

1. main-two-cvs-while.c implements producer and consumer signaling each other that solves the bounded buffer problem
- 2.

```
yufei@Yufeis-Air Downloads % ./a.out -p 1 -c 1 -m 1 -v
```

```
NF      P0 C0
0 [*--- ] p0
0 [*--- ]  c0
0 [*--- ] p1
1 [* 0 ] p4
1 [* 0 ] p5
1 [* 0 ] p6
1 [* 0 ]  c1
0 [*--- ]  c4
0 [*--- ]  c5
0 [*--- ]  c6
0 [*--- ]  c0
0 [*--- ]  c1
0 [*--- ]  c2
1 [*EOS ] [main: added end-of-stream marker]
1 [*EOS ]  c3
0 [*--- ]  c4
0 [*--- ]  c5
0 [*--- ]  c6
```

Consumer consumption:

```
C0 -> 1
```

```
sh: command not found: -p
```

```
yufei@Yufeis-Air Downloads % ./a.out -p 1 -c 1 -m 10 -v
```

```
NF      P0 C0
0 [*--- --- --- --- --- --- --- --- --- ] p0
0 [*--- --- --- --- --- --- --- --- --- ]  c0
0 [*--- --- --- --- --- --- --- --- --- ] p1
1 [u 0 f--- --- --- --- --- --- --- --- ] p4
1 [u 0 f--- --- --- --- --- --- --- --- ] p5
1 [u 0 f--- --- --- --- --- --- --- --- ] p6
1 [u 0 f--- --- --- --- --- --- --- --- ]  c1
0 [ --- *--- --- --- --- --- --- --- --- ]  c4
0 [ --- *--- --- --- --- --- --- --- --- ]  c5
0 [ --- *--- --- --- --- --- --- --- --- ]  c6
0 [ --- *--- --- --- --- --- --- --- --- ]  c0
1 [ --- uEOS f--- --- --- --- --- --- --- ] [main: added end-of-
stream marker]
1 [ --- uEOS f--- --- --- --- --- --- --- ]  c1
0 [ --- --- *--- --- --- --- --- --- --- ]  c4
0 [ --- --- *--- --- --- --- --- --- --- ]  c5
0 [ --- --- *--- --- --- --- --- --- --- ]  c6
```

Consumer consumption:

```
C0 -> 1
```

```
yufei@Yufeis-Air Downloads % ./a.out -p 1 -c 1 -m 1 -C 0,0,0,0,0,0,1 -v
```

```
NF      P0 C0
0 [*--- ] p0
0 [*--- ] c0
0 [*--- ] p1
1 [* 0 ] p4
1 [* 0 ] p5
1 [* 0 ] p6
1 [* 0 ] c1
0 [*--- ] c4
0 [*--- ] c5
0 [*--- ] c6
1 [*EOS ] [main: added end-of-stream marker]
1 [*EOS ] c0
1 [*EOS ] c1
0 [*--- ] c4
0 [*--- ] c5
0 [*--- ] c6
```

Consumer consumption:

C0 -> 1

```
yufei@Yufeis-Air Downloads % ./a.out -p 1 -c 1 -m 10 -l 10 -C 0,0,0,0,0,0,1 -v
```

```
NF      P0 C0
0 [*--- ] p0
0 [*--- ] c0
0 [*--- ] p1
1 [u 0 f--- ] p4
1 [u 0 f--- ] p5
1 [u 0 f--- ] p6
1 [u 0 f--- ] c1
1 [u 0 f--- ] p0
0 [ --- *--- ] c4
0 [ --- *--- ] c5
0 [ --- *--- ] c6
0 [ --- *--- ] p1
1 [ --- u 1 f--- ] p4
1 [ --- u 1 f--- ] p5
1 [ --- u 1 f--- ] p6
1 [ --- u 1 f--- ] p0
1 [ --- u 1 f--- ] p1
2 [ --- u 1 2 f--- ] p4
2 [ --- u 1 2 f--- ] p5
2 [ --- u 1 2 f--- ] p6
2 [ --- u 1 2 f--- ] p0
2 [ --- u 1 2 f--- ] p1
3 [ --- u 1 2 3 f--- ] p4
3 [ --- u 1 2 3 f--- ] p5
3 [ --- u 1 2 3 f--- ] p6
3 [ --- u 1 2 3 f--- ] p0
3 [ --- u 1 2 3 f--- ] p1
4 [ --- u 1 2 3 4 f--- ] p4
4 [ --- u 1 2 3 4 f--- ] p5
4 [ --- u 1 2 3 4 f--- ] p6
4 [ --- u 1 2 3 4 f--- ] p0
4 [ --- u 1 2 3 4 f--- ] p1
5 [ --- u 1 2 3 4 5 f--- ] p4
```

