# Written Assignment 5

1. Customers arrive to a service facility with *k* servers, and wait in a queue if no servers are available. For their part, servers are allowed to take a break after a certain amount of (calendar) time. However, if a server’s break time comes up when they are serving a customer, they will finish that customer before taking a break, which lasts for a certain amount of time. After a break, that server becomes available again, and the time to the next break starts again. That is, the time to the next break is based on when the server finished the last break. All of these times could be random.

Formulate an Event Graph model for this situation. Be sure to carefully define parameters, state variables, and any entities you use.

1. Jobs arrive to a facility with *m* machines for processing, waiting in a queue if no machine is available upon arrival. Each machine experiences failures after a certain amount of *processing* time (*not* “calendar time”). That is, each machine has a certain number of hours it can spend processing jobs before it fails; the time a machine is idle does not “count” towards when it eventually fails. The means that a machine failure will only occur when it is processing a job. Upon a machine failure, the job being processed gets “credited” with the amount of work that has been performed and is returned to the front of the queue (assume that this takes a negligible amount of time). In that case, if another machine is available for processing, then it may start immediately. Failed machines wait for availability of one of *r* repair people. Job processing times, machine times to failure, and repair times are all given by (different) random sequences.

To be clear, in this situation machines only fail when processing parts; the times when they are idle do not “count” towards failure. That is, if *tF* is the time to failure for a machine, then it will fail after *tF* units of time spent processing jobs, *not* simply after *tF* unitsofsimulatedtime.

Formulate an Event Graph model for this situation.[[1]](#footnote-1)

1. Hint: use Entities to represent the jobs, and define additional attribute(s) on the job Entity type. [↑](#footnote-ref-1)