

Exercise No. 7
Algorithms and Methods for Distributed Storage
Winter 2008/2009

Exercise 11 *Ranged Hash Functions*

Given a set of files with the keys $\{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ a set of servers $\{A, B, C, D\}$ and a hash function f that maps keys and servers to the interval $[0..1]$ as follows:

x	1	2	3	4	5	6	7	8	9	A	B	C	D
f(x)	0.23	0.02	0.34	0.56	0.49	0.79	0.36	0.86	0.91	0.1	0.4	0.7	0.9

Furthermore, consider the following views:

$$\begin{aligned}V_1 &= \{A, B, C\} \\V_2 &= \{B, C, D\} \\V_3 &= \{B, D\}\end{aligned}$$

- Calculate the load of each server.
- Calculate the spread of each file.
- For which constant c does the balance property hold?