Exercise 1

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5 points possible (graded)

ESTIMATED TIME TO COMPLETE: 10 minutes

Here is some code from lecture:

```
def linearSearch(L, x):
    for e in L:
        if e == x:
            return True
    return False
```

Choose which of the following inputs to `linearSearch` would give the best case, average case, or worst case run time.

1. Best Case Run Time

- `linearSearch([14, 15, 6, 27, 13, 16, 25, 11, 7], 15)`
- `linearSearch([21, 1, 25, 22, 30, 13, 7, 24, 12], 24)`
- `linearSearch([20, 10, 1, 7, 4, 22, 25, 12, 31], 20)`
- `linearSearch([9, 3, 12, 24, 7, 8, 23, 11, 19], 8)`
- `linearSearch([4, 12, 20, 17, 9, 14, 7, 24, 6], 7)`
- `linearSearch([13, 9, 22, 3, 10, 17, 11, 2, 12], 26)`

2. Worst Case Run Time

- `linearSearch([14, 15, 6, 27, 13, 16, 25, 11, 7], 15)`
- `linearSearch([21, 1, 25, 22, 30, 13, 7, 24, 12], 24)`
- `linearSearch([20, 10, 1, 7, 4, 22, 25, 12, 31], 20)`
- `linearSearch([9, 3, 12, 24, 7, 8, 23, 11, 19], 8)`
- `linearSearch([4, 12, 20, 17, 9, 14, 7, 24, 6], 7)`
- `linearSearch([13, 9, 22, 3, 10, 17, 11, 2, 12], 26)`

3. Average Case Run Time

- `linearSearch([14, 15, 6, 27, 13, 16, 25, 11, 7], 15)`
- `linearSearch([21, 1, 25, 22, 30, 13, 7, 24, 12], 24)`
- `linearSearch([20, 10, 1, 7, 4, 22, 25, 12, 31], 20)`
- `linearSearch([9, 3, 12, 24, 7, 8, 23, 11, 19], 8)`
- `linearSearch([4, 12, 20, 17, 9, 14, 7, 24, 6], 7)`
- `linearSearch([13, 9, 22, 3, 10, 17, 11, 2, 12], 26)`

4. What is the number of steps it will take to run `linearSearch` in the best case? Express your answer in terms of *n*, the number of elements in the list `L`.

Indicate addition and multiplication explicitly, with `+` and `*` symbols. Indicate exponentiation with the caret (`^`) symbol.

5. What is the number of steps it will take to run `linearSearch` in the worst case? Express your answer in terms of *n*, the number of elements in the list `L`.

   Indicate addition and multiplication explicitly, with `+` and `*` symbols. Indicate exponentiation with the caret (`^`) symbol.

Reminder: You do not lose points for trying a problem multiple times, nor do you lose points if you hit "Show Answer". If this problem has you stumped after you've tried it a few times, feel free to reveal the solution.

Click the "Reset" button to clear your answers.

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