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Exercise #7

Templated Functions and Roomba Algorithms

First, think of scenarios where you might want to write a templated function, such as the swap function.

Explain why you would want to define this function as a template?

- Because you might want to use it again for a different set of data that would need the same set of functionality in a different area since prototypes can be interchangeable with such of function.

What are the different types that might be passed to this function?

- Integers, characters, floats, doubles, strings, pointers, etc.

Next, think of scenarios where you might want to write a templated class, such as the vector class.

Explain why you would want to define this class as a template?

- Because you might want to use it again for a different set of data that would need the same set of functionality in a different area since prototypes can be interchangeable with such of function.

What are the different types that might be used with this class?

- Integers, characters, floats, doubles, strings, pointers, etc.

What are two algorithms for a Roomba to clean a room?

In assignment #4, you will be simulating three algorithms for a Roomba to clean a room. One is random movements, but the other two are more intelligent. For the two smart algorithms, think of two approaches that might work. Design what these algorithms will look like if your Roomba can only move left, right, up, and down from its current position.

Describe both approaches.

- Have the Roomba go over to the farthest column to either the left or right, then go over to the farthest row either up or down, and then either approach stated below:
  1. Go down a row, down one, repeat. OR Go down a column, go over one, repeat.
  2. Combine both strategies stated in the first approach.

How will you determine when the room is clean?

- When there's no more f's left to account for, or all the spaces accounted for are c's. There will be a tracker that will be aware of this since given the dimensions of the room initial, it'll know how many spaces there'll be, which we be able to determine how many f's and c's are there.

How will you determine if the battery has died?

- Have a counter that keeps track of the moves by the Roomba which determines its battery life.