

Managing Massive Multiplayer Online Games
SS 2017

Exercise Sheet 4: Persistence

Discussion: May 24th, 2017

Exercise 4-1 *Logging with simple algorithms*

In the following regard an abstract game with its information stored server sided. Assume the following data to be saved by the server in objects O_1, \dots, O_3 . In the beginning every object O_i has the value o_i . Beginning at time t_{10} game information should be stored persistently on the hard disk every 10 ticks to avoid data loss by the server in case of a system error. Assume that writing an object onto the hard disk takes two ticks.

The server thereby performs the following changes of the database:

Time	Object	New Value
t_6	O_1	o'_1
t_9	O_2	o'_2
t_{12}	O_3	o'_3
t_{15}	O_1	o''_1
t_{16}	O_3	o''_3
t_{22}	O_2	o''_2
t_{22}	O_3	o'''_3

- (a) Outline how the logging algorithm *Naive Snapshot* proceeds.
- (b) Outline how the logging algorithm *Copy-on-Update* proceeds.
- (c) Outline how the logging algorithm *Wait-Free Zigzag* proceeds.
- (d) Outline how the logging algorithm *Wait-Free Ping-Pong* proceeds.
- (e) Discuss advantages and disadvantages of these methods.