POZNAN UNIVERSITY OF TECHNOLOGY

Faculty of Electronics and Telecommunication

Simulation Techniques
Project

Poznań, 2017

1. Task

An integrated circuits testing line employs a rotary table serving **N** testers. Circuits arrive at the table at exponentially distributed intervals with mean **A**. A single circuit enters the table for test operation 1 (provided the tester 1 is free, otherwise the circuit is queued), then is rotated through all **N** operations before being unloaded. The table can rotate only when all **N** testers have finished their current operation. The processing time on tester i is normally distributed with mean $\mathbf{TM_i}$ and variance $\mathbf{TV_i}$ and the rotation takes **T** time units. All testers are subject to random break- downs, but only when the tester is handling a circuit. If a tester breaks down, it remains suspended for uniformly distributed time between **LB** and **MB** units, and the table cannot rotate before the end of this period of time. A circuit being processed by the broken tester is discarded immediately. The intervals of uninterrupted operation for a single tester are exponentially distributed with mean **TT** (does not include time when a tester is waiting for the next element). The same rules apply to the table which may break down when rotating. In such a case, all parts currently on the table are removed. Estimate the utilization of all testers and the average length of the testing run.

2. Parameters

N – number of testers
A – mean time between arrivals
$\mathbf{TM_i}$ – mean time of testing on i-th tester
$\mathbf{TV_i}$ – variance of time on i-th tester
T – time of rotation
LB – minimal time of suspension
MB – maximal time of suspension
TT – mean time of uninterrupted operation

M	Description
M1	Activity scanning
M2	Event scheduling
M3	ABC method
M4	Proces interaction

A	Description
A1	Size of the queue is unlimited. Estimate average size of queue
A2	Size of the queue is limited. If the queue is full and a new element arrives it is dropped. Estimate the size of the queue so the number of dropped elements is between 1%-5%
A3	Each circuit must be tested two times. After first testing run it is put back to queue. After second run, circuit is unloaded.