第八章 主存管理

1. **Explain the difference between internal and external fragmentation.**

2. **Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (in order), how would each of the first-fit, best-fit, and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB, and 426 KB (in order)? Which algorithm makes the most efficient use of memory?**

3. **Consider a paging system with the page table stored in memory.**
   a. If a memory reference takes 200 nanoseconds, how long does a paged memory reference take?
   b. If we add TLBs, and 75 percent of all page-table reference are found in the TLBs, what is the effective memory reference time?(Assume that finding a page-table entry in the TLBs takes zero time, if the entry is there)

1. 内部碎片：指为进程分配的内存块大于进程实际需要的内存量，导致该内存块内部出现未被利用的空间。

外部碎片：指内存中存在多个分散的小空闲块，每个空闲块单独无法满足进程的内存需求，但所有空闲块的总容量足够，这是由于动态内存分配后，回收的空闲空间不连续，导致无法为大进程分配连续内存的问题。

2. 首次适应：100KB 176KB 200KB 300KB 183KB (426K 未分配)

500 − 212 − 112 = 176，600 − 417 = 183

最佳适应：100K 83K 88K 88K 174K

500 − 417 = 83K，200 − 112 = 88K，300 − 212 = 88K，600 − 426 = 174K

最差适应：100K 83K 200K 300K 276K (426K 未分配)

500 − 417 = 83K，600 − 212 − 112 = 276K

最佳适应算法的总利用率高

3.

(a) 内存引用需要两次内存访问：① 页表 ② 访问实际内存

$t = 200 + 200 = 400ns$

(b)

$$t = 75\% \times 200 + (1 - 75\%) \times 400$$

$$= 150 + 100 = 250\,ns$$