# Intro to Linked Lists

## Investigating the Basics

# What is a linked list?

- A data structure that allows you to store data inside it
  - Serves a similar purpose as an array

- Technical definition:
  - “a linked list is a linear collection of data elements whose order is not given by their physical placement in memory.” - Wikipedia

- An array requires that elements be contiguous… this is what makes an array and a linked list fundamentally different

# What is a data structure?

- Wikipedia:

  “In computer science, a data structure is a data organization, management, and storage format that enables efficient access and modification. More precisely, a data structure is a collection of data values, the relationships among them, and the functions or operations that can be applied to the data.”

- This is where software engineering comes into play
  - The design and implementation of your program has a profound impact on its performance (memory consumption, execution speed, # of bugs, etc.)

# Conceptual Overview

- Arrays

- Linked list

# Adding or removing items?

- Arrays

- Linked list

# Implementing Abstract Data Types

- Stack: entries are only inserted and removed at the head
  - Last in, First out (LIFO)
  - Push: add to the top/front
  - Pop: remove from the top/front
  - Ideal for storing items that must be retrieved in the reverse order from which they are stored

# Implementing Abstract Data Types

- Queue: entries only removed at the front, entries only added to the back
  - FIFO
  - Push: add to the back
  - Pop: remove from the front