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Skill 30.1 Exercise 1

If an array of Integer objects contain the following elements,

89 42 -3 13 109 70 2

Write the method search, that can be implemented as illustrated below,

```
public static void main(String[] args) {  
    int arr[] = {2, 3, 4, 10, 40};  
    int x = 10;  
    int result = Sequential.search(arr, x);  
    if(result == -1)  
        System.out.print("Element is not present in array");  
    else  
        System.out.print("Element is present at index " + result);  
}
```

//complete the search method below.

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Skill 30.2 Exercise 1

For which of the following arrays could a binary search be applied? Explain.

{1, 10, 22, 32, 100, 200, 302}

{x, y, z, a, b, c, d, f}

{and, ant, bat, cat, dog, rat}

{300.12, 200, 100, 50, 2, 0, -80}

Skill 29.3 Exercise 1

Consider the following `binarySearch` method. The method correctly performs a binary search.

```
/** Precondition: data is sorted in increasing order. */  
  
public static int binarySearch(int[] data, int target) {  
  
    int start = 0;  
    int end = data.length - 1;  
  
    while (start <= end)    {  
        int mid = (start + end) / 2;        /* Calculate midpoint */  
  
        if (target < data[mid])    {  
            end = mid - 1;  
        }    else if (target > data[mid])    {  
            start = mid + 1;  
        }    else    {  
            return mid;  
        }  
    }  
    return -1;  
}
```

Consider the following code segment.

```
int[] values = {1, 2, 3, 4, 5, 8, 8, 8};  
int target = 8;
```

What value is returned by the call `binarySearch(values, target)` ?

Suppose the `binarySearch` method is called with an array containing 2,000 elements sorted in increasing order.

What is the maximum number of times that the statement indicated by `/* Calculate midpoint */` could execute?

AP Computer Science A
Ticket Out the Door
Set 30: Searches

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