

CA(12) 《线程级并行性》课后作业

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1.

(1) $C0: R, AC20 \rightarrow C0.L0: (S, AC20, 0020)$

(2) $C0: W, AC20 < - - 80 \rightarrow C0.L0: (M, AC20, 0080), C3.L0: (I, AC20, 0020)$

(3) $C3: W, AC20 < - - 80 \rightarrow C3.L0: (M, AC20, 0080)$

(4) $C1: R, AC10 \rightarrow C1.L2: (S, AC10, 0010)$

(5) $C0: W, AC08 < - - 48 \rightarrow C0.L1(M, AC08, 0048), C3.L1: (I, AC08, 0008)$

(6) $C0: W, AC30 < - - 78 \rightarrow C0.L2: (M, AC30, 0078), M: AC10 \leftarrow 0030$

(7) $C3: W, AC30 < - - 78 \rightarrow C3.L2: (M, AC30, 0078)$ 或
 $C3.L3: (M, AC30, 0078)$

2.

a)

C3: R, M4

缓存状态:

C3 L0: S, M0, 0x0404(x)

目录状态:

M0:0x0404, DS, 00001000(x)

消息:

- 读需求: 011→100
- 数据回应: 0x0404, 100→011

C3: R, M2

缓存状态:

C3 L0: S, M2, 0x0202

目录状态

M4:0x0404, DI, 00000000(x)

M2:0x0202, DS, 00001000

消息:

- 无效: 011→010
- 读需求: 011→010
- 数据回应: 0x0202, 010→011

C7: W, M4 <-- 0xaaaa

缓存状态:

C7.L0:M,M4,0xaaaa(x)

目录状态:

M4:0x0404,DM,10000000(x)

消息:

- 写需求: 111→100
- 数据回应: 0x0404, 100→111

C1: W, M4 <-- 0xbbbb

缓存状态:

C7.L0:S,M4,0xaaaa(x)

C1.L0:M,M4,0xbbbb

C7.L0:I,M4,0xaaaa

目录状态:

M4:0x0404,DM,10000000(x)

M4:0xaaaa,DM,000000010

消息:

- 写需求:001->100
- 读需求:100->111
- 数据回应:0xaaaa,111->100
- 数据回应:0xaaaa,100->001
- 无效:100->111

b)

C3: R, M0

缓存状态:

C3.L0:S,M0,0x0000(x)

目录状态:

M0:0x0000,DS,00001000(x)

消息:

- 读需求: 011→000
- 数据回应: 0x0000, 000→011

C3: R, M2

缓存状态:

C3.L0:S,M2,0x0202

目录状态:

M0:0x0000,DI,00000000(x)

M2:0x0202,DS,00001000

消息:

- 无效: 011→000
- 读需求: 011→010
- 数据回应: 0x0202, 010→110

C6: W, M4 <-- 0xaaaa

缓存状态:

C6.L0:M,M4,0xaaaa(x)

目录状态:

M4:0x0404,DM,01000000(x)

消息:

- 写需求: 110→100
- 数据回应: 0x0404, 100→110

C3: W, M4 <-- 0xbbbb

缓存状态:

C6.L0:S,M4,0xaaaa(x)

C3.L0:M,M4,0xbbbb

C6.L0:I,M4,0xaaaa

目录状态:

M4:0x0404,DM,01000000(x)

M4:0xaaaa,DM,00001000

消息:

写需求:011→100

读需求:100->110

数据回应:0xaaaa,110→100

数据回应:0xaaaa,100→011

无效:100→110

c)

C0: R, M7

缓存状态:

C0.L0:S,M7,0x0707

目录状态:

M7:0x0707,DS,00000001

消息:

RRq:000→111

DRp:0x0707,111→000

C3: R, M4

缓存状态:

C3.L0:S,M4,0x0404

目录状态:

M4:0x0404,DS,00001000

消息:

读需求:011→100

数据回应:0x0404,100→011

C6: W, M2 <-- 0xaaaa

缓存状态:

C6.L0:M,M2,0xaaaa(x)

目录状态:

M2:0x0202,DM,01000000(x)

消息:

写需求:110→010

数据回应:0x0202,010→110

C2: W, M2 <-- 0xbbbb

缓存状态:

C6.L0:S,M2,0xaaaa(x)

C2.L0:M,M2,0xbbbb

C6.L0:I,M2,0xaaaa

目录状态:

M2:0x0202,DM,01000000(x)

M2:0xaaaa,DM,00000100

消息:

写需求:010->010

读需求:010->110

数据回应:0xaaaa,110->010

数据回应:0xaaaa,010->010

无效:010->110