

### Question #1 (100 points)

Implement a queue using dynamic memory in your Arduino board. You may draw inspiration from online sources such as:

- <http://codingfreak.blogspot.com/2010/04/singly-linked-list-in-c.html>

This particular code is described in detail here:

- <http://codingfreak.blogspot.com/2009/08/implementation-of-singly-linked-list-in.html>

Requirements:

- ▶ Each node in the queue stores two elements, a character with a *char* datatype and a floating point number with a *float* datatype.
- ▶ I would like you to create a function called **enqueue**, which adds an element to the queue.
- ▶ I would also like you to create another function called **dequeue**, which performs the necessary memory deallocation.
- ▶ Use the following **void loop()** function:

```
void loop()
{
    enqueue('a',12.4); enqueue('b',2.6);
    dequeue();
    enqueue('c',6.1); enqueue('a',1.2);
    for (int i=0; i<4 ; i++) { dequeue(); }
    while (true); //ensures that these operations are done only once
}
```

The Arduino should then print the following into the serial monitor.

... queue: (a,12.4)

... queue: (a,12.4) , (b,2.6)

... queue: (b,2.6)

... queue: (b,2.6) , (c,6.1)

... queue: (b,2.6) , (c,6.1), (a,1.2)

... queue: (c,6.1), (a,1.2)

... queue: (a,1.2)

... queue: cannot dequeue anything as the queue is empty!