**Network Programming Homework 0**

Deadline: Wednesday, 2025/3/12 23:55

# Description

In this homework, you are given a part of a program and a terminal output of two processes executed simultaneously. You should figure out possible context switch points according to the output.

The left part of page 2 contains a program that periodically reads a number from a file, prints its PID with the number, increases the number by one, and writes the number back to the file. The right part of page 2 shows the output of two processes executed simultaneously (suppose there is only one core). Please analyze the possible situation of every context switch point (marked as (1), (2) ... (9)) and give your answer on page 3.

The **Executing Block** means the section where the process is paused when a context switch happens. You should answer with **“Line x ~ y”** which represents “line x is the last line that we can confirm it’s finished and line y must not have been executed”. For example, “Line 6 ~ 7” means that “line 6 is the last line that we can confirm it’s finished while line 7 must not have been executed”, and “Line 10 ~ 6” means that “line 10 is the last line that we can confirm it’s finished while line 6 (next iteration) must not have been executed”. The **Description** block should contain the reason for your judgment.

You should give the answer based on the output in page 2. DO NOT execute the program. Besides, there may be more than one answer, and you only need to give one reasonable answer with explanation.

# Submission

* You should submit your answer to the E3 system.
* Only submit the answer page.
* You should name your file as **[student\_id].pdf**, for example, “0856000.pdf”.

**ATTENTION! We only accept PDF format.**

* Late submissions are not accepted after the deadline.
* DO NOT use handwriting.

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| --- | --- | --- | --- |
| **Code** | | **Output** | |
| 1  2  3  4  5  6  7  8  9  10  11  12  13 | int main() {      fstream seq\_file("seqno.txt");      int seqno, pid = getpid();      for (int i = 0; i < 20; ++i) {          seq\_file.seekg(ios::beg); /\* rewind before read \*/          seq\_file >> seqno;          cout << "pid=" << pid << ", seq#=" << seqno << endl;          ++seqno;          seq\_file.seekp(ios::beg); /\* rewind before write \*/          seq\_file << seqno << endl;      }      seq\_file.close();  } | pid=186, seq#=1  pid=186, seq#=2  **(1)**  pid=187, seq#=3  pid=187, seq#=4  pid=187, seq#=5  **(2)**  pid=186, seq#=6  pid=186, seq#=7  pid=186, seq#=8  **(3)**  pid=187, seq#=9  pid=187, seq#=10  pid=187, seq#=11  **(4)**  pid=186, seq#=9  pid=186, seq#=10  pid=186, seq#=11  pid=186, seq#=12  **(5)**  pid=187, seq#=12  pid=187, seq#=13  pid=187, seq#=14  pid=187, seq#=15  **(6)** | pid=186, seq#=13  pid=186, seq#=14  pid=186, seq#=15  pid=186, seq#=16  pid=186, seq#=17  **(7)**  pid=187, seq#=18  pid=187, seq#=19  pid=187, seq#=20  pid=187, seq#=21  **(8)**  pid=186, seq#=18  pid=186, seq#=19  pid=186, seq#=20  pid=186, seq#=21  pid=186, seq#=22  pid=186, seq#=23  **(9)**  pid=187, seq#=22  pid=187, seq#=23  pid=187, seq#=24  pid=187, seq#=25  pid=187, seq#=26  pid=187, seq#=27 |

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**Answer**

**Student ID: 110705063**

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| --- | --- | --- | --- |
|  | **Executing Blocks** | | **Description** |
| pid = 186 | pid = 187 |
| **(1)** | Line 10 ~ 6 |  | 由於(1)之後pid 187輸出為3，可知已將seqno寫入檔案。  由於(2)之後pid 186輸出為6，可知此時尚未讀取檔案。 |
| **(2)** |  | Line 10 ~ 6 | 由於(2)之後pid 186輸出為6，可知pid 187在context switch前已將seqno寫入檔案  由於(3)之後pid 187輸出為9，可知pid 187在(2)被切換前尚未讀取檔案 |
| **(3)** | Line 6 ~ 7 |  | 由於(3)之後pid 187輸出為9，可知pid 186在context switch前已將seqno寫入檔案  由於(4)之後pid 186輸出為9，可知pid 186在(3)被切換前已讀取檔案 |
| **(4)** |  | Line 7 ~ 7 | 由於(5)之後pid 187輸出為12，可知pid 187在(4)被切換前可能(未寫入&未讀取) | (已寫入&已讀取)，讀取pid 187自己寫入的seqno；  或假設pid 186在(5)切換時未寫入的話，則pid 187在(4)也可能為(已寫入&未讀取) |
| **(5)** | Line 7 ~ 7 |  | 由於(6)之後pid 186輸出為13，可知pid 186在(5)被切換前可能有(未寫入&未讀取) | (已寫入&已讀取) 兩種情況 |
| **(6)** |  | Line 10 ~ 6 | 由於(6)之後pid 186輸出為13，可知pid 186在context switch前已將seqno寫入檔案  由於(7)之後pid 187輸出為18，可知pid 186在(6)被切換前未讀取檔案 |
| **(7)** | Line 7 ~ 7 |  | 由於(8)之後pid 186輸出為18，可知pid 186在(7)被切換前可能有(未寫入&未讀取) | (已寫入&已讀取) 兩種情況 |
| **(8)** |  | Line 7 ~ 7 | 由於(9)之後pid 187輸出為22，可知pid 186在(8)被切換前可能有(未寫入&未讀取) | (已寫入&已讀取) 兩種情況 |
| **(9)** | Line 7 ~ end |  | 最後一次輸出結束。 |