KISS stands for keep it simple stupid and BDUF stands for big design upfront.
8. What is Garbage collector? How does it work? A garbage collector deletes unwanted objects and class instances in order to free up space

9. What are 'deadlock' and 'livelock' in a relational database? deadlock occurs when two transactions are waiting for one another to release locks.A livelock is when a request for a lock is denied because there are other locks that are interfering with one and another
10.

11. What is Flask and what can we use it for? It provides useful tools and features that make creating web applications easier in python. It is more accessible to new developers and it allows you quick development of web applications. Its also small and light weight.

12.

2. Discuss the difference between Python 2 and Python 3 Python 3 uses newer syntax whilst python 2s syntax is a little outdated and example of this is that python 2 uses ASCII to encode English characters whilst python 3 uses Unicode, this method is a lot more flexible as you have the ability to represent foreign languages and emojis. There is a noticeable difference in how both of the versions run, python 3 is a lot faster than python.	**8 points**

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

```
def isPalindrome(name):
    return name == name[::-1]


# Driver code
name = input("whats your name?")
ans = isPalindrome(name)

if ans:
    print("Yes")
```

```
else:
    print("No")
```

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

```
class is_it_a_Palindrome(unittest.TestCase):

    def test_palindrome(self):

        assert is_it_a_Palindrome('') is True
        assert is_it_a_Palindrome('A') is True
        assert is_it_a_Palindrome('HANNAH') is True
        assert is_it_a_Palindrome('Elham') is False



    if __name__ == '__main__':
        unittest.is_it_a_Palindrome()
```

These test check to see if the palindrome is returning the expected outputs. The first option returns true if the input is empty. The second option returns true if the letter is a palindrome and the third option returns true if hannah is a palindrome.The last option should return false as my name is not a palindrome.

5. Agile methodology, Scrum: name at least 3 types of meetings that are exercised by Agile teams and describe the objective of each meeting. • The first one is Sprint planning.meeting- The sprint planning process is a collaborative effort between a scrum master, who facilitates the meeting, a product owner, who clarifies the product backlog items and their acceptance criteria, and an entire agile team, which defines the project. The second one is The daily scrum, or stand up, is a short daily meeting that lets the team plan out the work for the day and identify potential obstacles. • The third one is Sprint retrospective- a sprint retrospective is a recurring meeting held at the end of the sprint cycle to discuss what went well and what needs to be improved for the next sprint •	**8 points**

6. Exception handling in Python, explain what each of the following blocks means in the program flow:	**8 points**

Try: The try block is there to test the code for any errors

Except: The except block raises a value error when something goes wrong in the code

Else: the else block will only let you execute the code if there is no errors

Finally**:** The finally block will execute no matter what.

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. **8 points**

We can connect a python program to our database by using a module called my sql connector that connects us to the sql database. We have to first install the modules onto our chosen ide. We then use the import statement to import the module into the particular file that we are using. We can then connect to the database by using this statement connection = mysql.connector.connect(host='localhost',

database='random',

password='random123')

After that statement is executed, we need to include some try and except blocks just to make sure that we have connected to the database correctly. Once we have successfully connected to our database, we then can insert data into tables, we do so my using the INSERT INTO sql Keyword. We then use the cursor.excute method to insert the data into our tables.

8. Given two SQL tables below: authors and books. **10 points**

- **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!

SELECT SUM(sold_copies),author_name

FROM Books

JOIN Authors ON Books.book_name = Authors.book_name GROUP BY author_name LIMIT 3	

AUTHORS

author_name	book_name
author_1	book_1
author_1	book_2
author_2	book_3
author_2	book_4
author_2	book_5
author_3	book_6

BOOKS

book_name	sold_copies
book_1	1000
book_2	1500
book_3	34000
book_4	29000
book_5	40000
book_6	4400

9. TWO NUMBER SUM: **22 points**

- 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.

```
my_numbers = [3, 5, -4, 8, 11, 1, -1, 6]
target = 10
sum_to_target = []
```

```
def two_number_sum(my_numbers, target):
    for number in my_numbers:
        num_to_target = target - number
        if num_to_target in my_numbers and num_to_target !=
number:
            return [number, num_to_target]
        sum_to_target.append(number)
    return []


print(two_number_sum(my_numbers, target))
```