1.What is the divide and conquer strategy?

a)

In divide and conquer approach, a problem is divided into smaller problems, then the smaller problems are solved independently, and finally the solutions of smaller problems are combined into a solution for the large problem.

Generally, divide-and-conquer algorithms have three parts −

Divide the problem into a number of sub-problems that are smaller instances of the same problem.

Conquer the sub-problems by solving them recursively. If they are small enough, solve the sub-problems as base cases.

Combine the solutions to the sub-problems into the solution for the original problem.

2. What is binary search and how does it work?

a)

Binary search is an efficient algorithm for finding an item from a sorted list of items. It works by repeatedly dividing in half the portion of the list that could contain the item, until you've narrowed down the possible locations to just one.

Here's a step-by-step description of using binary search

1.Let min = 1 and max=n

2.Guess the average of max and min rounded down so that it is an integer.

3.If you guessed the number, stop. You found it!

4.If the guess was too low, set min to be one larger than the guess.

5.If the guess was too high, set max to be one smaller than the guess.

6.Go back to step two.

3. Explain the distinction between a list and a tuple.

a)

LIST

1.Lists are mutable

2.The list is better for performing operations, such as insertion and deletion.

3.Lists consume more memory

4.Lists have several built-in methods

TUPLE

1.Tuples are immutable

2. Tuple data type is appropriate for accessing the elements

3. Tuple consume less memory as compared to the list

4. Tuple does not have many built-in methods.

4. Can you explain how Python manages memory?

a)

Python’s memory allocation and deallocation method is automatic. The user does not have to pre allocate or deallocate memory similar to using dynamic memory allocation in languages such as C or C++.

Memory management in Python involves a private heap containing all Python objects and data structures. The management of this private heap is ensured internally by the Python memory manager. The Python memory manager has different components which deal with various dynamic storage management aspects, like sharing, segmentation, pre allocation or caching.

5. What is the difference between pickling and unpickling?

a)

The pickle module is used for implementing binary protocols for serializing and de-serializing a Python object structure.

Pickling: It is a process where a Python object hierarchy is converted into a byte stream.

Unpickling: It is the inverse of Pickling process where a byte stream is converted into an object hierarchy.

6. What are the different types of search algorithms?

a)

1. A simple approach is to do a linear search, i.e

Start from the leftmost element of arr[] and one by one compare x with each element of arr[]

If x matches with an element, return the index.

If x doesn’t match with any of elements, return -1.

2. Binary search is an efficient algorithm for finding an item from a sorted list of items. It works by repeatedly dividing in half the portion of the list that could contain the item, until you've narrowed down the possible locations to just one.