Jeremy Venne
Algorithms
Q5

A) A class representing a node in a doubly linked chain contains three private member variables. One of these is the data, which is the actual data the node contains. This depends on what you want to store in the list. You would also need a pointer to the next node. This is what creates the linkage in the first place. In order for the list to be doubly linked, you also require a pointer to the previous node. The constructor be able to set a value for data, and addresses to the two pointers. There also should be some member functions. First, you should be able to set, or change the value of the data. There should be a member function that can return this data. You should also be able to set and or change the pointers to the next and previous nodes. Lastly, you should be able to return the pointer to the previous or next node. This would be a complete class representing a node in a doubly linked list.

B) In order to add a node to the doubly linked list, you must first instantiate a new object. A new pointer is created that points to the new node. Next, the value of the data within the Node must be set. Now, the node must be added to the linked list. The next address of the new node must be set to the head pointer. Then, the previous address of the head must be set to the new node being added. This makes it so there is a link going both ways between the head and the new node. With the link created, the head is changed so that it points to the new node. This makes it so the beginning of the list is officially changed. The new node becomes the first item in the list. When another item is added, the process is repeated.

C) Removing the node at the beginning of the linked list can be easily done using a function. We need to move the first item to the list to the second, and then delete the original first item. Therefore, we need a temporary pointer alongside the head. This pointer to a node points to the head's address. Then, the head is set to point at the address of the next node. With this, the chains can be removed. The next of the temporary node is set to null. The previous of the head is also set to null. The temporary pointer is then deleted and its memory is cleared from the heap. Lastly, the temporary pointer is set to null. This means head is now pointing to the second item in the linked list. The first item no longer exists in memory. The pointers between the first two nodes are also removed.