

每題 12 分（除第 4 題），斟酌扣分（小錯皆扣一分）

1.

## A program vs. a process



- **Program:**
  - a set of instructions
- **Process:**
  - the **activity of executing a program**
  - **Process Status table**
- A program can be run multiple times, each instance/activity called a process
- **Interprocess communication (IPC)**
  - The communication between processes from running one or more programs

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2. 16 processes

3.

- **Virtual memory:**
  - Employ the physical memory and disk space
  - Create the **illusion** of a larger memory space
  - To facilitate the mapping, memory is grouped into **pages** (the basic memory unit).
  - Paging:
    - shuffle **pages** between main memory and disk.

4. 每選項 3 分，共 16 分

## Deadlock



- Processes **block** each other from continuing because each is waiting for a resource that **is allocated to another**
- Conditions required for **deadlock**
  - 1. **Mutual exclusion:**
    - Competition for non-sharable resources
  - 2. **Hold and wait:**
    - Resources requested on a partial basis
  - 3. **No preemption :**
    - An allocated resource can not be **forcibly retrieved**
  - 4. **Circular wait**

Remove any one of the conditions can resolve the deadlock

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5. TOO SHORT: context switch 太過頻繁，反而沒有時間處理 process

TOO LONG: 可能會造成一個 task 浪費太多時間，無法及時處理 short time task 以至於卡頓

6.  $5 * 10^7$  instructions

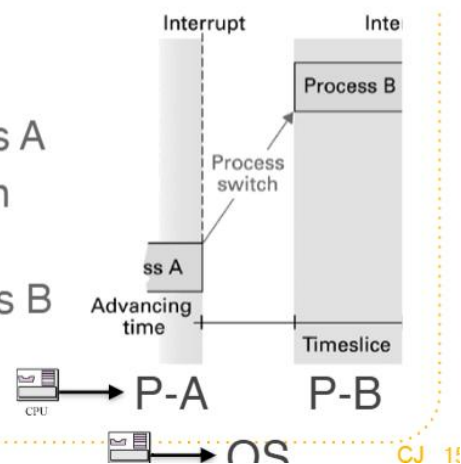
7. 令多個 process 能共享單一 CPU 資源

8.

## The steps of Context Switch



- 1. Get an **interrupt** from timer
- 2. Go to the interrupt handler
  - Save the context of process A
  - Find a process **ready** to run (Assume that is process B)
  - Load** the context of process B
- 3. Start (continue) process B



CJ 1!