AP Computer Science A
Ticket Out the Door
Set 28: Searches

Name _____ Period _____

Skill 28.1 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 28.2 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 28.3 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?

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