

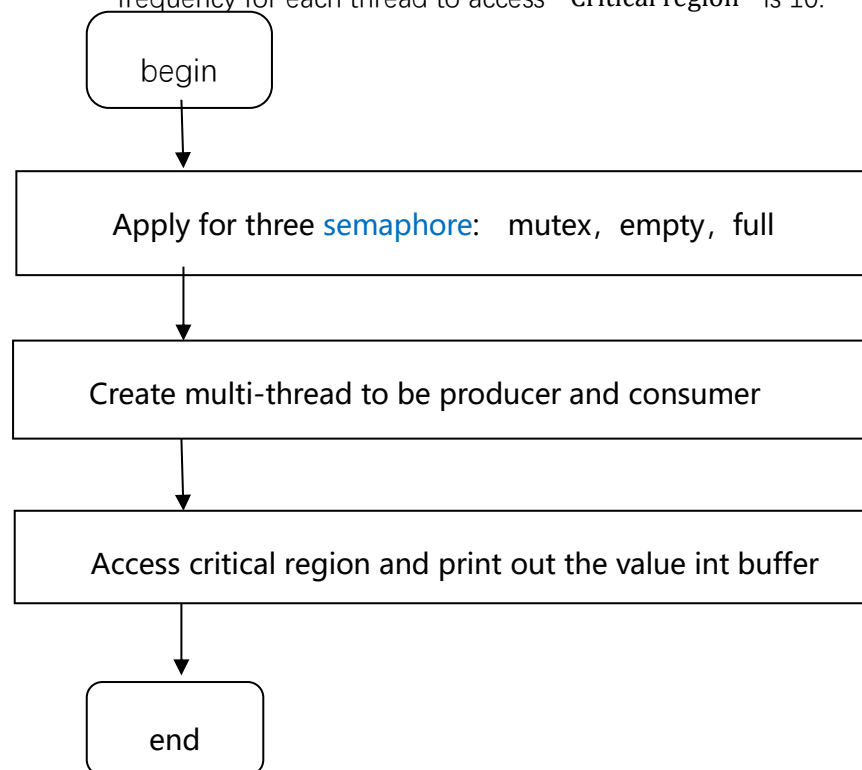
Operating system experiment report

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Working target: Handle consumer producer problem in Windows and Linux operating system by using **Windows API** and **PThread API**.

Working environment: **Window10** as basic operating system with “**virtual box**” virtual machine and **Ubuntu18.04** running on it. Using GCC version 8.2.0 on Windows and version 7.4.0 on Ubuntu.

1. In order to make the program satisfy "Critical Section", I set three semaphore **semaphore** `mutex = 1, empty = 10, full = 0` and a char buffer array **char** `buffer[10]` to be the critical region.
2. Producer produce into buffer using signal and make buffer turn to 'A'. Consumer consume buffer by changing it to 'B'. Either producer or consumer access "Critical region", I print buffer out to show changes.
3. Create multi-thread which include 5 producer and 5 consumer, the maximum frequency for each thread to access "Critical region" is 10.



The code of my program will be bale together with this report.

Experiment result:

Ubuntu:

```

ly@ly-MS-7B87:~/Documents$ ./p_thread_lin.out
140014860703488^0^ A N N N N N N N N N
140014860703488^1^ A A N N N N N N N N
140014860703488^2^ A A A N N N N N N N
140014860703488^3^ A A A A N N N N N N
140014860703488^4^ A A A A A N N N N N
140014852310784^0^ B A A A A N N N N N
140014852310784^1^ B B A A A N N N N N
140014852310784^2^ B B B A A N N N N N
140014852310784^3^ B B B B A N N N N N
140014843918080^0^ B B B B A A N N N N
140014869096192^0^ B B B B B A N N N N
140014860703488^5^ B B B B B A A N N N
140014860703488^6^ B B B B B A A A N N
140014860703488^7^ B B B B B A A A A N
140014860703488^8^ B B B B B A A A A A
140014860703488^9^ A B B B B A A A A A
140014860703488^10^ A A B B B A A A A A
140014860703488^11^ A A A B B A A A A A

```

Windows:

```

C:\Users\83723\Desktop>gcc p_thread_win.c
C:\Users\83723\Desktop>a.exe
生产到缓冲区槽: 0
生产到缓冲区槽: 1
取走缓冲区槽 0 的数
生产到缓冲区槽: 2
生产到缓冲区槽: 3
取走缓冲区槽 1 的数
取走缓冲区槽 2 的数
取走缓冲区槽 3 的数
取走缓冲区槽 4 的数
生产到缓冲区槽: 4
生产到缓冲区槽: 5
生产到缓冲区槽: 6
生产到缓冲区槽: 7
取走缓冲区槽 5 的数
取走缓冲区槽 6 的数
取走缓冲区槽 7 的数
取走缓冲区槽 8 的数
生产到缓冲区槽: 8
生产到缓冲区槽: 9
生产到缓冲区槽: 10
生产到缓冲区槽: 11
取走缓冲区槽 9 的数
取走缓冲区槽 10 的数
取走缓冲区槽 11 的数

```