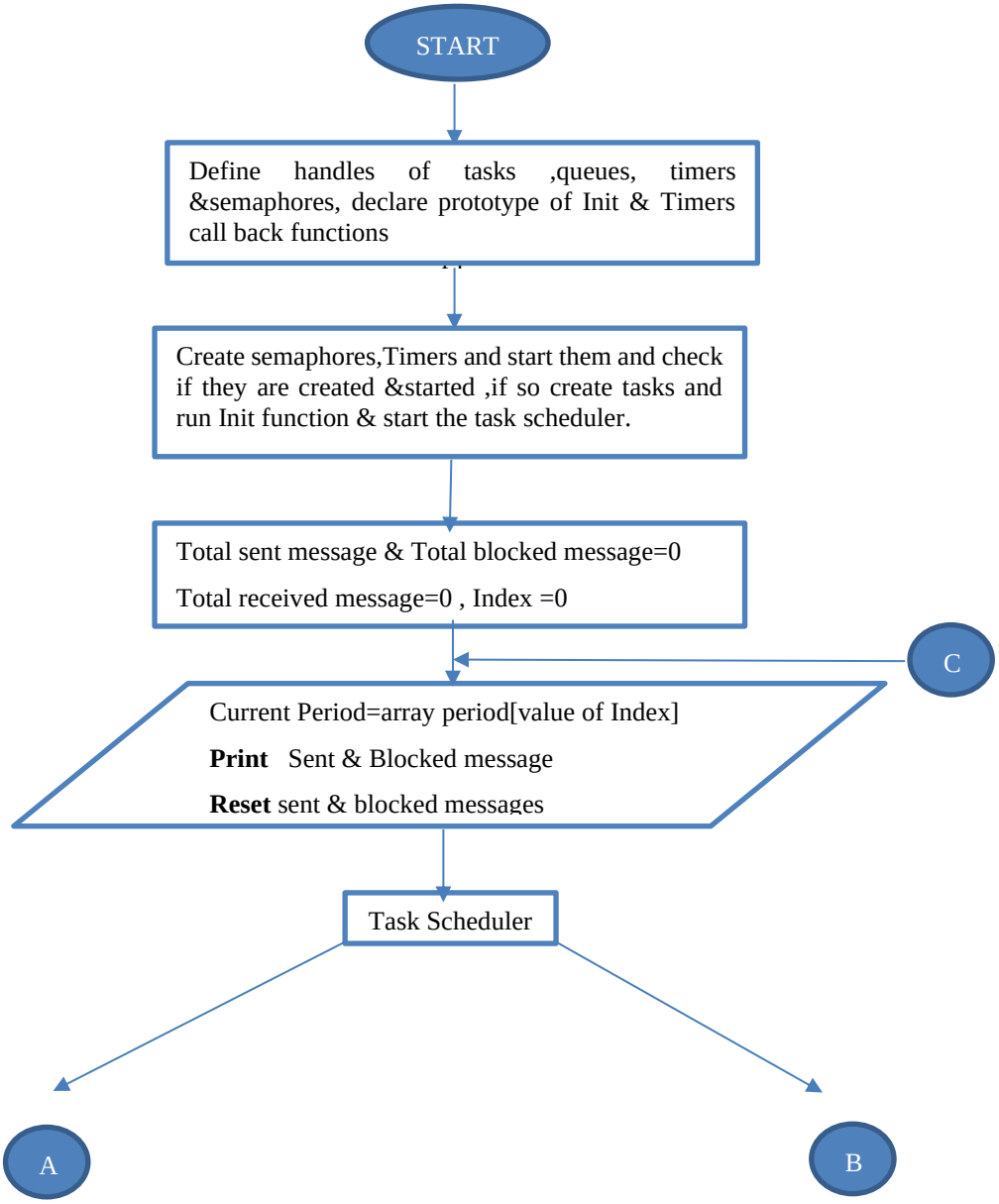
