3.Develop a c program to stimulate producer consumer problem using semaphores

```
#include <stdio.h>
#include <stdlib.h>
int mutex = 1; // Initializing the mutex variable with the value 1.
int full = 0; // Initializing the full variable with the value 0.
int empty = 10, data = 0; // empty variable will store the number of empty slots in the buffer

void producer()// A function that will resemble producers' production of data

{
--mutex; // decrementing the value of mutex
++full; // Increase the number of full slots
--empty; // decrementing the number of slots available
data++;// incrementing data which means that the data is produced
printf("\nProducer produces item number: %d\n", data);
++mutex; // incrementing the value of mutex

}

void consumer()// A function that will resemble the consumer's consumption of data
{
--mutex;
--full;
++empty;
printf("\nConsumer consumes item number: %d.\n", data);
data--;
++mutex;
}

int main()
{
int n, i;
printf("\n1. Enter 1 for Producer"
"\n2. Enter 2 for Consumer"
"\n3. Enter 3 to Exit");

for (i = 1; i > 0; i++)
{
printf("\nEnter your choice: ");
scanf("%d", &n);
switch (n) // using switch case as there can be multiple types of choice.
```

```
{
case 1: if ((mutex == 1) && (empty != 0))
{
producer();
}
else
{
printf("The Buffer is full. New data cannot be produced!");
}
break;
case 2:
if ((mutex == 1) && (full != 0))
{
consumer();
}
else
{
printf("The Buffer is empty! New data cannot be consumed!");
}
break;

case 3:
exit(0);
break;
}
}
}
```

Output

```
user@user-System-Product-Name:~$ cc semaphores.c
user@user-System-Product-Name:~$ ./a.out

1. Enter 1 for Producer
2. Enter 2 for Consumer
3. Enter 3 to Exit
Enter your choice: 1
```

Producer produces item number: 1

Enter your choice: 1

Producer produces item number: 2

Enter your choice: 1

Producer produces item number: 3

Enter your choice: 2

Consumer consumes item number: 3.

Enter your choice: 2

Consumer consumes item number: 2.

Enter your choice: 2

Consumer consumes item number: 1.

Enter your choice: 2
The Buffer is empty! New data cannot be consumed!
Enter your choice: 3