

COMP3101 Operating Systems

Assignment 1 (worth 10 coursework marks)

Due Midnight October 9, 2022

Write a multithreaded program that creates packets from a message. The program shall read a message of no more than 255 characters (terminated by a newline character) from the standard input and shall use threads to create packets from the input as described following:

- a. The program shall have a buffer of size 12 bytes.
- b. The program shall create three thread namely thread #1, thread #2, and thread #3.
- c. Thread #1 shall run to transfer characters from the input string into the buffer
- d. Thread #2 shall convert all the characters in the buffer to upper case
- e. Thread #3 shall create packages from the contents of the buffer.
- f. Each packet shall have the following values separated by colons
 - i. A two digit packet number. First packet is 0
 - ii. A count (two digits) of the number of characters in the message portion of the packet.
 - iii. The message

The following diagram is an illustration of the process:

<u>Input Message</u>	<u>Output Packets</u>
HelloWorldIamAdam	00:05:HELLO
	01:05:WORLD
	02:05:IAMAD
	03:02:AM

You may code your solution in Python, Java, or C.

Your effort will be graded as follows:

- | | | |
|-----|--|-----|
| 1.1 | Program runs. | [1] |
| 1.2 | The program runs to produce the sample output and one other case. | [2] |
| 1.3 | Synchronization of thread #1 (pauses when buffer is full) | [2] |
| 1.4 | Mutual exclusion of thread #2 and thread #3 | [2] |
| 1.5 | Code is judiciously documented. | [1] |
| 1.6 | Error handling (explain) | [1] |
| 1.7 | Added functionality (e.g. variable size buffer, or other innovation) | [1] |

Submission Instructions

Please submit source code to the electronic submission portal by the submission deadline. There will be a penalty for a late submission.