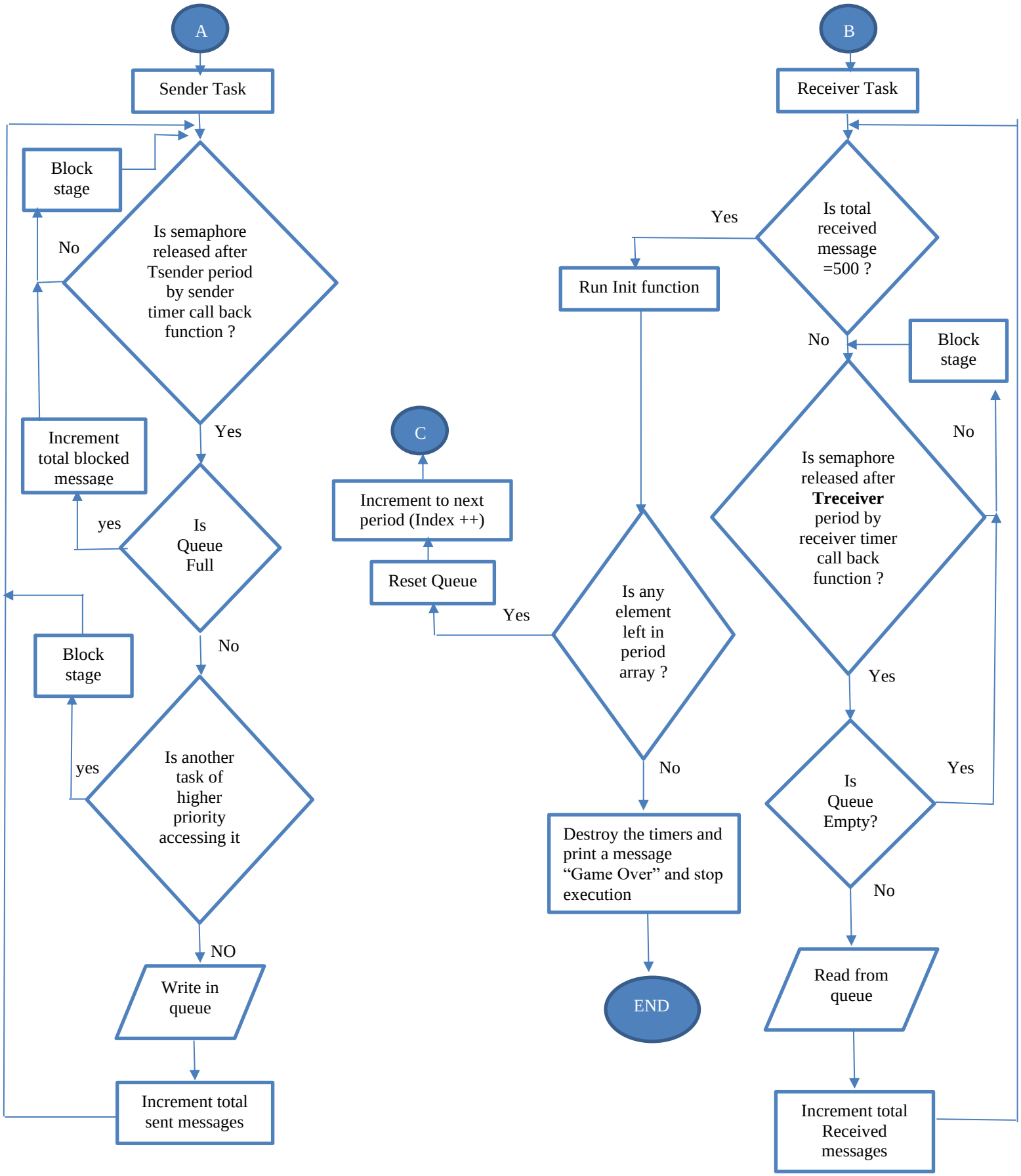
1 System Design

