

5.1.9 Construct algorithms using the access methods of a queue.

The Python list as a queue

The standard queue operations are:

enqueue() dequeue() isEmpty()

Imagine we have created a list in Python. We can use inbuilt list operations really easily to create the standard queue operations. For example the isEmpty function uses the fact that empty lists are false and non-empty lists are true.

```
s1 = []
# isEmpty returns True is the list has no items otherwise false
def isEmpty():
    return not s1
# enqueue adds the item to the end of the queue
def enqueue(item):
    s1.append(item)
# dequeue returns the item at the start of the list and deletes this item
def dequeue():
    if isEmpty():
        return None
    else:
        return s1.pop(0)
```

The Python queue class

The queue module contains a queue class.

This can be used directly.

see code right:

```
from queue import *
```

```
my_q = Queue(0)
```

```
my_q.put("one")
```

```
my_q.put("two")
```

```
my_q.put("three")
```

```
my_q.put("four")
```

Your task: Hospital triage

Create a program that uses a queue (either using a list or the queue class).

```
while (my_q.empty() == False) :|
    print(my_q.get(True, 3))
```

Your task is in stages:

Stage one:

Create a simple menu that allows the user to choose from:

Admit new patient

Treat next patient

Exit

Stage two:

Create a patient class. Initial contents:
name and priority

```
class patient:
    def __init__(self, name, priority):
        self.name = name
        self.priority = priority
```

Stage three:

Using just one queue implement the functions in the menu

Stage four:

Have three different queues for priority 1,2, and other patients.

Alter the treat patient function so that it first goes to the highest priority patient queue and then to the second and then to the other patients queue.

Stage five:

Implement a time stamp and alter the choice of patient to treat so that patients not on a high priority get treated before patients on priority two if:

They have been waiting for three hours or more AND they have been waiting longer than the priority two patient.