

Solution to Readers Writers Problem

~~Reader~~ We have a database used by
Reader & Writer

Reader → only reads the data

Writer → who wants to update the data also

DB

R-W } Problem
W-R }
W-W }

R-R } No-problem

Read Count

Ng. of readers in buffer

Page No.:

Date: / /

int rc = 0;

Semaphore mutex = 1;

Semaphore db = 1;

void Reader (void) {

while (True) {
down(mutex)

rc++

rc = rc + 1

if (rc == 1) {

down(db);

}

up(mutex)

Entry
code

CS [DB]

void Writer (void) {

while (true) {

down(db);

CS [DB]

up(db);

}

}

Exit

section

down(mutex)

rc = rc - 1

if (rc == 0) {

up(db)

}

up(mutex)

Process data

}

}

To synchronize the problem we use semaphores

Case 1: (R) Reader comes first

$rc = 0 + 1$ $mutex = 1 - 0 + 1$ $db = 1 - 0$
 $down(mutex)$

DB R₁

For writer

$rc = 1$ $mutex = 1$ $db = 0$
 ~~$down(db)$~~ $down(db)$

$db \neq -1$ so the process gets blocked

Case 2: W₁ comes first

$rc = 0 + 1$ $mutex = 1 - 0$ $db = 1 - 0$

$down(db)$

$db \neq -1$ can't be -ve
 so r_1 gets blocked

Case 3: Write-Write problem

When writer w_1 comes $down(db)$ $db(1 \rightarrow 0)$

- " - " - w_2 - " - $db \neq -1$ so it
 gets blocked

Case 4:

$rc = 0 + 2$ $mutex = 1 - 0 - 0 + 1$ $db = 1 - 0$

DB R₁ R₂

$2 == 1$ neg $down(db)$

$\leftarrow up(mutex)$