Bridge Course Major Exam

Q2. Implement a quicksort algorithm and modify it using a randomized pivot selection strategy. Compare its average-case performance with the standard pivot selection strategy. Provide Solution.
Example
arr = [1,4,2,5,3,6,3,8,3,6,8,3]

Solution:-

Running of the program is taking a bit of time as I have entered the value of repetitions quite high that is 1000.

We can get it low by reducing the repetitions.

```
[Running] python -u "c:\Users\onlin\OneDrive\Documents\Bridge course\Major exam\M23CSE011_Q2.py"
Standard Quicksort Execution Time: 2.1127604999928735
Randomized Quicksort Execution Time: 0.5265067999716848

[Done] exited with code=0 in 2.723 seconds
```

```
[Running] python -u "c:\Users\onlin\OneDrive\Documents\Bridge course\Major exam\M23CSE011_Q2.py"
Standard Quicksort Execution Time: 2.2228089999989606
Randomized Quicksort Execution Time: 0.5327108999481425
The Output with quick sort [1, 2, 3, 3, 3, 3, 4, 5, 6, 6, 8, 8]
The output with randomized quick sort [1, 2, 3, 3, 3, 3, 4, 5, 6, 6, 8, 8]

[Done] exited with code=0 in 2.93 seconds
```

Q4. The longest common subsequence (LCS) problem is to find the longest subsequence common to two given sequences. First sequence is 0, n, 2*n, 3*n , 4*n ....N, where n is prime number and N is the total length of sequence. Second sequence is generated by Fibonacci sequence F(m) = F(m-1) + F(m-2) with the initial conditions: F0 = 0 and F1 = 1, where m is the length of fibonacci sequence.
Example:
Input:
S1: 0, 3, 6, 9, 12
S2: 0, 1, 1, 2, 3, 5, 8, 13, 21
Output:
The longest common subsequence is [0,3], and its length is 2.

Solution:-

Implementation of LCS and the output is as below:-