1. What is the difference between a list and a set?

In general

**Set**

* Setis a collection of unique data.
* Membership checking in set is faster than list. Time complexity for this is O(1)
* Set does not provide indexing or slicing.
* Set can be ordered or unordered, based on implementation

**List**

* Listcan have multiple copy of same data
* Checking membership in list takes more time as the list has to iterate over all data. Time complexity for this is O(N)
* List provides indexing and slicing
* List is ordered

1. What ways of achieving concurrency do you know? What are the limitations of those ways?

Concurrency can be achieved using ‘**multithreading**’, e.g. ‘Pthreads’ and ‘OpenMP’.

Depending on the application, synchronization may result in a complex interaction of threads which might cause problems. The following are the possible limitations:

* Deadlocks
* Memory access latencies and cache effects
* Race condition

1. What is the worst-case time complexity of a quick sort?

The worst case run time complexity of quick sort is O(N^2)

1. What is an eigenvalue and an eigenvector?

**Eigenvector**: When a vector is transformed using the matrix results in a scaling of the original vector then the given vector is eigenvector. The vector is scaled by a random constant factor.

**Eigenvalue**: The scale factor is called the eigenvalue corresponding to the eigenvector.

Consider a matrix ‘A’ and vector ‘v’ and eigenvalue ‘’ then the relation between them is given by