CAPACITY PLANNING

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Exercise N.1

Calculate safety of a system made up of three CPU (working in parallel and whose output is given by a voter), one system RAID 5 with four disks, one bus, one keyboard and one monitor, with the hypothesis that for each component faults happen according to an exponential distribution with rate λ_{CPU}, λ_{DISK}, λ_{BUS}, λ_{KEY}, λ_{MON}, λ_{VOTER} and covering factors are C_{CPU}, C_{DISK}, C_{BUS}, C_{KEY} C_{MON}, C_{VOTER}.

Exercise N.2

Calculate the number of servers needed to have a percentage of lost equal to 5% for a web site made up of servers with the same workload.
Each server has one CPU and one Disk. The single request needs a 40 ms CPU service demand and a 200 ms Disk service demand.
The system receives 20 req./sec and each server can manage at most 4 requests at the same time.

Exercise N.3

A personal computer with a CPU and a local disk is connected to a network server (disk) by a LAN (transmission time equal 0) and performs batch programs using files on the local disk (access time 20 ms) and on the system disk (access time 5 ms).

In a period 5.000 sec long there are:

Completions	100
CPU occupancy	3000 sec
Number of Visit to local disk	12000
Number of Visit to network server	12000

Then model and evaluate the system behavior with 3 batch programs running.

Exercise N.4

Derive the Markov process for a queue M/M/3/6.
Then evaluate the probability, in a parametric form, that a new request is refused, knowing arrival rate (λ) and service rate (μ).