

Ex.No:6

Implementation of Mutex for Producer Consumer Problem by Semaphores

Date:

Aim:

To write a C-program to implement mutex for the producer – consumer problem by semaphores.

Algorithm:

1. Start the program.
2. Declare the required variables.
3. Initialize the buffer size and get maximum item you want to produce.
4. Get the option, which you want to do either producer, consumer or exit from the operation.
5. If you select the producer, check the buffer size if it is full the producer should not produce the item or otherwise produce the item and increase the value buffer size.
6. If you select the consumer, check the buffer size if it is empty the consumer should not consume the item or otherwise consume the item and decrease the value of buffer size.
7. If you select exit come out of the program.
8. Stop the program.

Program:

```
#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\n");

    while(1)
```

```
{  
printf("\nEnter your choice\n");  
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("\n consumer consumes item%d",x); x--;

mutex=signal(mutex);

}
```

Output:

```
1.PRODUCER
2.CONSUMER
3.EXIT

ENTER YOUR CHOICE
1

producer produces the item1
ENTER YOUR CHOICE
1

producer produces the item2
ENTER YOUR CHOICE
2

consumer consumes item2
ENTER YOUR CHOICE
2

consumer consumes item1
ENTER YOUR CHOICE
2
BUFFER IS EMPTY
ENTER YOUR CHOICE
3
```

Result: