OPERATING SYSTEM 2 (CS3523)

ASSIGNMENT 3

(Producer consumer problem using semaphores and locks)

Name :- Anurag Patil
Roll No. :- CS17BTECH11004


➢ The constant parameter's during my testing are:-
1. Capacity = 100 ;
2. np = 10 ;
3. nc = 15 ;
4. cntp = 15 ;
5. cntc = 10 ;
6. μp+μc = 20 seconds ;

> ➢   The Graph of Average waiting time(in seconds) vs the ratio(µp/µc) of is as follows :-

1.   When Ratio(x – axis) is less than 1.

Producer(semaphore), Consumer(semaphores), Producer (locks) and Consumer(locks)

■ Producer(semaphore)   ■ Consumer(semaphores)   ■ Producer(locks)   ■ Consumer(locks)
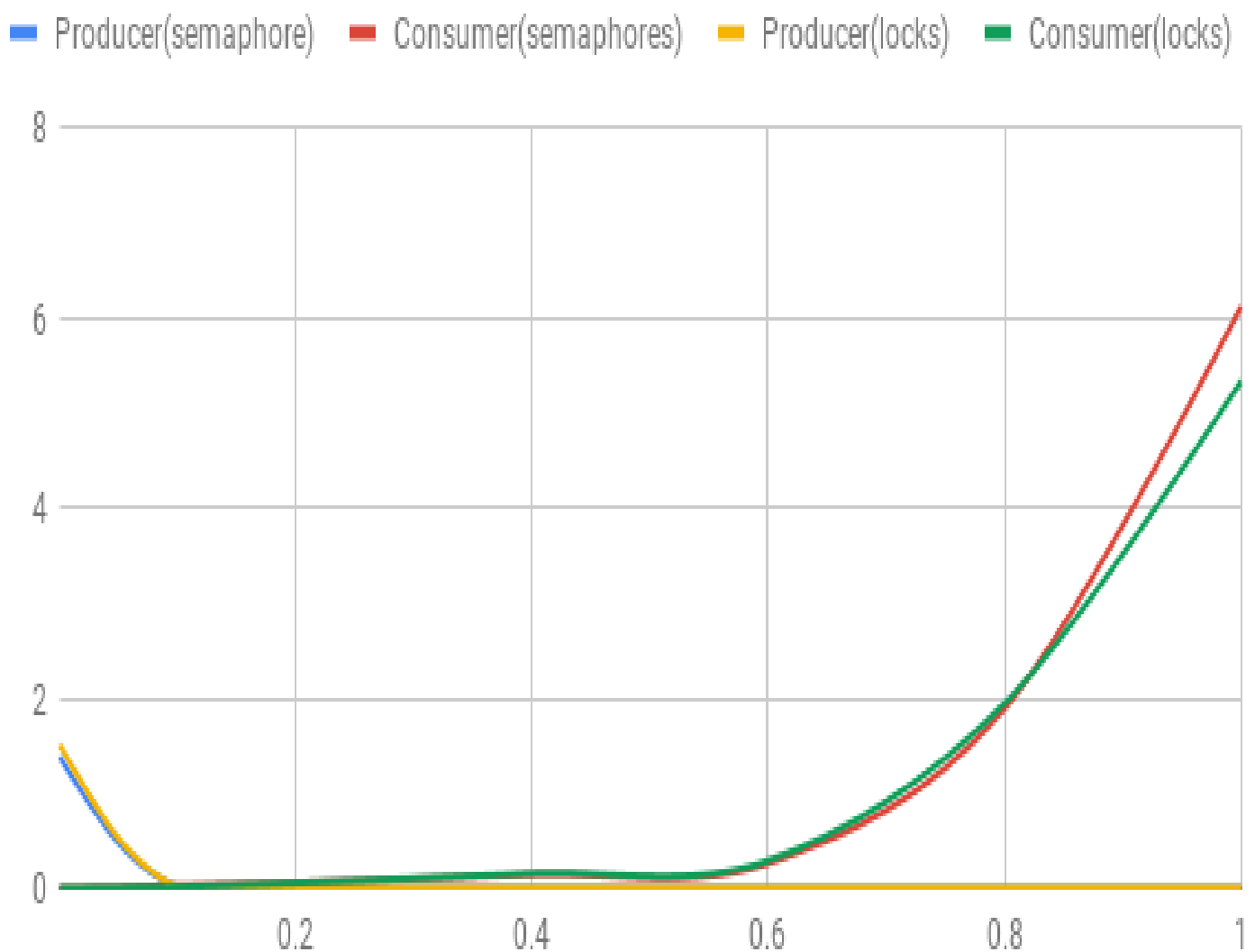
2. When Ratio(x - axis) is greater than 1.

