1. Consider telephone traffic in a link between two telephone exchanges. During the time interval $[0, T]$, where $T = 16$ (time units), there are 7 new calls arriving at the moments

   - 1, 2, 4, 5, 6, 9 and 12 (time units).

   The holding times (if the calls are not blocked) are respectively

   - 9, 5, 4, 1, 7, 2 and 6 (time units).

   The link capacity is assumed to be $n = 3$ channels. Assume further that, at time $t = 0$, the system is empty (that is, all the three channels are free).

   Draw a picture describing the call arrival times, channel occupation (for each channel separately), and the number of occupied channels as a function of time $t \in [0, T]$. How many of the calls offered are blocked? What is the proportion of time that the system is in the blocking state? What is the total traffic volume in this time interval $[0, T]$?

2. Consider data traffic in a statistical multiplexer of a packet switched network. During the time interval $[0, T]$, where $T = 16$ (time units), there are 6 new packets arriving at the moments

   - 1, 2, 4, 5, 9 and 14 (time units).

   Packets are transmitted in their arrival order (that is: according to the First Come First Served (FCFS) principle, which is also called the First In First Out (FIFO) principle). The packet transmission times are respectively

   - 5, 1, 1, 2, 1, 3 (time units).

   Assume that, at time $t = 0$, the system is empty (that is: no packets are in the buffer to be transmitted or in transmission).

   Draw a picture describing the packet arrival times, the number of packets in the buffer (including the one in transmission (if any)), and the status of the outgoing link as a function of time $t \in [0, T]$. What is the average waiting time for these packets? What is the proportion of time that the outgoing link is busy?