Process Description

？问题：

OS如何感知进程、控制进程及其所用的系统资源？

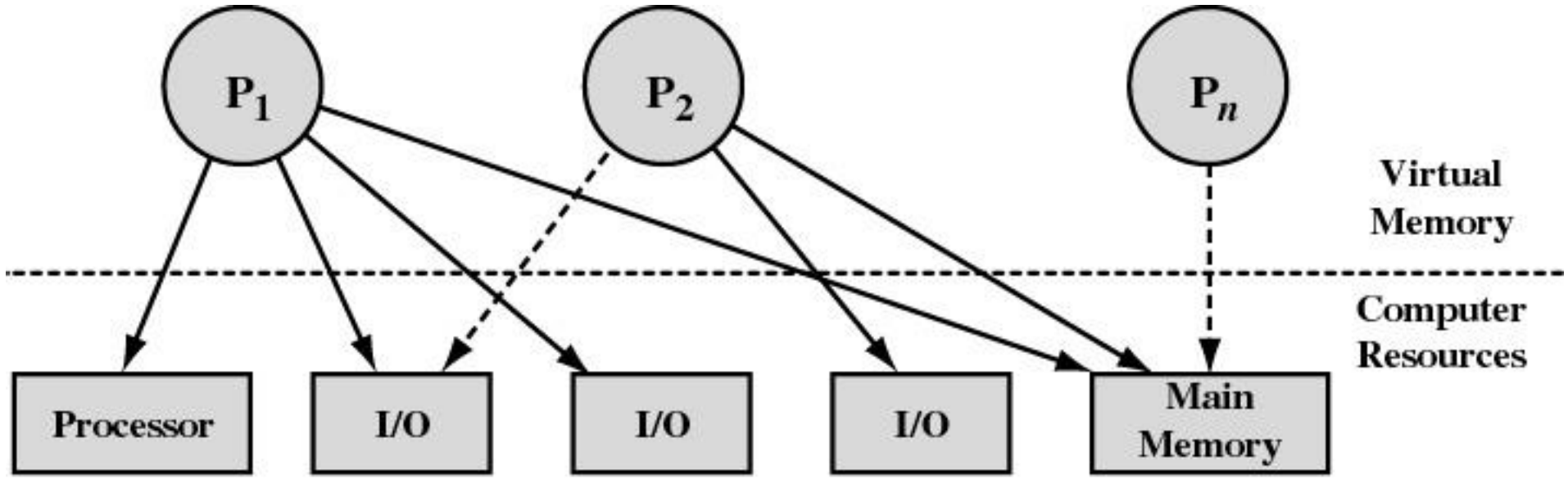

Figure 3.9 Processes and Resources (resource allocation at one snapshot in time)

Operating System Control Structures

- **Information about the current status of each process and resource**
- **Tables are constructed for each entity the operating system manages**
  - ***Memory Tables***
  - ***I/O Tables***
  - ***File Tables***
  - ***Process Table***

