1 . Complexity of finding the furthest patient from the rest and the two closest patients detail:

Finding Furthest Patient from Rest :

Ans : For each patient, you are summing up all the distances to other patients. This involves summing `n - 1` distances since you don't need to include the distance to the patient itself.

- This summation step has a time complexity of O(n).
- Since we have `n` patients, you perform this step `n` times to find the furthest patient.
- complexity for finding the furthest patient from the rest is **O(n^2).**

Finding Two Closest Patients :

Ans : For each patient, we are sorting the distances to all other patients to find the two nearest patients.

- Sorting `n` distances takes O(n * log(n)) time using efficient sorting algorithms like quicksort or mergesort.
- Since we have `n` patients, you perform this sorting step `n` times to find the two closest patients for each patient.
- complexity for finding the two closest patients is **O(n^2 * log(n)).**

*** complexities of both steps :**

- Complexity for Finding Furthest Patient: O(n^2)
- Complexity for Finding Two Closest Patients: O(n^2 * log(n))

In summary, the overall time complexity for finding the furthest patient from the rest and the two closest patients is dominated by the step with the higher complexity, which is finding the two closest patients with **O(n^2 * log(n))** complexity.

2. Practical use of calculating with a ***large number of features and patient data*** is in **clustering or classification tasks**. It helps in identifying patterns, **grouping similar patients together, or categorizing patients** based on their features. This can aid in medical research, patient diagnosis or treatment recommendation systems.