Project 6 – Multiprogrammed server

A multiprogrammed server provides service to n concurrent clients, whose transactions may involve processing, access to disk, and remote queries to a distant web server. More specifically:

- A new transaction always requires some processing time as a first step;
- After the processing has occurred:
    - with a probability p_1 the transaction is terminated and the reply is sent to the client that originated it;
    - with a probability p_2 a disk access is required, and then a new processing is required;
    - with a probability $1-p_1-p_2$ a remote query is required, and then a new processing is required.
- A user that receives a reply immediately issues another request.

The processor, the disk and the remote web server handle one request at a time in a FIFO order. Processing, disk access and remote query service demands are exponential IID RVs, and they are different from one iteration to another, even for the same transaction.

Evaluate at least the throughput of the system (i.e., the number of completed transactions per unit of time) under a varying level of multiprogramming. Simulate at least one scenario where the service demands at the three service centers have a considerably different mean (e.g. one order of magnitude).

In all cases, it is up to the team to calibrate the scenarios so that meaningful results are obtained.

Project deliverables:

a) Documentation (according to the standards set during the lectures)
b) Simulator code
c) Presentation (up to 10 slides maximum)