Workshop #4: Queues

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Implement the following for a Queue data structure:

- `__len__`
- `__bool__`
- `__repr__` (“unambiguous representation of an object”)
- `__str__`
- `__contains__`

In [11]:

```
class Queue:
    def __init__(self):
        self.items = []

    def is_empty(self):
        return self.items == []

    def enqueue(self, item):
        self.items.insert(0, item) # this insert is actually a O(n)

    def dequeue(self):
        return self.items.pop()

    def size(self):
        return len(self.items)

    def __len__(self):
        return self.size() # using 'size' as defined above, or return len(self.items)

    def __bool__(self):
        return not self.is_empty() # or return self.items != []

    def __repr__(self):
        return "Queue()"

    def __str__(self):
        q = "<Queue: {0}>".format(self.items)
        return q

    def __contains__(self, item):
        return item in self.items

    # Bonus peek
    def peek_first(self):
        if len(self.items): # This 'if' condition automatically executes for len(self.items
            return self.items[-1]
        else:
            return None

    def peek_recent(self):
        return self.items[0]
```

In [12]:

```
q = Queue()
```

In [13]:

```
q.enqueue(1)
q.enqueue(2)
q.enqueue(3)
q.enqueue(4)
q.enqueue(5)
```

In [14]:

```
# checking __repr__
q
```

Out[14]:

```
Queue()
```

In [15]:

```
# checking __str__
print(q)
```

```
<Queue: [5, 4, 3, 2, 1]>
```

In [16]:

```
# checking __len__
len(q)
```

Out[16]:

```
5
```

In [17]:

```
# checking __bool__
bool(q)
```

Out[17]:

```
True
```

In [18]:

```
q2 = Queue() # empty queue
print(bool(q2))
```

```
False
```

In [19]:

```
# checking __contains__
print(f'Is 3 in q? {3 in q}')
print(f'Is 7 in q? {7 in q}')
```

```
Is 3 in q? True
Is 7 in q? False
```

In [20]:

```
print(f'The last/most recent item in queue is: {q.peek_recent()}')
```

```
The last/most recent item in queue is: 5
```

In [21]:

```
print(f'The first item in queue is: {q.peek_first()}')
```

```
The first item in queue is: 1
```

In [ ]:

```
```