OO Design and Programming
Tutorial

Process Queues

Consider the following simplified description of queues of processes, where:

Every process has a priority and a workload.

Queues provide the capability to:

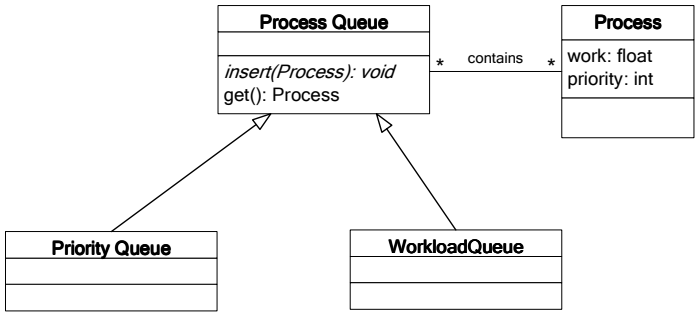
- create a new queue,
- insert a process into a queue,
- remove and return the process most recently entered into the queue.

Furthermore, we distinguish priority queues from workload queues:

- A process may be inserted into a priority queue only if its priority is higher than that of the process most recently entered in the queue; otherwise an error message is printed.
- A process may be inserted into a workload queue only if its workload is higher than that of the process most recently entered in the queue; otherwise an error message is printed.

Note that a process may simultaneously belong to several different queues; removing a process from one queue does not affect any other queue to which it may belong.

Use a UML diagram based on the following sketch



a Write C++ class declarations to support the above.

b Write a test function, where

i) P1 is a process with priority 3 and workload 4.4, P2 is a process with priority 5 and workload 8.8, P3 is a process with priority 7 and workload 2.5.

ii) PQ is a priority queue; insert P1 into PQ; insert P2 into PQ, then insert P3 into PQ.

iii) WQ is a workload queue; insert P1 into WQ; then insert P3 into WQ.

iv) Remove from WQ the process most recently entered.

c Write the functions bodies for your answer to part a.