Important: This is an open book test. You can use any books, notes, or paper, but not exchange anything with other students. You are not allowed to use any electronic/communication devices, including a calculator. *Do not log into the computer during the test.* Any calculations and rough work can be done on the back side of the test pages. You will lose five points for not writing your name.

1. [8 pt] Distinguish between the resource allocator and virtual machine views of the operating systems. Which parts of Unix and Windows correspond to these parts?

2. [8 pt] What is the difference between SIMD and SMP? Which of these two requires the use of multiple CPUs? Is either of them essential for cluster computing?

3. [5 pt] What is cascading process termination? How do you prevent that in Unix systems that support it?

4. [5 pt] Give arguments in favor of and against the transition of process state from `Blocked/Suspended` to `Blocked`.

5. [5 pt] Does the bakery algorithm to solve critical section problem guarantee bounded wait condition. Explain your yes or no answer.

6. [6 pt] Differentiate between multiprogramming, multiprocessing, and multitasking operating systems?

7. [6 pt] In the multiple process solution (solution 4 in notes), we have a `do-while` loop in entry section that is controlled by the statement

```
do
    ...
while ( j < n ) || ( turn != i && flag[turn] != idle );
```

What is the effect if we remove the testing of condition `turn != i` from this loop control?