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Lab 8 Design Document-

Design:

Basically the design I decided to go with was a bit more complicated than a linear linked list. I decided to simulate a Mobius Strip by creating to separate lists and tying them together. I know I could have just made a linear circular list, but I wanted the added challenge of creating two lists and tying them together. The design I envisioned is shown in Figure 1.

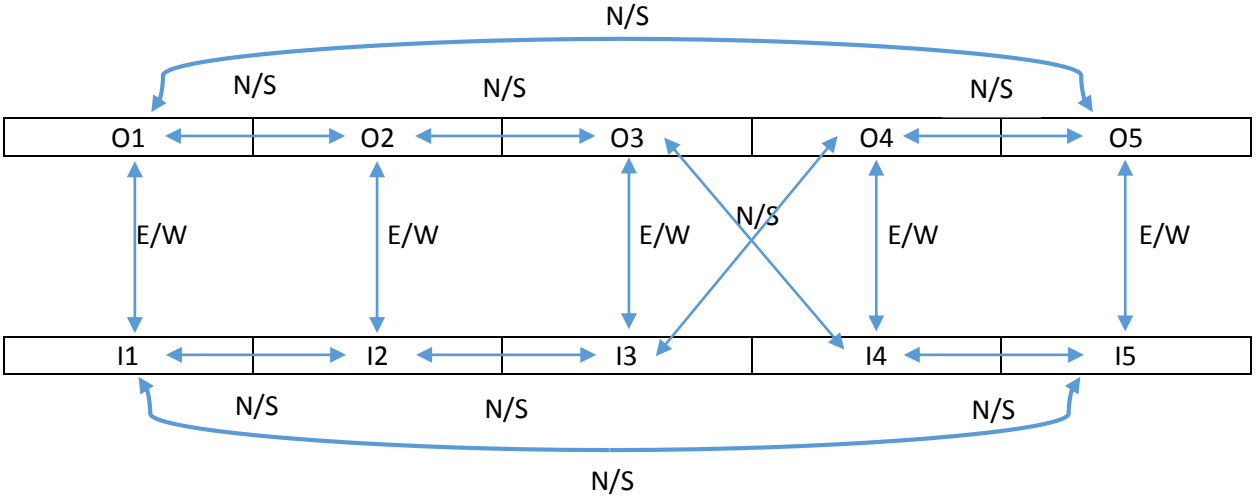

Figure 1. Mobius Strip Design Layout

The movement I envisioned is illustrated by the arrows. The maze design was fairly simple. If the user moved directly North for 10 continuous steps (or one continuous northerly loop) they exit the maze.

The construction of the loop was fairly simple. I initialized a root, and then passed that to a function that built a new Room in the north pointer (currentRoom->N = new Room), and initialized all of the new rooms pointers to a closed system of links. The North link of the new room was set to NULL, the south link was set to the previous room, and east and west were set to the new room itself so that the movement couldn't break at any point. After creating 2 separate 5 link chains, I passed them to another function that tied each east and west to one another, and links 3 and 4 of each other to the appropriate north/south links.

Testing:

To test I simply moved the character north and south with labels on, and included an output of the memory location of each room. At each link I would move east three times, and then move west three times. After that I would move north once and repeat. It was clear checking the memory locations and the labels that the links were working properly. I then ran through the whole structure north, and south. Lastly, I enabled the maze condition and I tested the condition by running continuously north, continuously south then turning north, and several random travel paths ending with 10 northerly movements.

Once I knew that the data structure was built, I tested the deallocation process. I advanced a pointer north by one, then deallocated the previous node. I checked to make sure that 10 (the length of the complete mobius strip) or less would be properly deallocated. When I deallocated more than 10 links, the program crashed. When it was less, the program could still close appropriately and release the memory but by design it was supposed to be 10 links.