

## Practical-11

**Write a program for producer-consumer paradigm, both processes are running concurrently.**

```
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <fcntl.h>
#include <sys/wait.h>
#include <sys/mman.h>

#define BUFFER_SIZE 10

typedef struct {
    int buffer[BUFFER_SIZE];
    int index;
} shared_data;

void producer(shared_data *data) {
    int i, value;

    for (i = 0; i < 20; i++) {
        value = rand() % 100;

        while (data->index == BUFFER_SIZE) {
            printf("Buffer is full, producer waiting...\n");
            sleep(1);
        }

        data->buffer[data->index++] = value;
        printf("Producer added value %d to buffer\n", value);
    }
}
```

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```
void consumer(shared_data *data) {
    int i, value;

    for (i = 0; i < 20; i++) {
        while (data->index == 0) {
            printf("Buffer is empty, consumer waiting...\n");
            sleep(1);
        }

        value = data->buffer[--data->index];
        printf("Consumer removed value %d from buffer\n", value);
    }
}

int main() {
    int fd, result;
    shared_data *data;

    fd = shm_open("/myshm", O_CREAT | O_RDWR, 0666);
    if (fd == -1) {
        perror("shm_open");
        exit(1);
    }

    result = ftruncate(fd, sizeof(shared_data));
    if (result == -1) {
        perror("ftruncate");
        exit(1);
    }
}
```

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```
data = mmap(NULL, sizeof(shared_data), PROT_READ | PROT_WRITE,
MAP_SHARED, fd, 0);

if (data == MAP_FAILED) {
    perror("mmap");
    exit(1);
}

data->index = 0;

pid_t pid = fork();

if (pid == -1) {
    perror("fork");
    exit(1);
} else if (pid == 0) {
    consumer(data);
} else {
    producer(data);

    wait(NULL);

    result = shm_unlink("/myshm");
    if (result == -1) {
        perror("shm_unlink");
        exit(1);
    }
}

return 0;
}
```

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```
Producer added value 83 to buffer
Producer added value 86 to buffer
Producer added value 77 to buffer
Producer added value 15 to buffer
Producer added value 93 to buffer
Producer added value 35 to buffer
Producer added value 86 to buffer
Producer added value 92 to buffer
Producer added value 49 to buffer
Producer added value 21 to buffer
Consumer removed value 83 from buffer
Consumer removed value 21 from buffer
Consumer removed value 49 from buffer
Consumer removed value 92 from buffer
Consumer removed value 86 from buffer
Consumer removed value 35 from buffer
Consumer removed value 93 from buffer
Consumer removed value 15 from buffer
Consumer removed value 77 from buffer
Consumer removed value 86 from buffer
```