Tahsin Parvez
CSC 33200
Lab 1

**Task 3**

Write a report on the differences, pros and cons of Link List and Circular Link List. Point out some of the cases where Link List is used and some of the cases where Circular link list is used.

**Linked Lists**

Pros

A linked list has many positives as well as some downsides to its utilization. Linked lists do not waste any memory, other than insertion and deletion of items. Insertion and deletion of items in a linked list are also much easier compared to other data structures, and moving between pointers is faster than moving the actual item itself.

Cons

Despite not wasting any memory, linked lists have a high amount of memory usage, and normal linked lists do not allow for random access of elements. It is more difficult to reversely traverse a linked list, as it will waste some memory. In addition, storing pointers takes extra space.

Some examples of a linked list are in a web browser. When going back and to new pages, it is the same as traversing from one node to the next. Another example is a music playlist. Music playlists are linked lists, where each song is a node. When skipping or going back to a song, you traverse the linked list.

**Circular Linked Lists**

Pros

When a linked list is circular, it is possible to reverse from the last node of the list, all the way back to its head node, since they are connected to each other by order of the list. Another positive is that circular linked lists can start at any node rather than a designated starting node. Since the list is circular, it will traverse through all of the nodes regardless of the starting node, and it also has no need for a NULL function for the same reason. Each node will always be connected to another.

Cons

It can be difficult to find where to insert items in a circular linked list, whereas a typical linear list will allow you to easily insert items to the head or tail end of the list. A similar negative aspect of circular linked lists is that because there is not necessarily a start or end node, sometimes you must traverse each item in the list to reach the desired node. As a result, you cannot directly access a specific element in the list.

Circular linked lists are used in data structures such as stacks and queues. Computers themselves use circular linked lists in order to keep multiple applications open at the same time by the operating system.