C PROGRAM FOR PRODUCER CONSUMER PROBLEM

NOTE: To Execute the following program you need to type the given below command  in to the terminal

                                         gcc filename.c -lpthread

REASON: “The header pthread.h is used so that the compiler understands the data types & symbol names, which are used in the below given C program but are defined/declared in the pthread library header file.   pthread libray is linked using -lpthread ,so that the linker can actually find those symbols in the pthread library during the linking stage.”

#include<stdio.h>  
#include<semaphore.h>  
#include<pthread.h>  
#include<stdlib.h>  
#define buffersize 10pthread\_mutex\_t mutex;  
pthread\_t tidP[20],tidC[20];  
sem\_t full,empty;  
int counter;  
int buffer[buffersize];

void initialize()  
{  
pthread\_mutex\_init(&mutex,NULL);  
sem\_init(&full,1,0);  
sem\_init(&empty,1,buffersize);  
counter=0;  
}

void write(int item)  
{  
buffer[counter++]=item;  
}

int read()  
{  
return(buffer[–counter]);  
}

void \* producer (void \* param)  
{  
int waittime,item,i;  
item=rand()%5;  
waittime=rand()%5;  
sem\_wait(&empty);  
pthread\_mutex\_lock(&mutex);  
printf(“\nProducer has produced item: %d\n”,item);  
write(item);  
pthread\_mutex\_unlock(&mutex);  
sem\_post(&full);  
}

void \* consumer (void \* param)  
{  
int waittime,item;  
waittime=rand()%5;  
sem\_wait(&full);  
pthread\_mutex\_lock(&mutex);  
item=read();  
printf(“\nConsumer has consumed item: %d\n”,item);  
pthread\_mutex\_unlock(&mutex);  
sem\_post(&empty);  
}

int main()  
{  
int n1,n2,i;  
initialize();  
printf(“\nEnter the no of producers: “);  
scanf(“%d”,&n1);  
printf(“\nEnter the no of consumers: “);  
scanf(“%d”,&n2);  
for(i=0;i<n1;i++)  
pthread\_create(&tidP[i],NULL,producer,NULL);  
for(i=0;i<n2;i++)  
pthread\_create(&tidC[i],NULL,consumer,NULL);  
for(i=0;i<n1;i++)  
pthread\_join(tidP[i],NULL);  
for(i=0;i<n2;i++)  
pthread\_join(tidC[i],NULL);

//sleep(5);  
exit(0);  
}