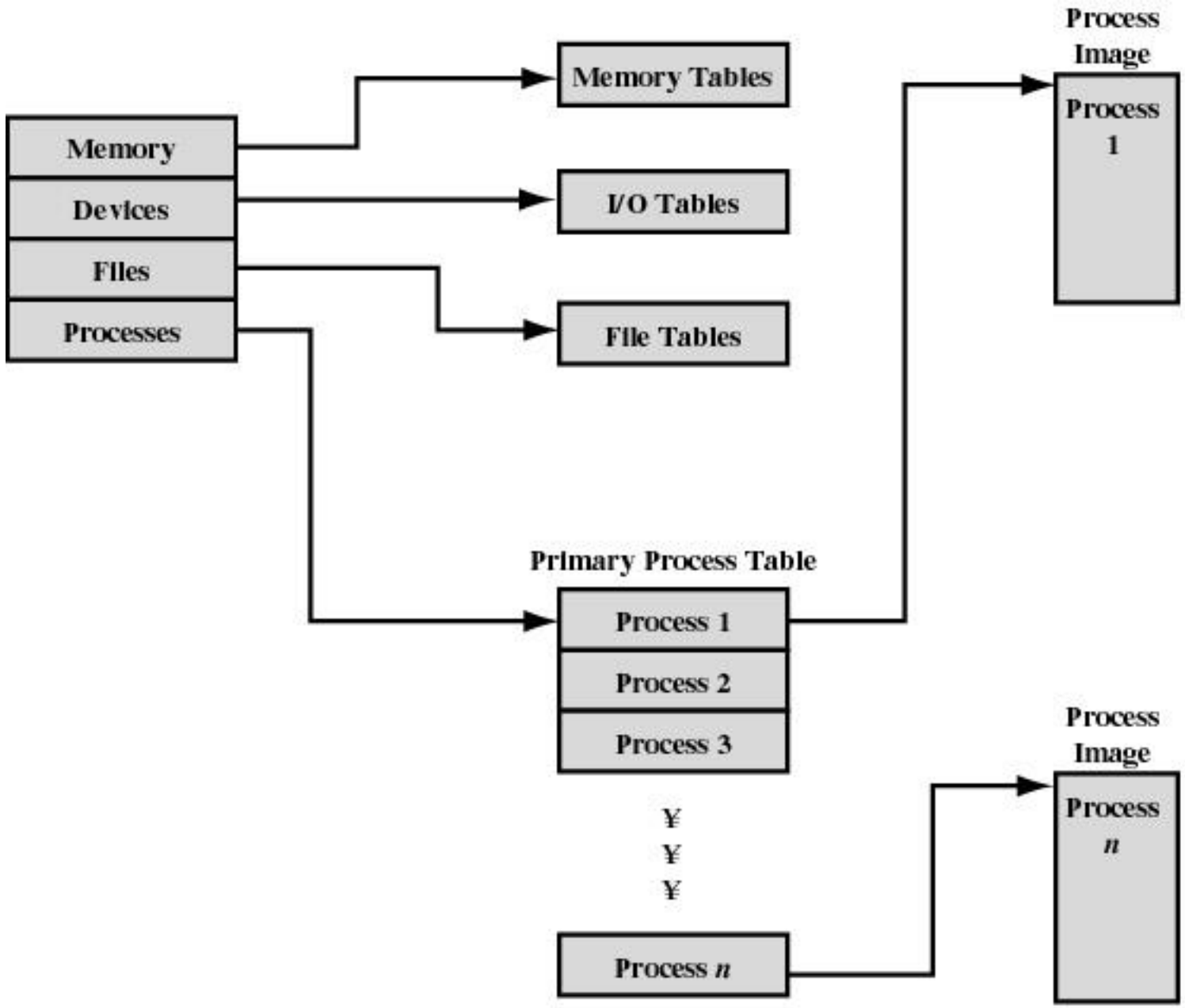

Figure 3.10 General Structure of Operating System Control Tables

Memory Tables

- **Allocation of main memory to processes.**
- **Allocation of secondary memory to processes.**
- **Protection attributes for access to shared memory regions.**
- **Information needed to manage virtual memory（虚拟存储）.**

I/O Tables

- **I/O device is available or assigned.**
- **Status of I/O operation.**
- **Location in main memory being used as the source or destination of the I/O transfer.**

File Tables

- **Existence of files.**
- **Location on secondary memory.**
- **Current Status.**
- **Attributes.**
- **Sometimes this information is maintained by a file-management system.**

Process Table

- **Where process is located.**
- **Attributes necessary for its management.**
  - **Process ID**
  - **Process state**
  - **Location in memory**

Process Location

- Process includes set of programs to be executed.
  - Data locations for local and global variables.
  - Any defined constants.
  - Stack.
- Process control block（PCB）.
  - Collection of attributes.
- Process image（进程映像）
  - Collection of program, data, stack, and attributes.

Process Image

- User Data
- User Program
- System Stack：存放系统及过程调用地址、参数
- Process Control Block（PCB）：OS感知进程、控制进程的数据结构