Queues: Takeaways ⤴

Syntax

- Queue implementation:

```python
class Queue(LinkedList):
    def enqueue(self, data):
        self.prepend(data)
    def get_front(self):
        return self.tail.data
    def dequeue(self):
        ret = self.tail.data
        if self.length == 1:
            self.tail = self.head = None
        else:
            self.tail = self.tail.prev
            self.tail.next = None
        self.length -= 1
        return ret
```

- FCFS algorithm:

```python
cur_time = 0
num_processes_done = 0
wait_queue = Queue()
cur_pid = None
while num_processes_done < processes.shape[0]:
    # Check if current process finished
    if cur_pid is not None:
        if processes.loc[cur_pid, "Start"] + processes.loc[cur_pid, "Duration"] == cur_time:
            processes.loc[cur_pid, "End"] = cur_time
            cur_pid = None
            num_processes_done += 1
    # Handle arriving processes
    ready_processes = processes[processes["Arrival"] == cur_time]
    for pid, _ in ready_processes.iterrows():
        wait_queue.enqueue(pid)
    # Assign a process to the processor
    if cur_pid is None and len(wait_queue) > 0:
        cur_pid = wait_queue.dequeue()
        processes.loc[cur_pid, "Start"] = cur_time
    cur_time += 1
```

Concepts

- Queues are a first-in, first-out (FIFO) data structure. This means that they work like a supermarket queue where the first client to be served is the first to arrive in the queue.
- Queues can be implemented by extending the linked list data structure. When we extend a class in Python, all the attributes and methods are automatically available to the new class.
- Inheritance (class extension) is a very powerful programming tool because it allows transfer functionality from one class to another. It promotes code re-usability.
- The FCFS scheduling algorithm is an algorithm for scheduling usage of a single shared resource. Usage is granted in a first-come, first-served fashion.
- The wait time of a process is the time between when the process arrives and the when it starts being executed.
- The turnaround time of a process is the time between when the process arrives and the time it terminates.

Resources

- [Queue](#)
- [Inheritance](#)
- [FIFO](#)