| **Fr. Conceicao Rodrigues College of Engineering**  **Department of Computer Engineering** | | | |
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| **Student’s Roll No** | **9914** | **Students Name** | **Vivian Ludrick** |
| **Date of Performance** | **07/03/2024** | **SE Computer – Div** | **A / B** |

**Aim:** Study Multiprocessing and Process Synchronization

**Lab Outcome:**

**CSL403.3:** Understand and apply the concepts of synchronization and deadlocks

**Pre-requirement: Python Programming.**

**Problem Statements:**

1. **WAP to demonstrate how to use lock mechanism to achieve process synchronization.**
2. **WAP to demonstrate the use of Queue mechanism to achieve process synchronization in Producer – Consumer Problem.**

**The outputs should reflect behaviour of processes with and without process synchronization in both techniques.**

**Synchronized:**

import time

from multiprocessing import Process, Lock, Value

def add\_lock(total, value, lock):

for i in range(value):

time.sleep(0.01)

lock.acquire()

total.value += 1

lock.release()

def sub\_lock(total, value, lock):

for i in range(value):

time.sleep(0.01)

lock.acquire()

total.value -= 1

lock.release()

if \_\_name\_\_ == '\_\_main\_\_':

total = Value('i', 1000)

lock = Lock()

add\_proc = Process(target=add\_lock, args=(total, 1000 , lock))

sub\_proc = Process(target=sub\_lock, args=(total, 500, lock))

add\_proc.start()

sub\_proc.start()

add\_proc.join()

sub\_proc.join()

print(f"Locked answer:\t{total.value}")

**NOT Synchronized:**

import time

from multiprocessing import Process, Value

def add\_no\_lock(total, value):

for i in range(value):

time.sleep(0.01)

total.value += 1

def sub\_no\_lock(total, value):

for i in range(value):

time.sleep(0.01)

total.value -= 1

if \_\_name\_\_ == '\_\_main\_\_':

another\_total = Value('i', 1000)

add\_proc\_no\_lock = Process(target=add\_no\_lock, args=(another\_total, 1000))

sub\_proc\_no\_lock = Process(target=sub\_no\_lock, args=(another\_total, 500))

add\_proc\_no\_lock.start()

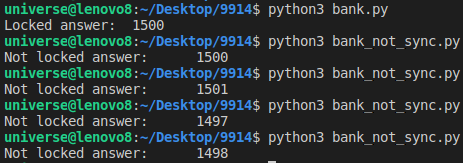
sub\_proc\_no\_lock.start()

add\_proc\_no\_lock.join()

sub\_proc\_no\_lock.join()

print(f"Not locked answer:\t{another\_total.value}")

**OUTPUT:**

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**References:**

[**https://www.youtube.com/watch?v=RR4SoktDQAw&list=PL5tcWHG-UPH3SX16DI6EP1FlEibgxkg\_6&index=1**](https://www.youtube.com/watch?v=RR4SoktDQAw&list=PL5tcWHG-UPH3SX16DI6EP1FlEibgxkg_6&index=1)

[**https://www.youtube.com/watch?v=iYJNmuD4McE&list=PL5tcWHG-UPH3SX16DI6EP1FlEibgxkg\_6&index=3**](https://www.youtube.com/watch?v=iYJNmuD4McE&list=PL5tcWHG-UPH3SX16DI6EP1FlEibgxkg_6&index=3)

[**https://www.youtube.com/watch?v=TQx3IfCVvQ0&list=PL5tcWHG-UPH3SX16DI6EP1FlEibgxkg\_6&index=6**](https://www.youtube.com/watch?v=TQx3IfCVvQ0&list=PL5tcWHG-UPH3SX16DI6EP1FlEibgxkg_6&index=6)

| **On time Submission(2)** | **Knowledge of Topic(4)** | **Implementation and Demonstraion(4)** | **Total (10)** |
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| **Signature of Faculty** |  | **Date of Submission** |  |