EX1 - RINASCIMENTO CLINIC

"Rinascimento" clinic is a small health care facility, located in Austin, Texas.
The medical examinations take place without an appointment and the flow is described as follows: a patient enters the clinic and goes to reception, where the receptionist, according to the patient's problem, sends her to Dr. Carter, a general practitioner, or sends her to Dr. Romano, a specialized physician. In some cases, the patient could be seen by both Dr. Carter and Dr. Romano.
The collected data are depicted in the following table. Arrival rate and service rate follow a negative exponential distribution.

Variable	**Average**
Patients arrival rate	30 p/h
Patients that are sent to Dr. Carter (fraction of the total number entering in the system)	2/3
Patients that are seen by Dr. Carter and then by Dr. Romano (percentage of the number of patients that are sent to Dr. Carter)	0.15
Receptionist service rate	40 p/h
Dr. Carter service rate	30 p/h
Dr. Romano service rate	15 p/h

1. The priority rule is FCFS. You are required to calculate:
    a. The average waiting time in each queue.
    b. The average waiting time in the system for each patient typology.
    c. The expected LT (Lead time of a generic patient).
    d. The average time of inactivity (expressed in minutes each hour) for the receptionist, Dr. Carter, and Dr. Romano.
2. Rinascimento clinic is considering implementing a priority system to manage in a different way the visits held by Dr. Romano. The idea is that the patients going to Dr. Romano after being seen by Dr. Carter, have a non-pre-emptive priority on the patients that arrive directly to Dr. Romano. Which are, in your point of view, the main effects introducing this priority rule has on the LT (for the 3 typologies and the generic patient)?