

```
/*producer consumer problem using semaphores*/
```

```
#include<stdio.h>
```

```
#include<stdlib.h>
```

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

```
int wait(int s);
```

```
int signal(int s);
```

```
void producer();
```

```
void consumer();
```

```
int main() {
```

```
    int n;
```

```
    printf("MAIN MENU\n");
```

```
    printf("1. producer\n2. consumer\n3. exit\n");
```

```
    while (1) {
```

```
        printf("\nEnter your choice: ");
```

```
        scanf("%d", &n);
```

```
        printf("\n");
```

```
        switch (n) {
```

```
            case 1:
```

```
                if ((mutex == 1) && (empty != 0))
```

```
                    producer();
```

```
            else
```

```
                printf("Buffer is full\n");
```

```
            break;
```

```
            case 2:
```

```
                if ((mutex == 1) && (full != 0))
```

```

        consumer();

    else

        printf("Buffer is empty\n");

    break;

case 3:

    exit(0);

default:

    printf("INVALID CHOICE\n");

    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);  
}
```

The screenshot shows a web browser window with the 'Programiz C Online Compiler' interface. The code editor on the left contains a C program for a producer-consumer problem. The program defines a buffer of size 3, a mutex, and a full flag. It includes functions for waiting and signaling. The main function displays a menu with options 1 (producer), 2 (consumer), and 3 (exit). A while loop handles user input, calling the producer or consumer functions based on the choice. The output window on the right shows the program's execution, including the menu display and the sequence of items produced and consumed.

```
main.c  
1 #include<stdio.h>  
2 #include<stdlib.h>  
3  
4 int mutex = 1, full = 0, empty = 3, x = 0;  
5  
6 int wait(int s);  
7 int signal(int s);  
8 void producer();  
9 void consumer();  
10  
11 int main() {  
12     int n;  
13     printf("MAIN MENU\n");  
14     printf("1. producer\n2. consumer\n3. exit\n");  
15  
16     while (!) {  
17         printf("\nEnter your choice: ");  
18         scanf("%d", &n);  
19         printf("\n");  
20  
21         switch (n) {  
22             case 1:  
23                 if ((mutex == 1) && (empty != 0))  
24                     producer();  
25                 else  
26                     printf("Buffer is full\n");
```

Output

```
./tmp/19bLagstEd.o  
MAIN MENU  
1. producer  
2. consumer  
3. exit  
  
Enter your choice: 1  
Producer produces the item: 1  
Enter your choice: 1  
Producer produces the item: 2  
Enter your choice: 1  
Producer produces the item: 3  
Enter your choice: 2  
Consumer consumes item: 3  
Enter your choice: 3
```