FLOW CHART



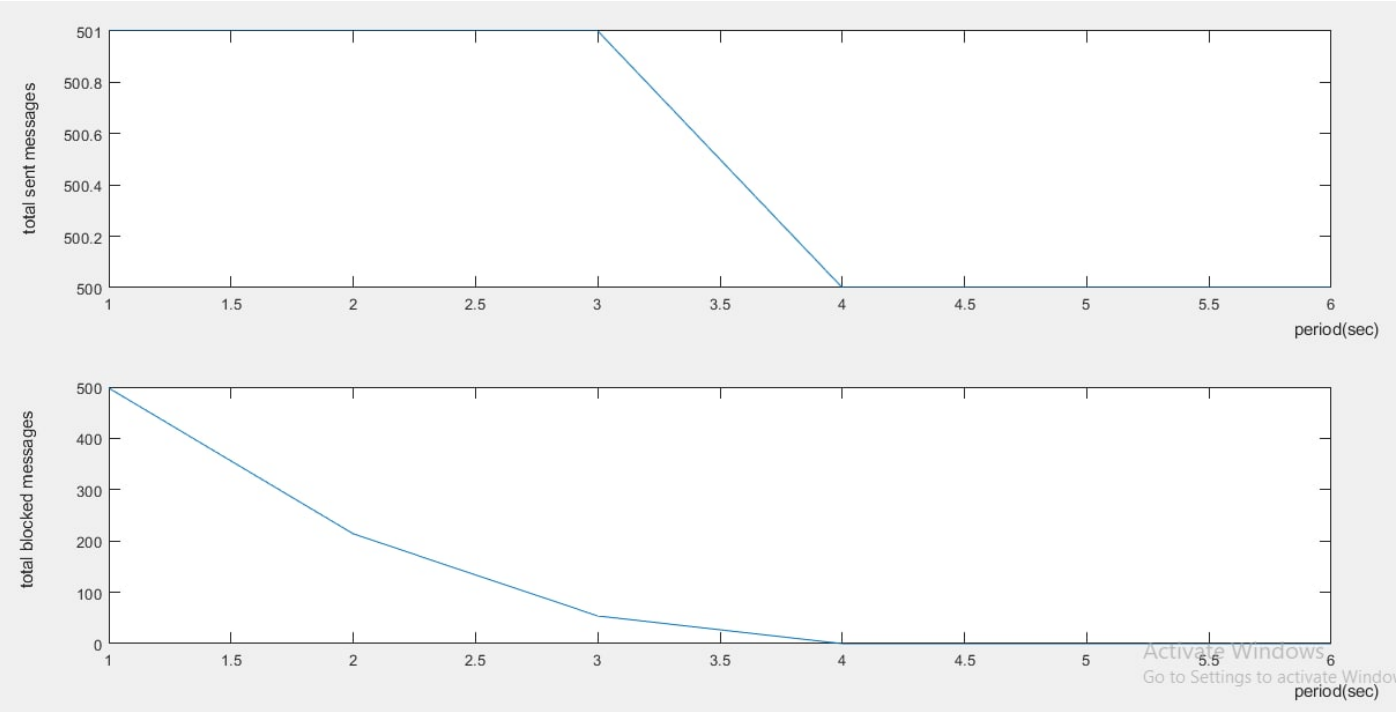

A
Sender Task
Block stage
Is semaphore released after Tsender period by sender timer call back function ?
No
Yes
Increment total blocked message
yes
Is Queue Full
No
Block stage
yes
Is another task of higher priority accessing it
NO
Write in queue
Increment total sent messages
C
Increment to next period (Index ++)
Reset Queue
Yes
Is any element left in period array ?
No
Run Init function
Destroy the timers and print a message "Game Over" and stop execution
END
B
Receiver Task
Is total received message =500 ?
Yes
No
Block stage
Is semaphore released after Treceiver period by receiver timer call back function ?
No
Yes
Is Queue Empty?
Yes
No
Read from queue
Increment total Received messages

