

EECS 338 Homework 8

General requirements:

- Due on the posted due date.
- Upload a single, compressed file (e.g. zip) to Blackboard that contains all required files.
- Include either a single makefile that compile all programs or a separate makefile for each.
- **Include a typed document with the program output for all problems.**
- All work should be your own, as explained in the Academic Integrity policy from the syllabus. File sharing is prohibited.

Introduction: The files `condition1.c` and `monitor1.c` are provided as examples of implementing condition variables and monitors using semaphores.

1. Revise problem #1 from the previous assignment using condition variables and the monitor algorithm in Sect. 5.8.3 of the textbook. There are different ways to approach this, but the simplest is to use two condition variables: one for the condition “not full” and another for the condition “not empty”. For example, the producer can check whether the buffer is full by using a “count” variable (see section 5.1 of the textbook) and wait on the “not full” condition if the buffer is full. The consumer can signal/post the “not full” condition variable after it consumes an item. The consumer can do the opposite by waiting on “not empty” if the buffer is empty, and the producer can signal/post whenever it adds an item.
2. Revise problem #2 from the previous assignment using condition variables and the monitor algorithm in Sect. 5.8.3 of the textbook. Note that, in this application, the readers are allowed to be in the monitor at the same time when reading. This can actually be done with one condition variable! The writer can wait on a “not reading” condition if there are any readers reading, and the last reader can signal/post whenever it finishes. Remember that mutual exclusion is still required for “read_count”.

Rubric:

Item	Points
1. Basic bounded buffer functionality from old HW	10
1. Basic use of condition variables, even if wrong logic	10
1. Correct use of condition variables	10
1. Correct use of next_count, next, and mutex	10
1. Inclusion of sample monitor code (cwait, etc.)	10
2. Basic readers/writers functionality from old HW	10
2. Basic use of condition variable, even if wrong logic	10
2. Correct use of condition variable	10
2. Correct use of next_count, next, and mutex	10
2. Inclusion of sample monitor code (cwait, etc.)	10
<i>Total</i>	100