Producer(semaphore), Consumer(semaphores), Producer(locks) and Consumer(locks)
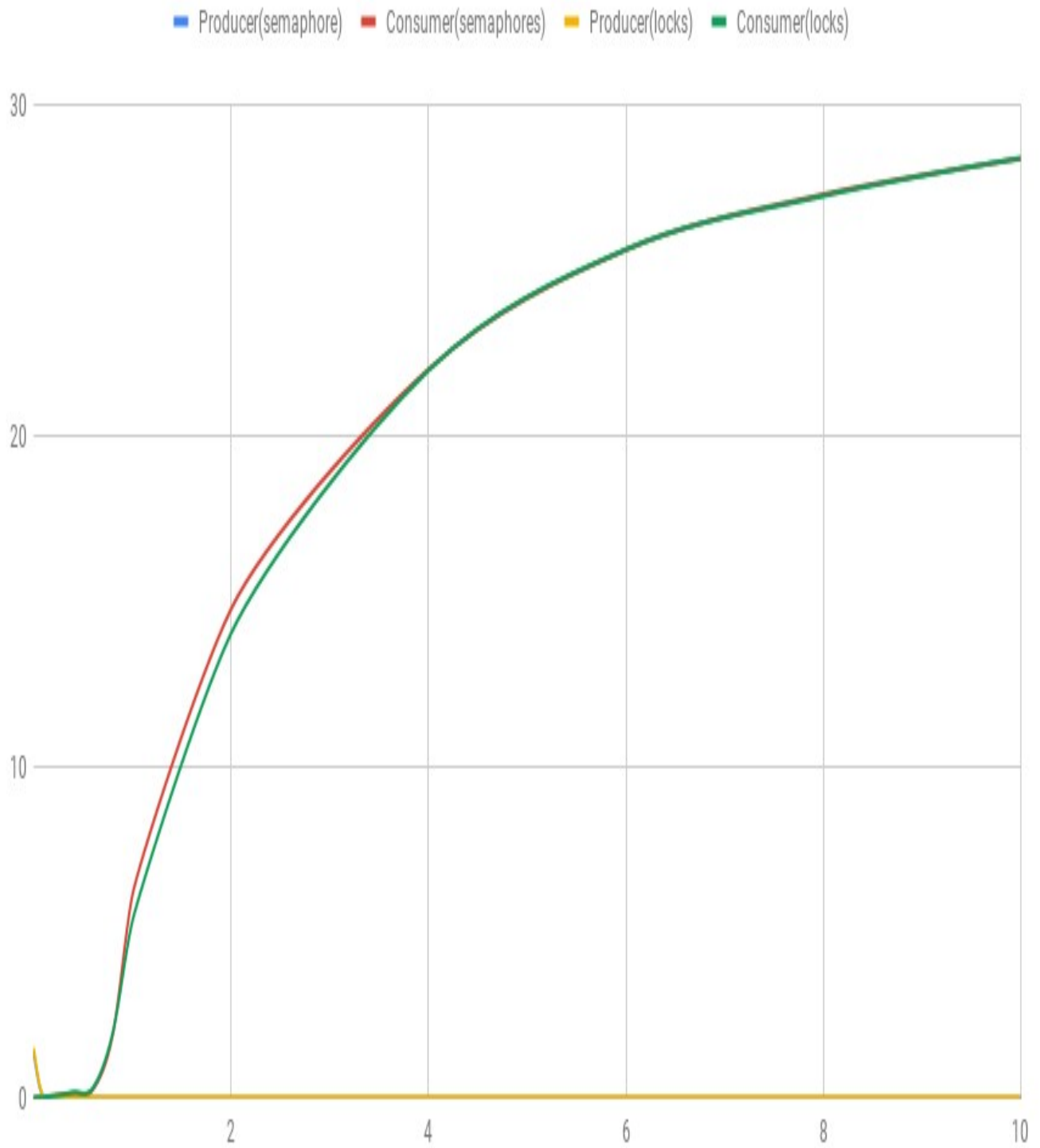
3.   The Above graph is on the basis of following output which i get during testing :-

Ratio	Producer(semaphore)	Consumer(semaphores)	Producer(locks)	Consumer(locks)
0.001	1.38	0	1.50667	0
0.05	0.4866	0.0066	0.5333	0.0066
0.1	0.0133	0.0266	0.0133	0.0133
0.2	0	0.0533	0	0.0533
0.4	0	0.14	0	0.153333
0.6	0	0.26	0	0.28667
0.8	0	1.8866	0	1.94
1	0	6.12	0	5.3333
2	0	14.78	0	14.0467
4	0	22.0333	0	22
6	0	25.6467	0	25.66
8	0	27.32	0	27.28
10	0	28.4067	0	28.4267

➢   Consumer is waiting too much on consuming every item when ration is more than 1.

➢   Producer is waiting when ratio is typically less than 0.2.

