PROGRAM CODE

```
#include <stdio.h>
#include <semaphore.h>
#include <pthread.h>
#include <stdlib.h>
#include <unistd.h>

int size, in = 0, out = 0;
int* buffer;
sem_t full, empty;
pthread_mutex_t mutex;
pthread_t ptid, ctid;

void producer() {
	do {
		int item = rand() % 100;

		sleep(1); // For better output view
		sem_wait(&empty);
		pthread_mutex_lock(&mutex);

		buffer[in] = item;
		printf("Producer produced %d in buffer at %d\n", item, in);
		in = (in + 1) % size;

		pthread_mutex_unlock(&mutex);
		sem_post(&full);
	} while (1);
}

void consumer() {
	do {
		sem_wait(&full);
		pthread_mutex_lock(&mutex);

		int item = buffer[out];
		buffer[out] = 0;
		printf("Consumer consumed %d from buffer at %d\n", item, out);
		out = (out + 1) % size;

		pthread_mutex_unlock(&mutex);
		sem_post(&empty);
	} while (1);
}

void main() {
	printf("Enter buffer size: ");
	scanf("%d", &size);
	printf("\n");

	buffer = (int*) malloc(size * sizeof(int));

	sem_init(&full, 0, 0);
	sem_init(&empty, 0, size);
	pthread_mutex_init(&mutex, NULL);
```

```
        pthread_create(&ptid, NULL, (void*) producer, NULL);
        pthread_create(&ctid, NULL, (void*) consumer, NULL);
        pthread_join(ptid, NULL);
        pthread_join(ctid, NULL);

        sem_destroy(&full);
        sem_destroy(&empty);
        pthread_mutex_destroy(&mutex);
        free(buffer);
}
```

SAMPLE OUTPUT

```
Enter buffer size: 5

Producer produced 83 in buffer at 0
Consumer consumed 83 from buffer at 0
Producer produced 86 in buffer at 1
Consumer consumed 86 from buffer at 1
Producer produced 77 in buffer at 2
Consumer consumed 77 from buffer at 2
Producer produced 15 in buffer at 3
Consumer consumed 15 from buffer at 3
Producer produced 93 in buffer at 4
Consumer consumed 93 from buffer at 4
Producer produced 35 in buffer at 0
Consumer consumed 35 from buffer at 0
Producer produced 86 in buffer at 1
Consumer consumed 86 from buffer at 1
Producer produced 92 in buffer at 2
Consumer consumed 92 from buffer at 2
Producer produced 49 in buffer at 3
Consumer consumed 49 from buffer at 3
Producer produced 21 in buffer at 4
Consumer consumed 21 from buffer at 4
```