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ASSIGNMENT-DAY-4

Question 1

In the Binary Search algorithm, it is suggested to calculate the mid as

beg + (end - beg) / 2 instead of (beg + end) / 2. Why is it so?

Because the iterator returned from end does not denote an element, it may not be incremented or dereferenced.

Question 2

Write the algorithm/function for Ternary Search.

```
// C++ program to illustrate
// recursive approach to ternary search
#include <bits/stdc++.h>
using namespace std;

// Function to perform Ternary Search
int ternarySearch(int l, int r, int key, int ar[])
{
        if (r >= l) {

                // Find the mid1 and mid2
                int mid1 = l + (r - l) / 3;
                int mid2 = r - (r - l) / 3;

                // Check if key is present at any mid
                if (ar[mid1] == key) {
                        return mid1;
                }
                if (ar[mid2] == key) {
                        return mid2;
                }

                // Since key is not present at mid,
                // check in which region it is present
                // then repeat the Search operation
                // in that region
                if (key < ar[mid1]) {

                        // The key lies in between l and mid1
```

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```
                return ternarySearch(l, mid1 - 1, key, ar);
            }
            else if (key > ar[mid2]) {

                // The key lies in between mid2 and r
                return ternarySearch(mid2 + 1, r, key, ar);
            }
            else {

                // The key lies in between mid1 and mid2
                return ternarySearch(mid1 + 1, mid2 - 1, key, ar);
            }
        }

        // Key not found
        return -1;
}

// Driver code
int main()
{
        int l, r, p, key;

        // Get the array
        // Sort the array if not sorted
        int ar[] = { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 };

        // Starting index
        l = 0;

        // length of array
        r = 9;

        // Checking for 5

        // Key to be searched in the array
        key = 5;
```

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```
        // Search the key using ternarySearch
        p = ternarySearch(l, r, key, ar);

        // Print the result
        cout << "Index of " << key
                << " is " << p << endl;

        // Checking for 50

        // Key to be searched in the array
        key = 50;

        // Search the key using ternarySearch
        p = ternarySearch(l, r, key, ar);

        // Print the result
        cout << "Index of " << key
                << " is " << p << endl;
}
```