➢   As the ratio is increasing keeping the sum of μ_p and μ_c constant, the waiting time of consumer increases and waiting time of producer decreases till it beecome 0 then become 0.

➢   In above graph waiting time of producer thread is too low bacause the buffer size 100 is too big as compared to total item produced 150.

➢   In below graph i try to reduce buffer size and want to see it's affect.
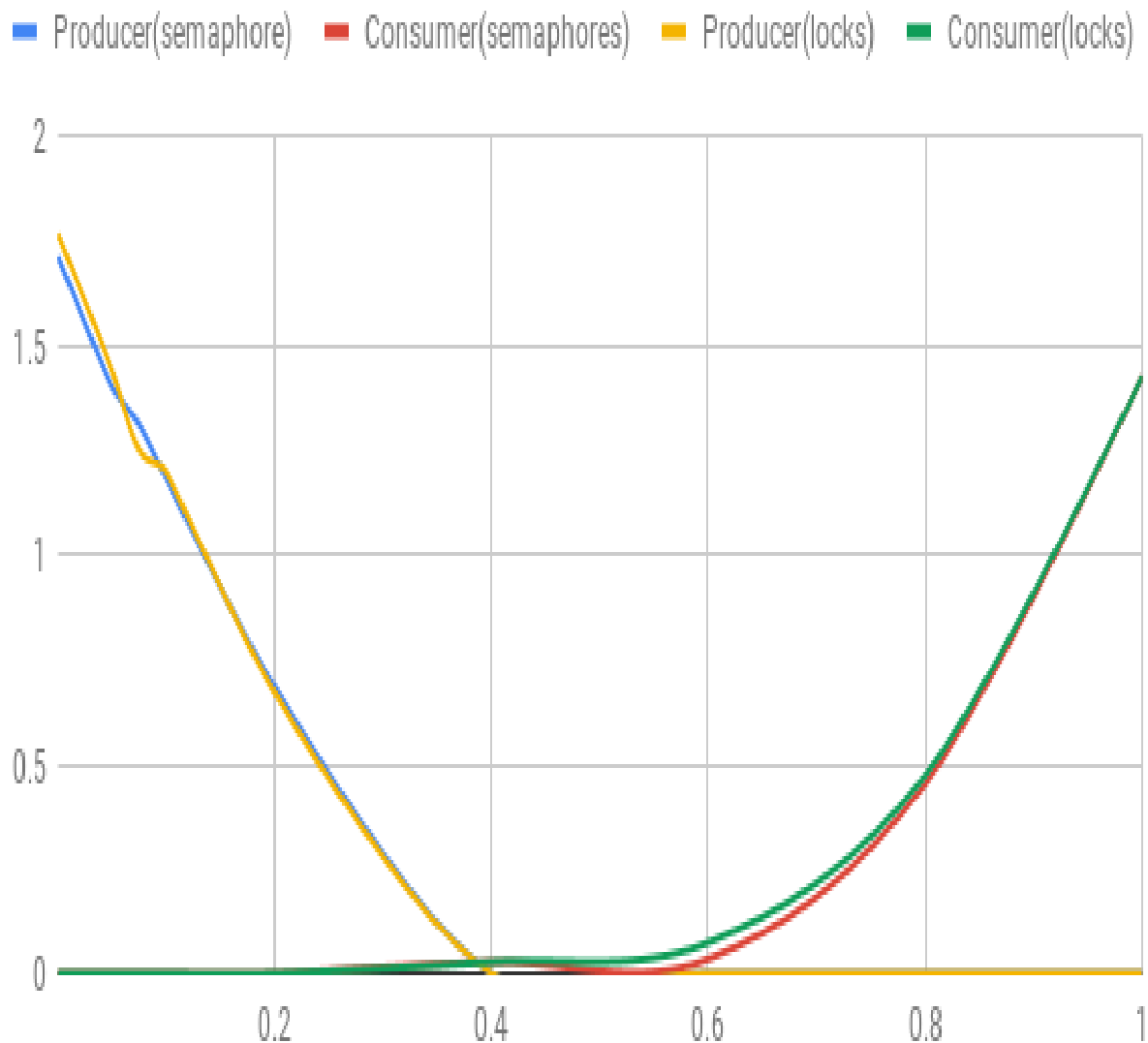
➢ The constant parameter's during my testing are:-
1. Capacity = 40 ;
2. np = 10 ;
3. nc = 15 ;
4. cntp = 15 ;
5. cntc = 10 ;
6. $\mu p + \mu c$ = 5 seconds ;

