

## C and analysis units

- ▶ (C) Introduction to C (Monday)
- ▶ (C) C functions and the compilation process (Wednesday)
- ▶ (Analysis) Loop invariants (**Today**)
- ▶ (Analysis) Algorithms line-by-line (next week Wednesday)
- ▶ (Analysis) Review of recursion (next week Friday)
- ▶ (Analysis) Analyzing recursive sorting algorithms (week-after Monday)
- ▶ (C) Structs (week-after Wednesday)

### Today:

- ▶ Lab retrospective: Substring
- ▶ The correctness and efficiency of algorithms
- ▶ Loop invariants
  - ▶ Bounded linear search
  - ▶ Selection sort
  - ▶ Insertion sort

**General strategy** for both selection sort and insertion sort: Repeatedly move an item from the unsorted portion of the array to the sorted portion until all are sorted.

Specifically, either

- ▶ take the **next** item from the unsorted portion and **insert** it into the right place in the sorted portion, or
- ▶ **select** the **smallest** item from the unsorted portion and place it in the last place of the sorted section.

For next time, write invariants for **bubble sort**:

```
void bubbleSort(int array[], int n)
{
    int i, j;

    for (i = n; i > 1; i--)
    {
        for (j = 1; j < i; j++)
        {
            if (array[j] < array[j-1])
            {
                int temp = array[j];
                array[j] = array[j-1];
                array[j-1] = temp;
            }
        }
    }
}
```

## Coming up:

- ▶ **Due Tues, Jan 20.** *Do Project 0 (find description on Canvas)*
- ▶ **Due Wed, Jan 21 (at class time).** *Do the practice problem found on Canvas.*
- ▶ **Coming soon, due Feb 2.** *Do Project 1...*