Java   Name -
Binary Search worksheet #1   Period -

1. Play the "I'm guessing an integer between 1 and 100" game with a friend or parent. You think of a secret number and ask the other person to guess the number. Tell the player whether each guess is "too high" or "too low". Record the player's guesses **and their signature** below. After they've guessed the number, tell them that they played the game well if they guessed the number correctly within 7 guesses. Explain the binary search algorithm to them and stress that it is much faster than doing a sequential search (e.g. Is your secret number 1?...No…Is your secret number 2?....No….Is your secret number 3?....No…etc.)

list of guessed numbers:

signature: _____

2. Trace the code below. **You will be expected to write this algorithm from memory on quizzes, tests & the AP exam**.

```
int mid = 0;
int numbers[] = {13, 15, 32, 48, 60, 74, 91, 93, 99};
boolean found = false;                              found    low    high        mid
int key = 65;
int low = 0;
int high = numbers.length - 1;

while (low <= high && !found)
{
   mid = (low + high) / 2;

   if (key > numbers[mid])
   {
      low = mid + 1;
   }
   else if (key < numbers[mid])
   {
      high = mid - 1;                    output
   }
   else
   {
      found = true;
   }

}

if (found)
{
   System.out.println("The value" + key + " was found in position " + mid);
}
else
{
   System.out.println("The value" + key + " was not found");
}
```

3. Trace the algorithm again with the following changes where the key is located in the array, which has an even # of elements.

```
key = 32;                                          found    low    high    mid
int numbers[] = {13, 15, 32, 48, 60, 74, 91, 93};
```

output