Завдання №1

Ми реалізували синхронізацію між потоком-виробником і потоком-споживачем за допомогою семафорів. Виробник генерує числа і поміщає їх у буфер, а споживач забирає їх, при цьому потоки чекають, поки інші завершать роботу, і дотримуються обмежень на розмір буфера.

Завдання №2

Програма синхронізує роботу потоків за допомогою умовних змінних: виробник генерує числа і зберігає їх у глобальній змінній, а споживач чекає на повідомлення і виводить числа. Потоки працюють синхронно, поки не досягнуть заданого часу для завершення програми.

```
mint@asus-mint:~/git/op-course/lab8/task1$ ./bin/main
Producer produced: 99
Consumer consumed: 99
Producer produced: 65
Consumer consumed: 65
Producer produced: 7
Producer produced: 19
Consumer consumed: 7
Producer produced: 97
Consumer consumed: 19
Consumer consumed: 97
Producer produced: 5
Consumer consumed: 5
Producer produced: 66
Consumer consumed: 66
Producer produced: 87
Consumer consumed: 87
Producer produced: 98
Consumer consumed: 98
Producer produced: 64
Producer produced: 77
Producer produced: 82
Consumer consumed: 64
Producer produced: 47
Producer produced: 51
```

```
Consumer consumed: 77
Producer produced: 22
Producer produced: 44
Consumer consumed: 82
Producer produced: 95
Consumer consumed: 47
Consumer consumed: 51
Producer produced: 51
Producer produced: 80
Consumer consumed: 22
Producer produced: 6
Consumer consumed: 44
Consumer consumed: 95
Consumer consumed: 51
Producer produced: 20
Producer produced: 4
Consumer consumed: 80
Producer produced: 30
Producer produced: 94
Consumer consumed: 6
Producer produced: 1
Consumer consumed: 20
Producer produced: 88
Consumer consumed: 4
Consumer consumed: 30
Producer produced: 16
Producer produced: 81
Consumer consumed: 94
Producer produced: 99
Consumer consumed: 1
Consumer consumed: 88
Producer produced: 24
Producer produced: 13
Consumer consumed: 16
Producer produced: 85
Consumer consumed: 81
Producer produced: 34
Consumer consumed: 99
Consumer consumed: 24
Producer produced: 14
Producer produced: 15
Consumer consumed: 13
Consumer consumed: 85
Producer produced: 53
Producer produced: 62
```

```
Consumer consumed: 34
Producer produced: 3
Consumer consumed: 14
Producer produced: 88
Consumer consumed: 15
Producer produced: 5
Consumer consumed: 53
Producer produced: 77
Consumer consumed: 62
Producer produced: 88
Consumer consumed: 3
Time is up. Cancelling threads...
Program completed.
mint@asus-mint:~/git/op-course/lab8/task1$
```

Для завдання №1

```
mint@asus-mint:~/git/op-course/lab8/task2$ ./bin/main
Producer generated: 53
Consumer consumed: 53
Producer generated: 39
Consumer consumed: 39
Producer generated: 63
Consumer consumed: 63
Producer generated: 23
Consumer consumed: 23
Producer generated: 52
Consumer consumed: 52
Producer generated: 72
Consumer consumed: 72
Producer generated: 98
Consumer consumed: 98
Producer generated: 14
Consumer consumed: 14
Producer generated: 5
Consumer consumed: 5
Producer generated: 18
Consumer consumed: 18
Producer generated: 55
Consumer consumed: 55
Producer generated: 3
Consumer consumed: 3
```

```
Producer generated: 30
Consumer consumed: 30
Producer generated: 77
Consumer consumed: 77
Producer generated: 40
Consumer consumed: 40
Time is up. Cancelling threads...
Program completed.
mint@asus-mint:~/git/op-course/lab8/task2$
```

Для завдання №2