**Question 1:** We know that the Worst Case of Quick Sort O(n2) Occurs when the list is Already Sorted, and we choose the First or the last element in the list as pivot. How can we modify the Algorithm so that it performs O(n logn) in the same Situation.

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| We can always pick middle element as pivot and make sure that this situation will always divide the list in half and so we can get O(n log n). |
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**Question 2:** What graph representation is suitable if you want to find Time:to determine if (*u, v*)∈ *E*: Θ(1).

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| Adjacency matrix |
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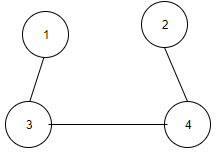
**Question 3:** The diagonal of adjacency matrix of a graph with self-loop will contain:

1. 0
2. 1
3. -1
4. Both 0 and 1

**Question 4:** Explain why, when resolving hash-table collisions via linear probing, one cannot remove an entry from the hash table by resetting the slot to NIL.

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| Linear probing looks for the item linearly until it finds a NIL Slot. If we delete an item and add set the deleted slot to NIL the Linear Probing will assume that the item is not in list when it gets a NIL. There fore for deleted items we should add a tombstone marker instead of NIL to distinguish between an empty slot and the deleted slot. |
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**Question 5:** What would be the number of zeros in the adjacency matrix of the given graph?

 10 Zeros.