Experiment - 8

FIRST READERS - WRITERS PROBLEM

AUTHOR: EMIL TITUS

(Roll #24)

Compiling the Program

To compile the program (on Linux):

```
gcc readerwriter.c -lpthread -o rw
```

Running the Program

In a terminal, run the program:

```
./rw <number of readers> <number of writers>
```

For example,

```
./rw 5 2
```

The numbers of readers and writers have to be non-negative. Each reader and writer waits for a random amount of time (between 0.001ms and 10ms) on being spawned, before attempting to read or write.

A variable ‘A’ acts as the shared memory. Each writer spawned have been alternatively assigned an operand (+1 or -1), which they will add to ‘A’.

Screenshots

```
kali@kali:~/Desktop$ ./rw 5 2
 Creating 5 readers and 2 writers.
 Initially, A = 100.

    Reader #2 is waiting to read.
    Writer #2 is waiting to write.
    Reader #2 is reading the value of 'A'. Now, A = 100.
    No readers are currently reading.
    Writer #2 modified the value in 'A'. Now, A = 99.
    Reader #4 is waiting to read.
    Reader #3 is waiting to read.
    Reader #3 is reading the value of 'A'. Now, A = 99.
    Reader #1 is waiting to read.
    Writer #1 is waiting to write.
    Reader #4 is reading the value of 'A'. Now, A = 99.
    Reader #5 is waiting to read.
    Reader #5 is reading the value of 'A'. Now, A = 99.
    Reader #1 is reading the value of 'A'. Now, A = 99.
    No readers are currently reading.
    Writer #1 modified the value in 'A'. Now, A = 100.

 There are no readers or writers left.
 Exiting...
```

```
kali@kali:~/Desktop$ ./rw 5 -1
 Negative values are not permitted.
kali@kali:~/Desktop$ ./rw 2 0
 Creating 2 readers and 0 writers.
 Initially, A = 100.

    Reader #1 is waiting to read.
    Reader #1 is reading the value of 'A'. Now, A = 100.
    No readers are currently reading.
    Reader #2 is waiting to read.
    Reader #2 is reading the value of 'A'. Now, A = 100.
    No readers are currently reading.

 There are no readers or writers left.
 Exiting...
kali@kali:~/Desktop$ ./rw 0 2
 Creating 0 readers and 2 writers.
 Initially, A = 100.

    Writer #2 is waiting to write.
    Writer #2 modified the value in 'A'. Now, A = 99.
    Writer #1 is waiting to write.
    Writer #1 modified the value in 'A'. Now, A = 100.

 There are no readers or writers left.
 Exiting...
```

```
kali@kali:~/Desktop$ ./rw 5 4
 Creating 5 readers and 4 writers.
 Initially, A = 100.

   Reader #3 is waiting to read.
   Writer #3 is waiting to write.
   Reader #3 is reading the value of 'A'. Now, A = 100.
   No readers are currently reading.
   Writer #3 modified the value in 'A'. Now, A = 101.
   Reader #1 is waiting to read.
   Writer #1 is waiting to write.
   Reader #1 is reading the value of 'A'. Now, A = 101.
   No readers are currently reading.
   Writer #1 modified the value in 'A'. Now, A = 102.
   Reader #5 is waiting to read.
   Reader #2 is waiting to read.
   Writer #2 is waiting to write.
   Reader #4 is waiting to read.
   Writer #4 is waiting to write.
   Reader #4 is reading the value of 'A'. Now, A = 102.
   Reader #2 is reading the value of 'A'. Now, A = 102.
   Reader #5 is reading the value of 'A'. Now, A = 102.
   No readers are currently reading.
   Writer #2 modified the value in 'A'. Now, A = 101.
   Writer #4 modified the value in 'A'. Now, A = 100.

 There are no readers or writers left.
 Exiting...
```