

科目：作業系統 B

日期：109 年 7 月 15 日 第 1 頁 共 2 頁

請 “✓” 明 ✓不可看書 可看書

* 請將答案依題號順序寫入答案卷

答題時字跡需工整，否則不予計分。Write your answers legibly; otherwise you will get zero score.

1. (10 pts) Assume that we have a program with three running threads as follows, where x is a pre-initialized mutex object.

Thread 1	Thread 2	Thread 3
<pre>while(1) { pthread_mutex_lock(&x); cnt++; pthread_mutex_unlock(&x); }</pre>	<pre>while(1) { pthread_mutex_lock(&x); cnt++; pthread_mutex_unlock(&x); }</pre>	<pre>while(1) { pthread_mutex_lock(&x); cnt++; pthread_mutex_unlock(&x); }</pre>

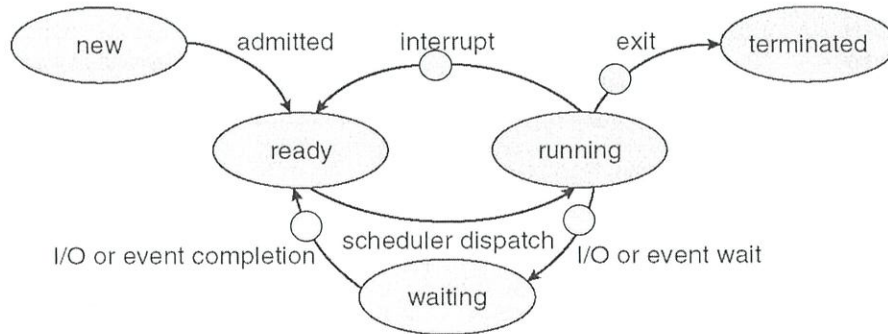
Let r be the rate of cnt (i.e., the increase in the value of cnt per second) and assume that we deploy the program on a machine with n CPU cores.

Plot the relation between r and n for $n=1\sim 8$.

2. (10 pts) If we run a program twice, which of the following might cause the two executions to generate different results?
- A. CPU scheduler states
 - B. Filesystem states
 - C. Process states of the other programs running on the system
 - D. The mapping of pages to physical frames
 - E. User inputs
3. (10 pts) Which of the following are true regarding the use of high-speed SSDs (solid state drives)?
- A. Loading time of a program can be reduced
 - B. Memory swapping will be faster
 - C. CPU intensive workload will run faster
 - D. Memory intensive workload will run faster
 - E. The performance overhead caused by file system fragmentation will be less significant
4. (10 pts) Mark on the following diagram of process state the time points when a *preemptive* scheduler will be invoked.

科目：作業系統 B

日期：109 年 7 月 15 日 第 2 頁 共 2 頁



5. (10 pts) Which of the following are true regarding the UNIX discretionary access control mechanism (i.e., the one that is configured by the `chmod` and `chown` commands)?
- A. Need root privilege to change the owner of a file
 - B. The owner of a file can control the access permissions of the file
 - C. The root can control the access permissions of a file even if he/she is not the owner of the file
 - D. The access control list information is stored in the directory (same as how the filename information is stored)
 - E. The access control will remain effective even if we remove the disk and mount the disk on another system.

◎請用深黑色鋼筆或原子筆出題

命題老師簽名：