



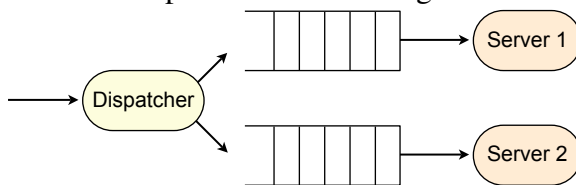
## Exercise No. 7

July 3, 2009

### Task 1 *Simulating a Queue*

Consider the queuing example in lecture 7.1.

1. Write a simulator for a single queuing system (M/M/1) using an object oriented design as described in the lecture. Uses classes for simulator, server and an event dispatcher.
2. Extend your program so that tasks are handled by two servers with a queue for each server. The dispatcher should assign the task to the server with fewer tasks in the queue.



3. Run simulations for the following parameters: Mean inter-arrival time = 1; mean service time = 0.3, 0.5, 0.7, 0.9. Execute 10 simulation runs for each parameter set with 1000 tasks each.
4. Record statistics for average queue length, average waiting time and server utilization and plot them using error bars (showing average and standard error) or box-and-whiskers.