

## 2) (10 pts) ALG (Linked Lists)

Suppose we have a queue implemented as a doubly linked list using the structures shown below. Use head for the front of the queue and tail for the end of the queue.

```
struct node {
    int data;
    struct node* next, *prev;
}

struct queue {
    int size;
    struct node *head, *tail;
}
```

Write a dequeue function for this queue. If the queue is NULL or is already empty, return 0 and take no other action. If the queue isn't empty, dequeue the appropriate value, make the necessary adjustments, and return the dequeued value. (**Note: You must free the node that previously stored the dequeued value.**)

```
int dequeue(queue *thisQ) {

    if(thisQ == NULL)                                // Grading - 1 pt
        return 0;

    if(thisQ->size == 0)                              // Grading - 1 pt
        return 0;

    int retval = thisQ->head->data;                    // Grading - 1 pt
    node *temp = thisQ->head;                          // Grading - 1 pt
    thisQ->head = thisQ->head->next;                    // Grading - 1 pt

    if (this->size > 1)                                // Grading - 1 pt
        thisQ->head->prev = NULL;
    else
        thisQ->tail = NULL;

    free(temp);                                        // Grading - 2pts
    thisQ->size--;                                     // Grading - 1 pt

    return retval;                                    // Grading - 1 pt
}
```