Program (4-A):

```
#include<stdio.h>
#include<pthread.h>
#include<stdlib.h>
#include<semaphore.h>
#include<unistd.h>
#define buffer_size 10
sem_t full,empty;
int buffer[buffer_size];
pthread_mutex_t mutex;
void *producer(void *p);
void *consumer(void *p);
void insert_item(int);
int remove_item();
int counter;
void initialize()
{
  pthread_mutex_init(&mutex,NULL);
  sem_init(&full,1,0);
  sem_init(&empty,1,buffer_size);
  counter=0;
}

int main()
{
  int n1,n2,i;
  printf("\nEnter no. of producers you want to create:");
  scanf("%d",&n1);
  printf("\nEnter no. of consumers you want to create:");
  scanf("%d",&n2);
  initialize();
  pthread_t tid[n1],tid1[n2];
  for(i=0;i<n1;i++)
  pthread_create(&tid[i],NULL,producer,NULL);
  for(i=0;i<n2;i++)
  pthread_create(&tid1[i],NULL,consumer,NULL);
  sleep(50);
  exit(0);
}
void *producer(void *p)
{
  int item,waittime;
  waittime=rand()%5;
  sleep(waittime);

  item =rand()%10;
```

```
  sem_wait(&empty);
  pthread_mutex_lock(&mutex);
  printf("\n Producer produced %d item",item);
  insert_item(item);
  pthread_mutex_unlock(&mutex);
  sem_post(&full);
}
void *consumer(void *p)
{
  int item,waittime;
  waittime=rand()%10;
  sleep(
waittime);
  sem_wait(&full);
  pthread_mutex_lock(&mutex);
  item=remove_item();
  printf("\n Consumer consumed %d item",item);
  pthread_mutex_unlock(&mutex);
  sem_post(&empty);
}
void insert_item(int item)
{
  buffer[counter++]=item;
}
int remove_item()
{
  return(buffer[--counter]);
}
```

Output:

```
i-raj-shinobi-47@irajshinobi47-Lenovo-G50-80:~/Desktop/OSL Practicals/Assignment 4$ gcc
assignment_4.c  -lpthread
i-raj-shinobi-47@irajshinobi47-Lenovo-G50-80:~/Desktop/OSL Practicals/Assignment 4$
./a.out
Enter no. of producers you want to create:5
Enter no. of consumers you want to create:4

 Producer produced 3 item
 Producer produced 6 item
 Producer produced 7 item
 Consumer consumed 7 item
 Producer produced 0 item
 Consumer consumed 0 item
 Consumer consumed 6 item
 Producer produced 9 item
i-raj-shinobi-47@irajshinobi47-Lenovo-G50-80:~/Desktop/OSL Practicals/Assignment 4$
```