➢ The Graph of Average waiting time(in seconds) vs the ratio(μp/μc) of is as follows :-
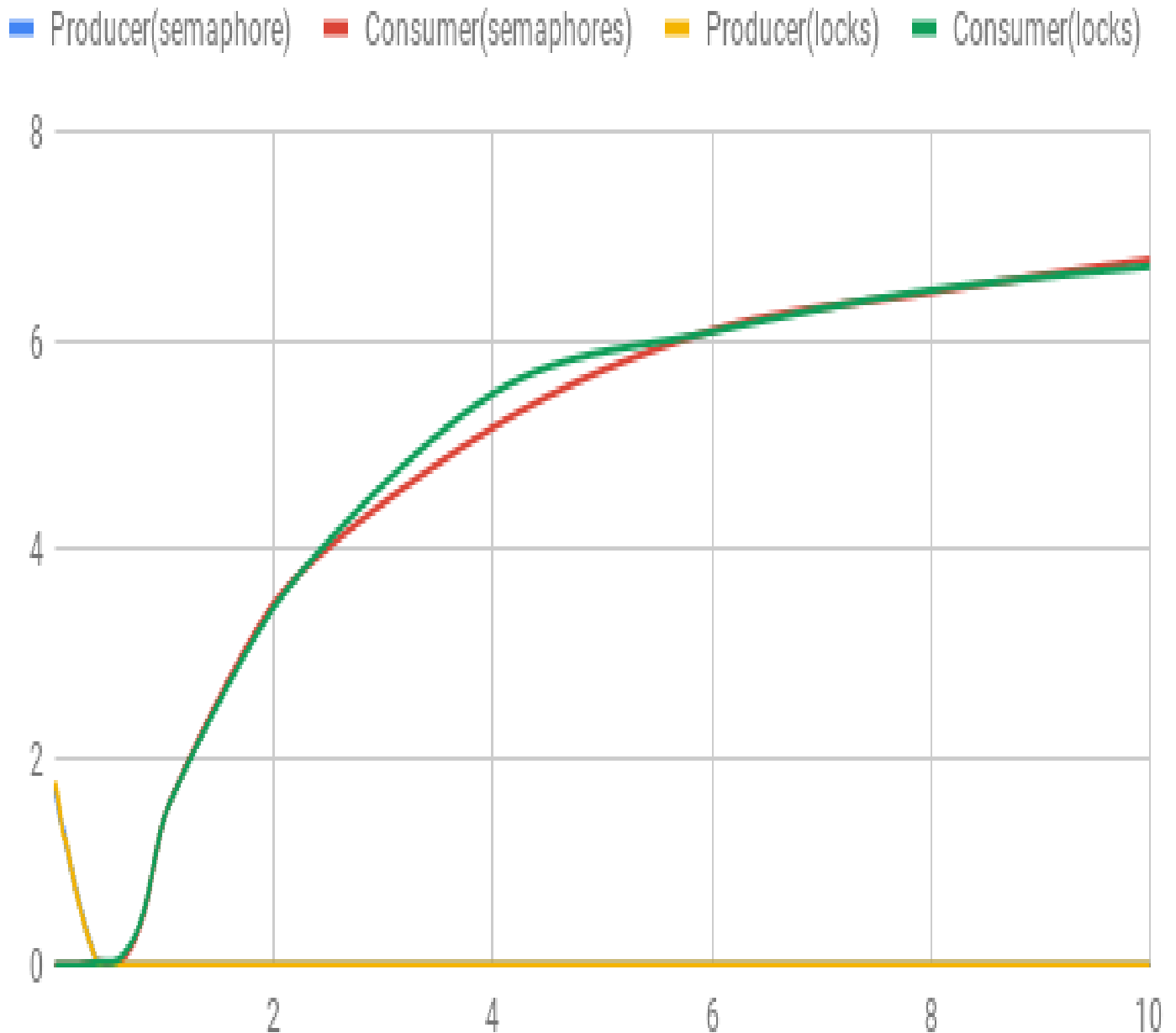
1. When Ratio(x – axis) is less than 1.

Producer(semaphore), Consumer(semaphores), Producer (locks) and Consumer(locks)

2.   When Ratio(x - axis) is greater than 1.

Producer(semaphore), Consumer(semaphores), Producer (locks) and Consumer(locks)

3.   The Above graph is on the basis of following output which i get during testing :-

Ratio	Producer(semaphore)	Consumer(semaphores)	Producer(locks)	Consumer(locks)
0.001	1.71333	0	1.76667	0
0.05	1.40667	0	1.44667	0
0.075	1.3133	0	1.25333	0
0.1	1.18667	0	1.2	0
0.2	0.68667	0	0.67333	0
0.4	0	0.026667	0	0.026667
0.6	0	0.03333	0	0.07333
0.8	0	0.453333	0	0.4733
1	0	1.42667	0	1.42667
2	0	3.48	0	3.44
4	0	5.1667	0	5.49333
6	0	6.1	0	6.08667
8	0	6.4666	0	6.48667
10	0	6.78	0	6.71333