ETEC3702 – Concurrency
Lab 6 – Using Queues for Inter-thread Communication

Due date: 20 February 2020 by the end of class.

Write a producer / consumer simulation that uses a queue to buffer the items between the set of producers and the set of consumers.

Serial Number Producer Thread:
- Produces numbers starting at 1 and increasing.
- Put these numbers in the snQueue.
- Repeat this 100 times.

Production Producer Thread:
- Pull a serial number from the snQueue.
- Delay for a random amount between 4.0 and 5.0 seconds.
- Append text to the end of the SN received to make it say:
  - Item:<SN> Produced by #:<producer number here>
- Place the resulting value into the prodQueue.
- Repeat this until all SNs have been processed.

Packaging Thread:
- Pull an item from the prodQueue
- Delay for a random number between 1.0 and 2.0 seconds.
- Create the following message:
  - Item:<SN> Produced by #:<producer number here> Packaged by #:<packager number>
- Place this message in the doneQueue
- Repeat this until all SNs have been processed.

Completion Thread:
- Pull an item from the doneQueue
- Print out the message:
  - Done: Item:<SN> Produced by #:<PDN> Packaged by #:<PKN>
- Repeat this until all are completed.

Make each thread display appropriate message when an item is produced, packaged, and completed.

Program 1:

Make a program with the following characteristics:

- 1 SN Producer thread.
- 1 Producer thread
- 1 Packager threads
- 1 Completion thread

Run this program. Have the program display the total execution time.

Program 2:

Make a program with the following characteristics:

- 1 SN Producer thread.
- 8 Producer thread
- 4 Packager threads
- 1 Completion thread

Run this program. Have the program display the total execution time.

Question: With 10 Producer threads, what number of packager threads is optimal?