Binary Search

```
public class BinarySearchDemo {

  // Method to perform binary search on a sorted array
  public static int binarySearch(int[] array, int target) {
    int left = 0;
    int right = array.length - 1;

    while (left <= right) {
      // Integer division to find the middle index
      int mid = (right-left) / 2;  // Integer division

      if (array[mid] == target) {
        return mid;  // Target found, return its index
      } else if (array[mid] < target) {
        System.out.println("Searching in the right half from index " + (mid + 1) + " to " + right);
        left = mid + 1;  // Discard the left half
      } else {
        System.out.println("Searching in the left half from index " + left + " to " + (mid - 1));
        right = mid - 1;  // Discard the right half
      }
    }

    System.out.println("Element not found.");
    return -1;  // Target not found
  }

  public static void main(String[] args) {
        int[] sortedArray = {2, 4, 6, 8, 10, 12, 14, 16, 18, 20};  // A sample sorted array
        int target = 18;  // The target we are searching for

        int result = binarySearch(sortedArray, target);
        if (result != -1) {
            System.out.println("Element found at index: " + result);
        }
    }
}
```

OUTPUT

```
Searching in the right half from index 6 to 9
Searching in the right half from index 8 to 9
Element found at index: 8
```