3. Not able to run on different system only have macOS

4.

```
1 [*EOS ] [main: added end-of-stream marker]
1 [*EOS ] c3
0 [*--- ] c4
0 [*--- ] c5
1 [*EOS ] [main: added end-of-stream marker]
1 [*EOS ] c6
1 [*EOS ] c3
0 [*--- ] c4
0 [*--- ] c5
1 [*EOS ] [main: added end-of-stream marker]
1 [*EOS ] c1
1 [*--- ] c6
0 [*--- ] c4
0 [*--- ] c5
0 [*--- ] c6
```

Consumer consumption:

C0 -> 4

C1 -> 2

C2 -> 4

Total time: 11.05 seconds

Around 11.05 seconds

5.

Around 12 seconds this time

```

1 [ --- uEOS f--- ] [main: added end-of-stream marker]
2 [f--- uEOS EOS ] [main: added end-of-stream marker]
3 [ EOS *EOS EOS ] [main: added end-of-stream marker]
3 [ EOS *EOS EOS ] c3
2 [ EOS f--- uEOS ] c4
2 [ EOS f--- uEOS ] c5
2 [ EOS f--- uEOS ] c6
2 [ EOS f--- uEOS ] c3
1 [uEOS f--- --- ] c4
1 [uEOS f--- --- ] c5
1 [uEOS f--- --- ] c6
1 [uEOS f--- --- ] c3
0 [ --- *--- --- ] c4
0 [ --- *--- --- ] c5
0 [ --- *--- --- ] c6

```

Consumer consumption:

```

C0 -> 4
C1 -> 4
C2 -> 2

```

Total time: 12.06 seconds

6.

```

1 [*EOS ] c1
0 [*--- ] c4
0 [*--- ] c0
0 [*--- ] c5
0 [*--- ] c6
1 [*EOS ] [main: added end-of-stream marker]
1 [*EOS ] c1
0 [*--- ] c4
0 [*--- ] c5
0 [*--- ] c6
1 [*EOS ] [main: added end-of-stream marker]
1 [*EOS ] c0
1 [*EOS ] c1
0 [*--- ] c4
0 [*--- ] c5
0 [*--- ] c6

```

Consumer consumption:

```

C0 -> 4
C1 -> 3
C2 -> 3

```

Total time: 5.02 seconds

7. Also 5 seconds
8. No there isn't problem
9. Might end up causing all thread sleeping
10. Code is fine with one consumer but might be a problem with two (always use while)
11. Make the first consumer only consumes one value

```

1 [f--- --- --- --- --- --- --- --- u 9 ] p6
1 [f--- --- --- --- --- --- --- --- u 9 ] c1
0 [*--- --- --- --- --- --- --- --- ] c4
0 [*--- --- --- --- --- --- --- --- ] c5
0 [*--- --- --- --- --- --- --- --- ] c6
0 [*--- --- --- --- --- --- --- --- ] c0
1 [uEOS f--- --- --- --- --- --- --- ] [main: ad
eam marker]
2 [uEOS EOS f--- --- --- --- --- --- --- ] [main: ad
eam marker]
2 [uEOS EOS f--- --- --- --- --- --- --- ] c3
1 [ --- uEOS f--- --- --- --- --- --- --- ] c4
1 [ --- uEOS f--- --- --- --- --- --- --- ] c5
1 [ --- uEOS f--- --- --- --- --- --- --- ] c6
1 [ --- uEOS f--- --- --- --- --- --- --- ] c1
0 [ --- --- *--- --- --- --- --- --- --- ] c4
0 [ --- --- *--- --- --- --- --- --- --- ] c5
0 [ --- --- *--- --- --- --- --- --- --- ] c6

```

Consumer consumption:

C0 -> 1

C1 -> 9

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