HELSINKI UNIVERSITY OF TECHNOLOGY | **Exercise 8**
Networking Laboratory | 29.3.2004
S-38.215 Special Course in Networking Technology, Spring 2004 | Aalto

1. (Lawler, Exercise 6.1) Suppose the lifetime of a component T_i in hours is uniformly distributed on $[100, 200]$. Components are replaced as soon as one fails and assume that this process has been going on long enough to reach equilibrium.

   (a) What is the probability that the current component has been in operation for at least 50 hours?

   (b) What is the probability that the current component will last for at least 50 hours more?

   (c) What is the probability that the total lifetime of the current component will be at least 150 hours?

   (d) Suppose that it is known that the current component has been in operation for exactly 90 hours. What is the probability that it will last at least 50 more hours?

2. (Lawler, Exercise 6.4) Repeat Problem 1 with the T_i having distribution

$$P\{T_i = 100\} = P\{T_i = 200\} = 1/2.$$

3. (Lawler, Exercise 6.6) Assume that the waiting times T_i have distribution

$$P\{T_i = 1\} = 9/10, \qquad P\{T_i = 10\pi\} = 1/10.$$

   Note that the times T_i have a nonlattice distribution.

   (a) What is the age distribution $\Psi_A(x)$?

   (b) For large times, what is the expected residual life? Compare to $E[T_i]$.