C and analysis units

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

Today:

- What formal analysis is
- Simple examples
- Selection sort
- Time permitting: Insertion sort

```
int sum(int array[], int n)
{
  int sum = 0;

  for (int i = 0; i < n; i++)

    sum += array[i];

  return sum;

}
```

```
void multTable(int array[], int n)
{

  for (int i = 0; i < n; i++) {

    for (int j = 0; j < n; j++)

      printf("%d\t", array[i] * array[j]);

    printf("\n");

  }

}
```

```
void selectionSort(int array[], int n)
{

  int i, j;

  for (i = 0; i < n; i++)
   {

      int min = array[i];

      int minPos = i;

      for (j = i + 1; j < n; j++)
        {

          if (min > array[j])
            {

              min = array[j];

              minPos = j;

            }
        }
      array[minPos] = array[i];

      array[i] = min;
    }
}
```

```
void insertionSort(int array[], int n)
{

  int i, j;

  for (i = 1; i < n; i++)
    {

      j = i;

      while (j  > 0 && array[j] < array[j-1])
        {

          int temp = array[j];

          array[j] = array[j-1];

          array[j-1] = temp;

          j--;
        }
    }
}
```

Coming up:

- **Due Wed, Jan 21 (at class time).** *Do the practice problem found on Canvas.*
- **Due Thurs, Jan 22, before lab.** *Read "Prelab reading 2" and take quiz on Canvas.*
- **Due Mon, Feb 2.** *Do Project 1, "Quick sort and experimental comparisons." You will be better prepared to do this project after Thursday's lab, but it's never too early to read the project description.*