+INFO 102 Lab 4: Sorting Algorithms and Computational Complexity

Partner #1: Name: _____ Net ID: _____

Partner #2: Name: _____ Net ID: _____

What is an **algorithm**?

How do **heuristics** differ from other **algorithms**?

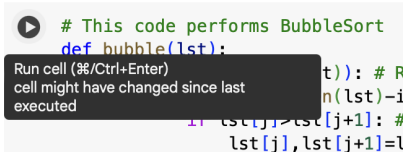
How does **data** differ from **information**?

What are some important **characteristics** that people should think about when choosing between different algorithms?

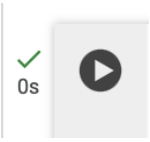
Open the Google Co-Lab notebook for today's lab at https://go.illinois.edu/info102-sorting-notebook

In **Part 1**, do your best to read through each of the 5 algorithms.

As you are reading, click on the ▸ in each code cell



After you click it it will show a ✓



Make a prediction:

Which algorithm do you think will be the **slowest**? Why?

Which algorithm do you think will be the **fastest**? Why?

In **Part 2**, read the directions and do a few runs of all the sorting algorithms with three different values for n (change the code in the first cell). Remember to click the ▸ to run the code in a cell.

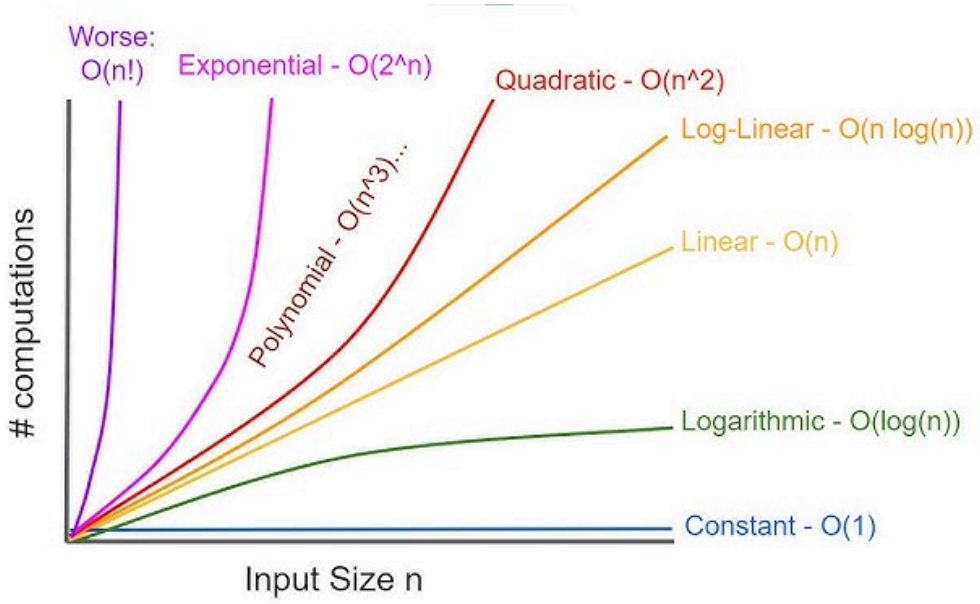
Which algorithm is actually the slowest?

Which algorithm is actually the fastest?

Do enough runs of all the sorting algorithms to clearly see the growth in time for the algorithm to complete as the length of the list gets longer. This might take 20 different values. The shape might become clearer if you include larger values, like n = 1000, n = 1500, n= 2000, etc.

It's ok to try really large numbers! This code is running on Google's computers, not UIUC's!

Which shape does the graph of the timing of each algorithm most closely follow?



BubbleSort: **MergeSort:** **Python built-in sort:**

SelectionSort: **QuickSort:**

Check your answers above with a TA/CA.

Which ones did you need to correct?

When you're done, check out with a TA or CA, and hand over this completed worksheet.

Bye!