Consider a machine where jobs arrive according to a Poisson stream with a rate of 4 jobs per hour. Half of the jobs have a processing time of exactly 10 minutes, a quarter of the jobs have a processing time of exactly 15 minutes and the remaining quarter have a processing time of 20 minutes. The jobs with a processing time of 10 minutes are called type 1 jobs, the ones with a processing time of 15 minutes type 2 jobs and the rest type 3 jobs. The jobs are processed in order of arrival.

(i) Determine the mean sojourn time (waiting time plus processing time) of a type 1, 2 and 3 job and also of an arbitrary job.

One decides to process smaller jobs with priority. So type 1 orders have highest priority, type 2 orders second highest priority and type 3 orders lowest priority.
Answer question (i) for the following two cases:

(ii) Jobs processed at the machine may not be interrupted.

(iii) Type 1 and type 2 jobs may interrupt the processing of a type 3 job. Type 1 jobs may not interrupt the processing of a type 2 job.