Answer1.1)

A computer program is a set of instructions which the computer uses to perform tasks as specified by the programmer. E.g. A developer can write a program to calculate the sum, difference, multiplication or division of any given numbers.

Answer 1.2)

In a computer, multiple process are running all the time. A process is a set of instructions that are currently being processed by a computer processor. The process being run by a computer can be seen by opening the processes tab in the task manager. A process contains the program code and its activity. A process executes the instructions contained in a computer program after these have been loaded from the disk into memory.

Answer 1.3)

Cache is a type of high speed random access memory (RAM). Data can be transferred to and from the cache much more rapidly than from RAM. Thus, cache is used to temporarily hold data and instructions that the processor is likely to use, ie.. it is used as a buffer between the main memory and CPU. Thus use of cache memory allows for faster processing as the processor does not have to wait for the data and instructions to be fetched from RAM. Cache is used to store data and instructions which the CPU uses more frequently, so that it does not have to access the main memory again and agin. This save time and makes cache a high speed memory. But because if its high speed, a cache memory is more expensive to build than a RAM. Thus, cache memory tends to be small in size.

Answer 1.4)

A thread is a basic unit of a process. A thread consist of program counter(responsible for keeping track of instructions ), register(system registers are used to keep track of current working variable of a thread), stack(contains the history of thread execution). Threads are also known as Lightweight processes. As each thread has its own independent resource for process execution; thus Multiple processes can be executed parallelly by increasing the number of threads. A thread mainly shares the data segment, code segment, files, etc. with its peer threads.

There are two types of threads:

1. User Threads
2. Kernel Threads

User threads are above the kernel and without kernel support. These are the threads that application programmers use in their programs.

Kernel threads are supported within the kernel of the OS itself. All modern OSs support kernel-level threads, allowing the kernel to perform multiple simultaneous tasks and/or to service multiple kernel system calls simultaneously.

Multithreading Models

**Multithreading means that there are two or more things happening at the same time**. This helps in saving a large amount of data space and computation time. All the individual threads will share the same resources for efficiency. The user threads must be mapped to kernel threads, by one of the following strategies:

Many to many: Any number of user threads can interact with an equal or lesser number of kernel threads.

Many to one: It maps many user-level threads to one Kernel-level thread.

Many to one: It maps many user-level threads to one Kernel-level thread.

Answer 1.5)

The Global Interpreter Lock (GIL) is a python process lock. GIL in Python doesn’t allow multi-threading which can sometimes be considered as a disadvantage. Unlike the other programming languages, Python has a “reference-counter” for memory management. When an object is declared in python, there’s a reference-counter variable dedicated to it. This will keep track of the number of references that point to the particular object. When this count becomes 0, the variable/object is released from memory. This reference counter needs to be protected in order for it from being accidentally released from memory, which is what GIL does.

In the case of Multithreading, there is a possibility that the two threads might increase or decrease the counter’s value at the same time. Because of this, the variable might be incorrectly released from the memory while a reference to that object still exists. It can cause leaked memory, even end up in system crash or numerous bugs. Hence, GIL protects the reference counter by disabling multi-threading in Python.

Answer 1.6)

Concurrency means that multiple processes or threads are making progress concurrently. While only one thread is executed at a time by the CPU, these threads can be switched in and out as required. This means that no thread is completed totally before another is scheduled. So all the threads are executing concurrently.

Parallelism means that multiple processes or threads are making progress in parallel. This means that the threads are executing at the same time. This can happen if all the threads are scheduled on parallel processors

Answer 1.7)

Don’t Repeat Yourself — DRY

This refers to the idea that there should be a single source of truth and that no code should be duplicated. Duplication means if the code needs to be changed, it needs to be changed in more than one place. If you forget to do that then that causes errors. Likewise it saves on testing in more than one place.

Keep It Simple, Stupid — KISS

Wite easy to write and easy to understand code. Don’t overcomplicate to show off your skill. Simple is clean and elegant.

Big Design Up Front- BDUF

This is the process where a website, app, or software design is completed and perfected up-front, before its implementation is started. It uses the waterfall process. Cons include Easy to cost and schedule design, as it’s a known quantity from the start and it’s efficient. But it is not an easily adaptable approach, design is not easily tested and validated.

Answer 1.8)

The garbage collector is keeping track of all objects in memory. Python schedules garbage collection based upon a threshold of object allocations and object deallocations. When the number of allocations minus the number of deallocations is greater than the threshold number, the garbage collector is run. An object's reference count changes as the number of aliases that point to it changes. An object's reference count increases when it is assigned a new name or placed in a container (list, tuple, or dictionary).

