Solutions to Sheet 5

Friedrich May, 355487; Markus Moll, 406263; Mariem Mounir, 415862
Group 57

June 17, 2020

Exercise 5

To calculate the expected total aggregated runtime for a job of n tasks we need to know the expected runtime of a task.

$$E(R) = nE(R_1)$$

.

The expected runtime of a task consists of the time the task itself takes t and the expected additional recovery time A_1

$$E(R_1) = t + E(A_1)$$

. We know that a failure during the execution or the recovery of a task happens with probability $p_f \in [0, 1)$. The probability for a task to fail k times therefore is p_f^k. With every recovery takeing $10t$ this yields a expected additional recovery time

$$E(A_1) = 10t \sum_{k=1}^{\infty} kp^k = 10t \frac{p_f}{(p_f - 1)^2}$$

. Therefore the expected total accumulated runtime is

$$E(R) = n \left(t + 10t \frac{p_f}{(p_f - 1)^2} \right)$$

.