**EXERCISE 3**

**gather more information about unit testing and profiling modules in python**

**Ans:** **A)Unit Testing**

* Unit Testing is a technique in which particular module is tested to check by developer himself whether there are any errors. The primary focus of unit testing is test an individual unit of system to analyze, detect, and fix the errors.
* There are different types of tests like Manual testing, Automate testing, Integration testing, etc
* Python provides the **unittest module** to test the unit of source code. The unittest plays an essential role when we are writing the huge code, and it provides the facility to check whether the output is correct or not.
* Normally, we print the value and match it with the reference output or check the output manually. But this process takes a lot of time.
* Manual Testing- To do the manual testing, we need to prepare a list of the application; we enter the different inputs and wait for the expected output. It is a common way of testing.
* Automates Testing- executes the code according to our code plan which means it runs a part of the code that we want to test, the order in which we want to test them by a script instead of a human.
* Python contains many test runners. The most popular build-in Python library is called **unittest.**

**B)Profile Modules**

* Python provides many excellent modules to measure the statistics of a program. This makes us know where the program is spending too much time and what to do in order to optimize it. It is better to optimize the code in order to increase the efficiency of a program. So, perform some standard tests to ensure optimization and we can improve the program in order to increase the efficiency.
* Timers- Timers are easy to implement and they can be used anywhere at a program to measure the execution time. By using timers we can get the exact time and we can improve the program where it takes too long. Time module provides the methods in order to profile a program.
* Line\_profiler - Python provides a built-in module to measure execution time and the module name is LineProfiler.It gives detailed report on time consumed by a program.
* cProfile- Python includes a built in module called cProfile which is used to measure the execution time of a program.cProfiler module provides all information about how long the program is executing and how many times the function get called in a program.