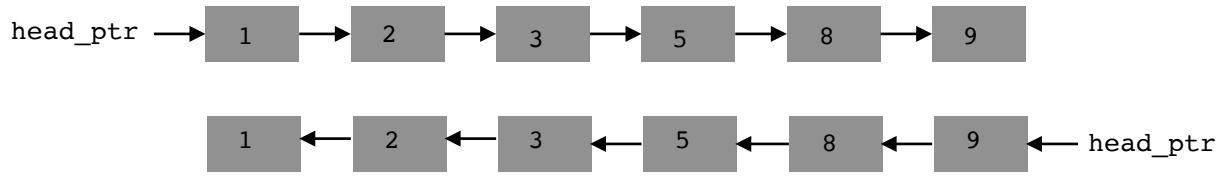
Project 3A: Recursive Invert

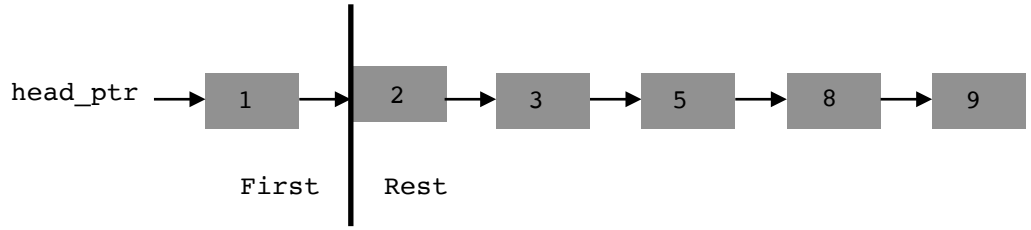
For this project you will modify a **singly-linked list** class by adding a method that will invert the order of the list. This method **must be recursive** and should not involve any loops.

The idea: In a linked list it is possible to invert the order of its elements in **O(n) time** and **O(1) space** simply by changing the direction of the links:

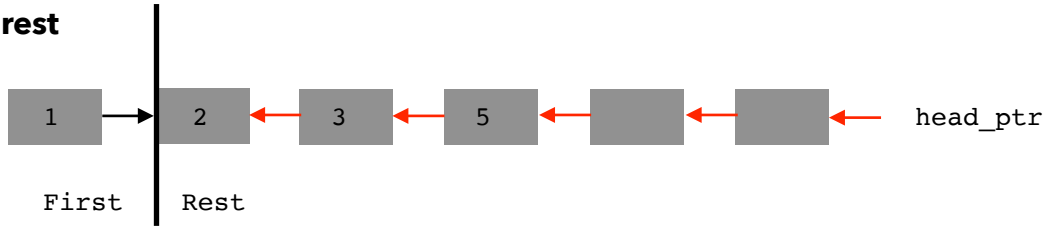


To do so recursively, you can think of the solution to the problem as:

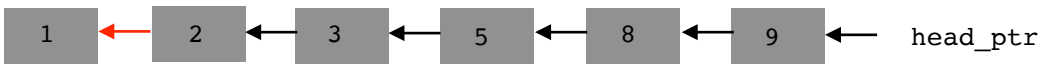
- **Split the list into first and rest**



- **Invert the rest**



- **Reconnect rest to first in the appropriate direction**



Implementation:

In order to practice safe programming and not expose the structure of the list to clients of the class via pointer parameters, you will write a **public non-recursive method `invert`** that calls a **private recursive method `invertRest`.**
You must implement these methods in O(n) time and O(1) space (**you cannot use any additional list or other containers**)
Should you write a solution that uses iteration instead of recursion and /or uses additional containers to invert the list, I reserve the right to take away points even if Gradescope gives you full credit. Moreover, if your name is not in your submission's comment preamble you will lose 10 points.

```
// A  wrapper to a recursive method that inverts the contents of the list
// @post the contents of the list are inverted such that
//       the item previously at position 1 is at position item_count_,
//       the item previously at position 2 is at position item_count_-1 ...
//       the item previously at position [item_count/2] is at position
         [item_count_/2]
void invert();

//private function to invert, used for safe programming to avoid
//exposing pointers to list in public methods
// @post the contents of the list are inverted such that
//       the item previously at position 1 is at position item_count_,
//       the item previously at position 2 is at position item_count_-1 ...
//       the item previously at position [item_count/2] is at position
        [item_count_/2]
void invertRest(Node<T>* current_first_ptr);
```

Project Notes: The List class will issue some **warnings** for `getEntry()`, because an uninitialized item is returned if the function is called with an invalid `position`. This is so because we have not discussed exception handling yet. We will be able to fix this later in the semester.

Submission:

You will find the Node and LinkedList class on Blackboard under Course Materials/ Project3. You must modify and **submit only `LinkedList.cpp` (1 file)**

Your project must be submitted on Gradescope. The due date is Friday April 5 by 6pm. No late submissions will be accepted.

Have Fun!!!!!