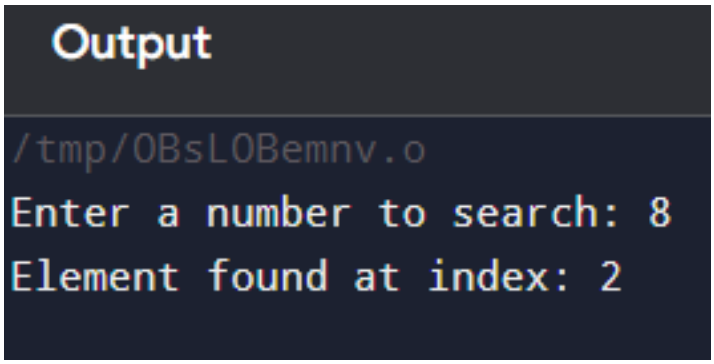
Exercise 6 - Searching Techniques

Linear Search

```
C/C++
#include <iostream>
using namespace std;

int linearSearch(int arr[], int size, int target) {
  for (int i = 0; i < size; i++) {
    if (arr[i] == target) {
      return i; // Return the index if found
    }
  }
  return -1; // Return -1 if not found
}

int main() {
  int arr[] = {5, 3, 8, 4, 2, 1, 6, 7, 9, 10};
  int size = sizeof(arr) / sizeof(arr[0]);
  int target;

  cout << "Enter a number to search: ";
  cin >> target;

  int result = linearSearch(arr, size, target);
  if (result != -1) {
    cout << "Element found at index: " << result << endl;
  } else {
    cout << "Element not found." << endl;
  }

  return 0;
}
```



Binary Search

C/C++

```cpp
#include <iostream>
using namespace std;

int binarySearch(int arr[], int size, int target) {
  int left = 0;
  int right = size - 1;

  while (left <= right) {
    int mid = left + (right - left) / 2;
    if (arr[mid] == target) {
      return mid; // Return the index if found
    }
    if (arr[mid] < target) {
      left = mid + 1; // Search in the right half
    } else {
      right = mid - 1; // Search in the left half
    }
  }
  return -1; // Return -1 if not found
}

int main() {
  int arr[] = {2, 3, 4, 5, 8}; // This array must be sorted
  int size = sizeof(arr) / sizeof(arr[0]);
  int target;

  cout << "Enter a number to search: ";
  cin >> target;

  int result = binarySearch(arr, size, target);
  if (result != -1) {
    cout << "Element found at index: " << result << endl;
  } else {
    cout << "Element not found." << endl;
  }

  return 0;
}
```