

Faculty of computers and artificial intelligence
Cairo University
Operating System Course

Assignment # 1

Description

Given N numbers and one file, our system simulates a real-life of how buffering is run where a user will decide N to get the prime numbers from 0 to N . Somehow, the producer schedules the primes in a queue and consumer will use this queue to write them in the file, so do an application using multiple threads to do multiple actions simultaneously which will reduce the time elapsed.

Note: The *Consumer* thread will hold a lock when it start and release it when the ready queue is Empty and must notify all other threads.

The application interface consists of a top section with three input fields and a 'Start Producer' button. The first field is labeled 'N' and contains the value '10000000'. The second field is labeled 'Buffer Size' and contains the value '8'. The third field is labeled 'Output File' and contains the value 'outputFile.txt'. Below these fields is a button labeled 'Start Producer'. The bottom section is a table with two columns. The first column contains labels: 'the largest prime number', '# of elements (prime number) generated', and 'time elapsed since the start of processing'. The second column contains values: '9999991', '664580', and '35004 ms'.

the largest prime number	9999991
# of elements (prime number) generated	664580
time elapsed since the start of processing	35004 ms

Output File

The output file, named 'outputFile.txt', contains a list of prime numbers. The first few lines of the file are: '1', '2', '3', '5', '7', '11', '13', '17', '19', '23', '29', '31', '37', '41', '43', '47', '53', '59', '61', '67', '71', '73', '79', '83', '89', '97', '101', '103', '107', '113', '127', '131', '137', '149', '151', '157', '163', '167', '173', '179', '181', '191', '193', '197', '211', '223', '227', '229', '233', '239', '241', '251', '257', '263', '269', '271', '281', '283', '293', '307', '311', '313', '317', '331', '337', '347', '349', '353', '359', '367', '373', '379', '383', '389', '397', '401', '409', '419', '421', '431', '433', '439', '443', '449', '457', '461', '463', '467', '479', '487', '491', '499', '503', '509', '521', '523', '529', '541', '547', '557', '563', '569', '571', '577', '587', '593', '599', '601', '607', '611', '613', '617', '619', '623', '629', '631', '637', '641', '643', '647', '653', '659', '661', '667', '671', '673', '677', '683', '687', '691', '697', '701', '703', '709', '711', '713', '719', '727', '731', '733', '737', '739', '743', '749', '751', '757', '761', '763', '769', '771', '773', '779', '781', '787', '791', '793', '797', '803', '809', '811', '817', '821', '823', '827', '829', '833', '837', '839', '841', '843', '847', '849', '851', '853', '857', '859', '863', '867', '869', '871', '873', '877', '881', '883', '887', '891', '893', '897', '901', '903', '907', '911', '913', '917', '919', '923', '927', '929', '931', '937', '941', '943', '947', '949', '951', '953', '957', '959', '961', '967', '971', '973', '977', '981', '983', '987', '991', '993', '997'. The file continues with many more prime numbers up to 9999991.

Submission instructions:

1. Submission deadline 18/11.
2. The assignment is submitted in group of minimum 3 and maximum 4 persons.
3. Don't use Built-in Semaphore

Grading Criteria

class producer	1
class consumer	1
Test cases	1
Handling Queue Is Empty	0.5
Save to file	0.5
Calculate prime number	0.5
Using synchronization	0.5
GUI (real time update of this GUI)	1