**Q1. Write a program in C to implement producer Consumer problem by using semaphore and functions Perform a dry run of the program also.**

#include<stdio.h>

#include<stdlib.h>

int mutex=1,full=0,empty=3,x=0;

int main()

{

int n;

void producer();

void consumer();

int wait(int);

int signal(int);

printf("\n1.Producer\n2.Consumer\n3.Exit");

while(1)

{

printf("\nEnter your choice:");

scanf("%d",&n);

switch(n)

{

case 1: if((mutex==1)&&(empty!=0))

producer();

else

printf("Buffer is full!!");

break;

case 2: if((mutex==1)&&(full!=0))

consumer();

else

printf("Buffer is empty!!");

break;

case 3:

exit(0);

break;

}

}

return 0;

}

int wait(int s)

{

return (--s);

}

int signal(int s)

{

return(++s);

}

void producer()

{

mutex=wait(mutex);

full=signal(full);

empty=wait(empty);

x++;

printf("\nProducer produces the item %d",x);

mutex=signal(mutex);

}

void consumer()

{

mutex=wait(mutex);

full=wait(full);

empty=signal(empty);

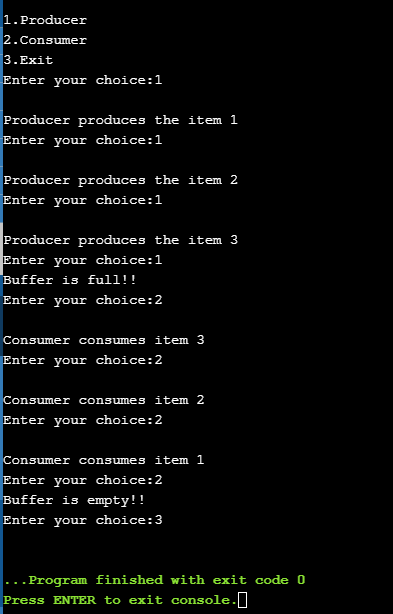
printf("\nConsumer consumes item %d",x);

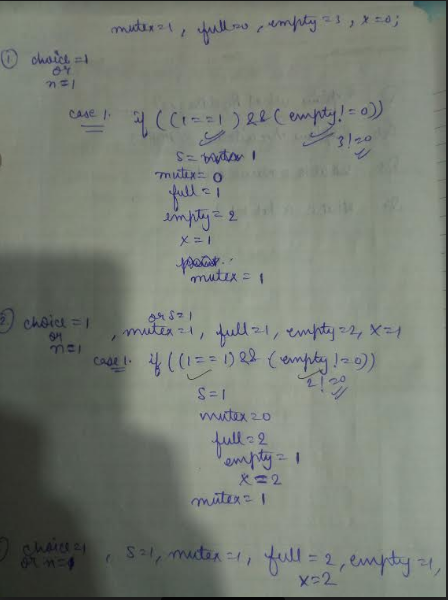
x--;

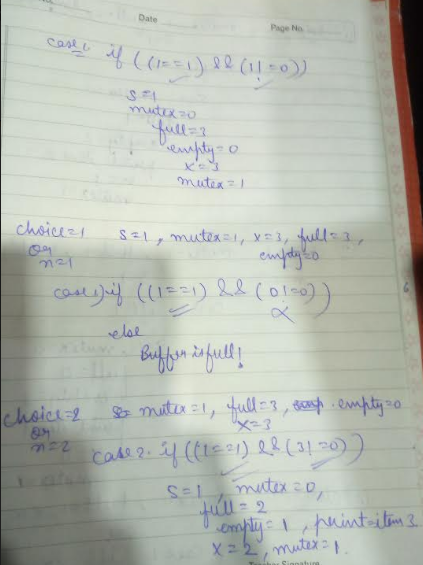
mutex=signal(mutex);

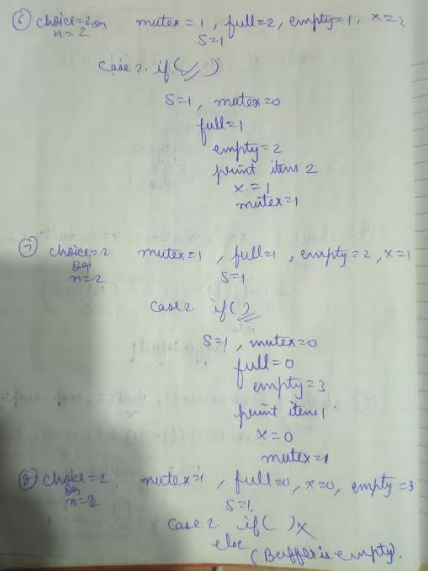
}

**OUTPUT-**

****

****

****

****