1. A programme is a piece of executable code that performs some kind of processing.
2. A process is an instance of a computer programme that is being run by one or more threads in computing. It includes the program's code as well as its activity. A process can be made up of numerous threads of execution that execute instructions at the same time, depending on the operating system
3. A cache is a hardware or software component that stores data in order to satisfy future requests for that data more quickly; the data in a cache could be the result of an earlier computation or a copy of data stored elsewhere.
4. python threading allows you to run several threads (tasks, function calls) at once. Python threads are utilised when a task's execution necessitates some waiting. Multithreading is the process of running many threads at the same time by rapidly swapping the CPU's control between them.
5. GIL is a mutex (or lock) that permits only one thread to control the Python interpreter at any given time. This means that at any given time, only one thread can be in a state of execution. The GIL is a single lock on the interpreter that adds a rule that requires gaining the interpreter lock before executing any Python bytecode. This avoids deadlocks while also reducing performance overhead. However, it basically makes every Python application that is CPU-bound single-threaded.
6. Concurrency is the process of running and controlling many computations at the same time. Parallelism is the technique of performing many calculations at once. Concurrency boosts the amount of work that can be done in a given amount of time. While boosting the throughput and processing performance of the system
7. DRY stands for "Don't Repeat Yourself," a software development principle focused at eliminating information repetition.

According to the KISS principle, most systems perform better when they are maintained simple rather than sophisticated; consequently, design should prioritise simplicity and minimise unneeded complexity. BDUF stands for Big Design Up Front and is used to indicate that the whole design solution is done before execution.

1. Python automatically deletes unnecessary objects (built-in types or class instances) to clear up memory. Garbage Collection is the mechanism by which Python regularly frees and reclaims memory blocks that are no longer in use. The garbage collector eliminates an object that is no longer referenced and thus not available by application code and reclaims the unneeded memory.
2. Deadlock happens when processes block each other with resource acquisition and no further progress can be made. Livelock is a deadlock-like scenario in which processes repeatedly alter their states but do not progress.
3. Flask is an open-source web framework. This means flask gives you the tools, frameworks, and technologies you need to create a web app. This web application can be as simple as a set of web pages, a blog, or as complex as a web-based calendar or a commercial website.

2) The Python programming language has been updated to version 3. This version was primarily released to address issues with Python 2. Python 3 was incompatible with Python 2 due to the nature of these changes. It is incompatible with previous versions. Some Python 3 features have been backported to Python 2.x versions to make the Python 3 conversion process easier. Python 3 syntax is more straightforward and clear, whereas Python 2 syntax is more harder to grasp. Strings are stored in Unicode by default in Python 3, whereas Unicode string values must be defined using "u" in Python 2. The value of variables in Python 3 never changes, whereas the value of a global variable in Python 2 changes when it is used inside a for-loop. Python 3 exceptions should be surrounded by parenthesis, but Python 2 exceptions should be surrounded by notations. The rules for ordering comparisons in Python 3 are simpler, but the rules for ordering comparisons in Python 2 are more complicated. Iterations in Python 3 are performed with the Range() method, whereas iterations in Python 2 are performed with the xrange() function.

3)

my\_str = “madam”

my\_str = my\_str.casefold()

rev\_str = reversed(my\_str)

if list(my\_str) == list(rev\_str):

print("The string is a palindrome.")

else:

print("The string is not a palindrome.")

4)-

5) 1- All other agile meeting types are built on the foundation of sprint planning. During the first sprint, the team assesses how much work they can complete in one sprint, which is typically one or two weeks, taking into account the backlog's features. The team will be able to measure progress and determine velocity after multiple meetings. For a month-long Sprint, Sprint Planning is time-boxed to a maximum of eight hours and the purpose is for teams in Scrum to plan by selecting Stories from the product backlog. It is the job of the project manager to ensure that the event takes place and that the attendees understand why the event is taking place. The Sprint Planning stage is where all of the work for the Sprint is planned.

2- Sprint Review When the sprint is finished, it's time to go over the results. By this point, each team should have functional features that don't require any extra effort. It could, however, be a trial version. The main goal of this meeting is to distinguish between "things done" and "things to be done." A sprint review meeting brings together the scrum team and project stakeholders to discuss and evaluate the work performed during a sprint. In sprint review meetings, there's a lot to talk about. The development team should start by describing the project's progress, including what went well and what went wrong. They should also tell the group what they done to fix the issues. The development team should then demonstrate the work that has been performed. The following stage is to work together on the next steps. The team and stakeholders usually agree on future steps and an updated product backlog at the end of the meeting.

3- daily standup meetings- A scrum meeting (also known as a daily standup meeting) is a 15-minute meeting when team members synchronise their efforts and formulate a daily strategy. The daily standup meetings should ideally take place at the same time and place every day. As the team gets closer to accomplishing the Sprint goal, the daily scrum acts as a progress tracker. The goal of daily standup meetings is to discuss what was accomplished the day before and what will be accomplished the next day in order to reach the sprint goal. It's also crucial to talk about any obstacles that are stopping the team from meeting the Sprint Goal, as well as a solution to help.

6) Exceptions are caught and handled in Python using the try and except block. Python treats the code after the try statement as though it were a “normal” component of the programme. The code after the except statement is the program's response to any exceptions thrown by the try clause before it. Python throws an exception error when valid code encounters an error. If this exception error is not handled, the programme will crash. The program's response to exceptions is determined by the except clause. Using the else statement in Python, you may tell a programme to only run a given block of code if there are no exceptions.

For example :

try:

general function()

except AssertionError as error:

print(error)

else:

print('eg executing the else clause.')

Finally permits you to run pieces of code that should always run, whether or not there have been any previous exceptions so Whether or not the try block raises an error, the finally block will be executed.

7) MySQL is a database management system that runs on a server. Multiple databases could be housed on a single server. Before you can interact with a database, you must first connect to the server. So you must :

* Establish a connection to the MySQL server.
* Make a fresh database.
* Connect to a database that you've just built or one that you already have.
* Run a SQL query and retrieve the results.
* Any updates to a table should be reported to the database.
* Close the MySQL server's connection.

in Python, the first step is to utilise a cursor to run a SQL query, which abstracts away the access to database records. cursor objects make use of a MySQLConnection object to interact with your MySQL server. To create a cursor, use the .cursor() method of your connection variable. You also need a MySQL database that you want to connect with your Python application.

In order to insert data into DB tables from a python program: First, from the MySQL Connector/Python package, import the MySQLConnection and Error objects Create a new function called example() that takes two parameters: title and example. Construct an INSERT statement (query) and data (args) for adding into the example table inside the example() function. A tuple is used to pass data to the function. Then, in the try except block, create a new connection, run the statement, and commit the change. To make changes to the database, explicitly invoke the commit() method. Next close the cursor and database connection at the end of the example() function. Finally, call the example() function to insert a new row into the example table in the main() function.

8) SELECT authors.author\_name, SUM(books.sold\_copies) AS sold\_sum

FROM authors

JOIN books

ON books.book\_name = authors.book\_name

GROUP BY authors.author\_name

ORDER BY sold\_sum DESC

LIMIT 3;

9) def twoSumNaive(num\_arr, pair\_sum):

for i in range(len(num\_arr) - 1):

for j in range(i + 1, len(num\_arr)):

if num\_arr[i] + num\_arr[j] == pair\_sum:

print("Pair with sum", pair\_sum,"is: (", num\_arr[i],",",num\_arr[j],")")

num\_arr = [3, 5, 2, -4, 8, 11]

pair\_sum = 7

twoSumNaive(num\_arr, pair\_sum)