Answer 1.9)

In concurrent computing, a deadlock is a state in which each member of a group of actions, is waiting for some other member to release a lock

If two or more processes continually repeat the same interaction in response to changes in the other processes without doing any useful work. These processes are not in the waiting state, and they are running concurrently. This is different from a deadlock because in a deadlock all processes are in the waiting state.

Answer 1.10)

Flask is a web framework, it’s aPython module that lets you develop web applications easily. It’s has a small and easy-to-extend core. We used flask in class to create API’s. Top applications that use it include Pinterest, LinkedIn, and the community page for Flask.

Answer2)

Python 3 is a later version of python compared with python 2. Its syntax is easier to understand than that of python 2. In python 3 the value of the variables never changes whereas in python 2 the value of the global variable will be changed while using it on the for loop. Python3 has the range()function to perform iterations where in python 2 the xrange() is used for iterations. Python 3 exceptions should be enclosed in parenthesis while in python 2 exceptions should be enclosed in notations. Python 3 stores the strings as Unicode by default, whereas python 2 needs to define Unicode string value with “u”. Python 3 offer many new libraries which are not compatible with python2. In pyhton3 whenever you divide two integers you geta float value, whereas in python 2 , you always get an integer value back.

Answer3)

Source\_code

s = input(“Enter a string :”)

Def isPalin(s)

Return s == s[::-1]

Y= isPalin(s)

If y:

Print(“The string is a palindrome”)

Else:

Print(“The string is not a palindrome)

Answer4)

From unittest import TestCase, main

From source\_code import isPalin

Class TestPalindrom(unittest.TestCase):

Def test\_is\_palindrome(self):

Assert is\_palindrome(‘madam’) is True

Assert is\_palindrome(‘c‘) is True

Assert is\_palindrome(‘ABBA‘) is True

Assert is\_palindrome(‘charu‘) is False

If \_\_name\_\_ = ‘\_\_main\_\_’:

Main()

Answer 5)

The 3 types of scrum meetings I would like to discuss are:

1)Sprint planning meeting

2)Daily Scrum meeting and

3)Sprint Review Meeting

Sprint planning meeting-

This meeting is planned before the beginning of every sprint. The entire team (including scrum mater and product owner) are expected to attend this meeting. This meeting is used to determine highest priority tasks which need to be executed during the length of each sprint. Sprint backlog is also determined during this meeting. Each member then discuss the amount of work they can complete during this timeframe which in turn determines the sprint goal as well as the sprint backlog.

Daily Scrum meeting-

These are as the name suggest daily meeting, short in duration, typically 15-20 minutes to discuss the daily accomplishments, the work each member is undertaking that day and to discuss any roadblocks that a member maybe facing.

These meeting help to gain an insight into how the work is progressing and to determine and deal with any impediments any member maybe facing immediately.

Sprint Review Meeting-

This meeting is held at the end of each sprint. It purpose os to revie w how the sprint went and for the team to reflect back on what went wrong and what went right with the sprint. These insights in turn can be used enhance productivity for subsequent sprints.

Answer 6)

Try: it executes the statements under this block

Except: the error is handled in this block. This block can be used to provide a custom message to the end user, which is more user friendly and interpretable than the one provided by default

Else: if no exception was found in the try block the control passes to this bloc, skipping the except block

Finally: this block of code ALWAYS executes. This block is useful if you want to do things like close a database weather or not an exception has been raised in the earlier blocks.

Answer 7)

A connection can be established between MYSQL Db and python using the connect() method. The connect() method takes hostname, username, password and database as arguments.

Hostname is the server name -in our example in class it was localhost

Username this is the username for MYSQL DB – e.g larnico

Password- this is the password that was mde at the time of installing the DB

Database- this is used when one has multiple databases.

Answer 8)

SELECT TOP (3) author\_name

FROM AUTHORS

GROUP BY author\_name

HAVING COUNT (book\_name) =

(SELECT MAX (sold\_copies)

FROM (SELECT book\_name

FROM BOOKS

GROUP BY sold\_copies));

Answer 9)

numbers = [3, 5, -4, 8, 11, 1, -1, 6]

target\_sum = 10

listLen = len(numbers)

sumPair = []

def sumIt(numbers, target\_sum):

for index in range(0, listLen):

for secondIndex in range(1, listLen):

if (numbers[index] + numbers[secondIndex]) == target\_sum:

if numbers.index(numbers[index]) != numbers.index(numbers[secondIndex]):

if len(sumPair) < 2:

sumPair.append(numbers[index])

sumPair.append(numbers[secondIndex])

return sumPair

print(sumIt(numbers, target\_sum))