

上海交通大学试卷 (A 卷)

(2020 至 2021 学年 第 2 学期)

班级号_____ 学号_____ 姓名 _____

课程名称_____ 计算机系统基础 (组成) _____ 成绩 _____

Problem 1: Cache

1. 32 bytes

2. [1] 8 [2] 2 [3] 2

3. [1] H [2] 0xAB [3] H [4] 0x93

[5] M [6] - [7] H [8] 0xCC

[9] M [10] -

4. 1/2

5. No, (Reorder line 8 and 7 does not reduce miss rate)

6. B. Increasing the block size enables filling more elements in each cache line, thus reduce the miss rate.

Problem 2: Linking

1. 6 12

2. [1] 4 [2] OBJECT [3] COM [4] 00000000

[5] 0 [6] NOTYPE [7] UND [8] OBJECT

[9] .data [10] 00000004 [11] 4 [12] OBJECT

我承诺，我将严
格遵守考试纪律。

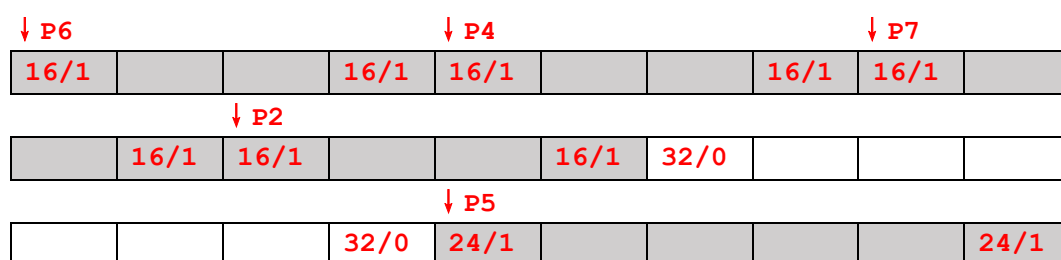
题号	1	2	3	4	5				
得分									
批阅人(流水阅 卷教师签名处)									

3. [1] b [2] -4
- [3] R_X86_64_PC32 [4] array [5] -4
- [6] R_X86_64_PC32 [7] a [8] -4
- [9] R_X86_64_PC32 [10] -4

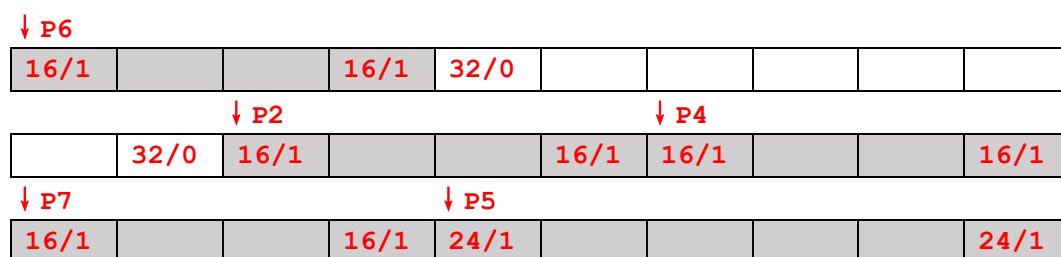
4. [1] 0x0686
- [2] 0x0676 [3] addr(foo)
- [4] addr(sprintf) [5] addr(foo)

Problem 3: Memory Allocation

1.



2.



3. 52 bytes

Problem 4: Address Translation

1. [1] 0x000 [2] 0x002 [3] 0x8F0 [4] 0x9F61

2. Yes. Entry A will be filled.

3. [1] Not-X [2] 1 [3] 1 [4] --

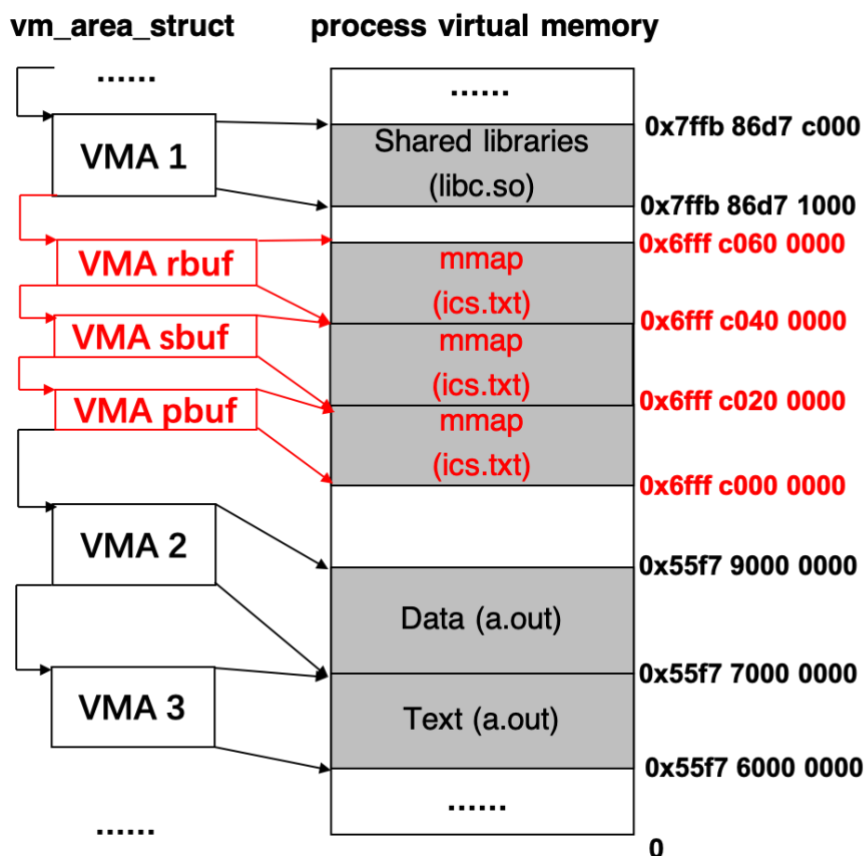
[5] -- [6] U [7] W [8] 1

4. 500 (data) + 1 (page table) = 501

Problem 5: Memory Mapping

1. mmap() supports fast file copying by allowing file transfers without copying into user space.

2.



3. [1] `PROT_READ | PROT_WRITE`

[2] `PROT_READ | PROT_WRITE | PROT_EXEC`

[3] `PROT_READ`

4. No. Because the access permission of the pbuf, sbuf and rbuf is unchanged between Label B and Label D.

(Note: The "`vm_prot`" describes the read/write permissions for all of the pages contained in the vma. It is used by kernel to record the access rights of the process's virtual pages, and is different from P/W/X bits in its corresponding PTEs)

5. Page fault: 1536 (512 + 512 + 512). COW: 512. 512 and 512 page faults will occur at Line 15 and Line 16 respectively since the PTEs for pbuf and sbuf are zero when program arrives at Label B. When pbuf is read at Line 16, its PTE is flagged with read-only. Then 512 page faults occur at Line 17, since there is write on pubf. Also 512 COW at Line 17 are handled.