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Assignment 2

1. ***How does your WindowSystem keep track of SimpleWindows? If you used a data structure, specify which one (e.g., array, linked list, hash table).***

   Our WindowSystem will keep track of the simple windows using a hash table.

2. ***Justify your specific design and/or choice of data structures, in particular how it would affect the following:***

- ***adding/removing windows***

  For adding we only need to introduce the key and the object, so whenever a new window is created a new instance to the table is added. For removing as we already can identify by keys, we only need to implement the remove command to remove a specific window identified by its corresponding key.

- ***drawing windows in front-to-back order***

  The hash table allows us to index objects by key, once stored in the table, the object type of SimpleWindow has an attribute to describe the depth of the window, then we can iterate the element of the table and according to its depth value determine which element is to be drawn first.

- ***finding a specific window given an arbitrary (x, y) (desktop) coordinate***

  Basically the procedure to find a specific window would be the same as we do on finding window in the z-axis, the SimpleWindow object contains the attributes for the *X* and *Y* position, so we need to iterate the element of the hash table and obtain the specific window.

- **overall code complexity**

  Using hash tables, the complexity of inserting, deleting, and searching operation in the average case is O(1). In contrast to that, in the worst case the complexity only changes to O(n) on the searching and inserting operation.