**ASSIGNMENT NO. 4**

**THREAD SYNCHRONIZATION**

#include<stdio.h>

#include<pthread.h>

#include<stdlib.h>

#include<semaphore.h>

#define BUFFERSIZE 5

int in=0, out=0;

sem\_t full, empty;

pthread\_mutex\_t mutex;

int array[BUFFERSIZE];

void \*producerMethod(void \*data)

int i, num, id;

id=(int)data;

for(i=0;i<3;i++)

{

sem\_wait(&empty);

pthread\_mutex\_lock(&mutex);

num=id;

array[in]=num;

printf("\nProducer: %d\nProduced value: %d\nStored at Location: %d\n", id, array[in], in);

in=(in+1)%BUFFERSIZE;

pthread\_mutex\_unlock(&mutex);

sem\_post(&full);

sleep(2);

}

}

void \*consumerMethod(void \*data)

{

int i, num, r;

do

{

sem\_wait(&full);

pthread\_mutex\_lock(&mutex);

num=array[out];

printf("\n\tConsumer Consumed: %d\n\tFrom Location: %d\n", num, out);

out=(out+1)%BUFFERSIZE;

pthread\_mutex\_unlock(&mutex);

sem\_post(&empty);

sleep(3);

sem\_getvalue(&empty, &r);

}

while(r!=BUFFERSIZE);

}

int main()

{

int r, i;

pthread\_t producer[4], consumer;

sem\_init(&full, 0, 0);

sem\_init(&empty, 0, 5);//producder

for(i=0;i<3;i++)

pthread\_create(&producer[i], NULL, producerMethod ,(void \*)i);

pthread\_create(&consumer, NULL,consumerMethod , NULL);

for(i=0; i<3;i++)

pthread\_join(producer[i], NULL);

pthread\_join(consumer, NULL);

return 0;

}

**OUTPUT**

[it@localhost ~]$ gcc semaphore.c -lpthread

[it@localhost ~]$ ./a.out

Producer:0

Produced value: 0

Stored at Location: 0

Producer: 1

Produced value: 1

Stored at Location: 1

Producer: 2

Produced value: 2

Stored at Location: 2

Consumer Consumed: 0

From Location: 0

Producer: 0

Produced value: 0

Stored at Location: 3

Producer: 1

Produced value: 1

Stored at Location: 4

Producer: 2

Produced value: 2

Stored at Location: 0

Consumer Consumed: 1

From Location: 1

Producer: 0

Produced value: 0

Stored at Location: 1

Consumer Consumed: 2

From Location: 2

Producer: 1

Produced value: 1

Stored at Location: 2

Consumer Consumed: 0

From Location: 3

Producer: 2

Produced value: 2

Stored at Location: 3

Consumer Consumed: 1

From Location: 4

Consumer Consumed: 2

From Location: 0

Consumer Consumed: 0

From Location: 1

Consumer Consumed: 1

From Location: 2

Consumer Consumed: 2

From Location: 3

[it@localhsost ~]$