2 Tables & Figures

When Queue Size =2

Current Periods (ms)	Total Sent Messages	Total Blocked Messages
100	501	498
140	501	214
180	501	54
220	500	0
260	500	0
300	500	0

Plots



- **Gap Between Sent & received messages**

When Tsender smaller than Treceiver

There is a huge Gap between the sent &received messages due to the blockage of the snet message when it is sent to a full queue as the receiever don't read the messages with the same rate of sending

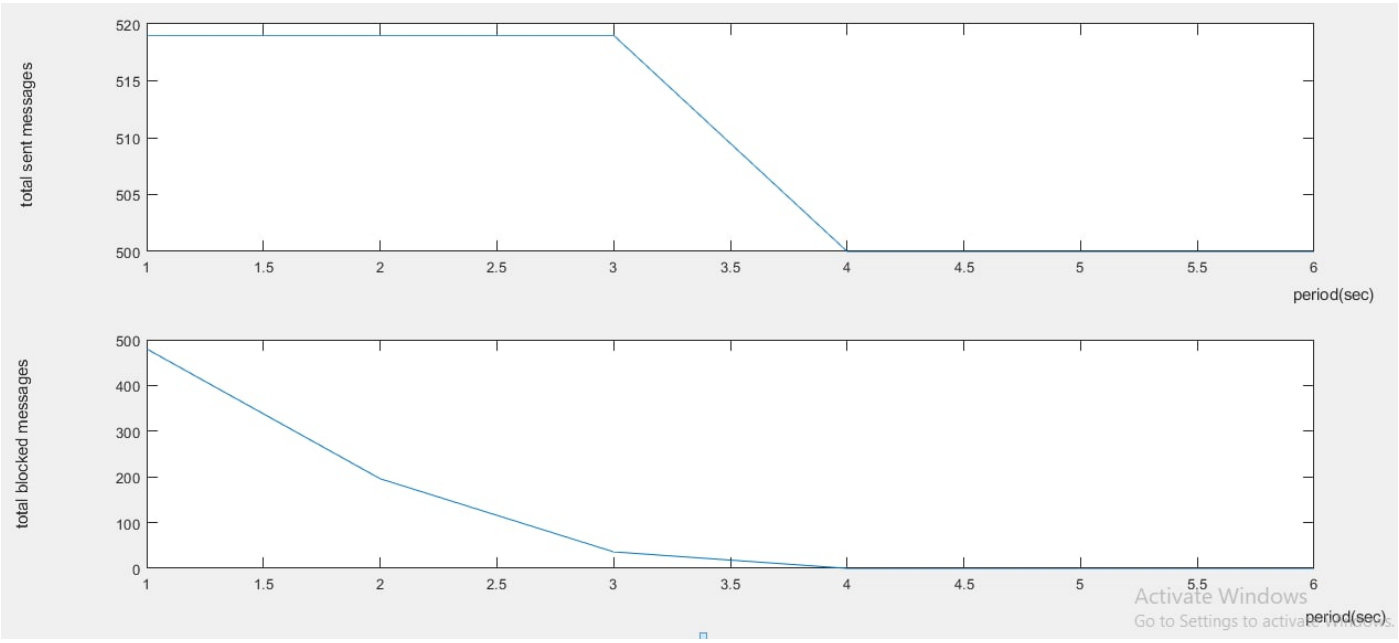
But when Tsender became larger than Treceiever

The gap between the sent & received messages decreased as the collision occurs between sending and receiving task during accessing the queue decreases thus the sending &receiving process will be stable.

Queue of size 20

Current Periods (ms)	Total Sent Messages	Total Blocked Messages
100	519	480
140	519	196
180	519	36
220	500	0
260	500	0
300	500	0

Plots



- When the queue size increases the number of blocked messages for each period of Tsender decreases as there are more empty slots for the sender task to write in it without getting blocked.

3 Clarification of the system

This is an example of how this RTOS task works with following specification

- Period of sender (Tsender)=100ms
- Period of receiver (Treceiver)=200ms
- Time slice of 10ms