Java synchronized

ReentrantLock

CAS

write_condition
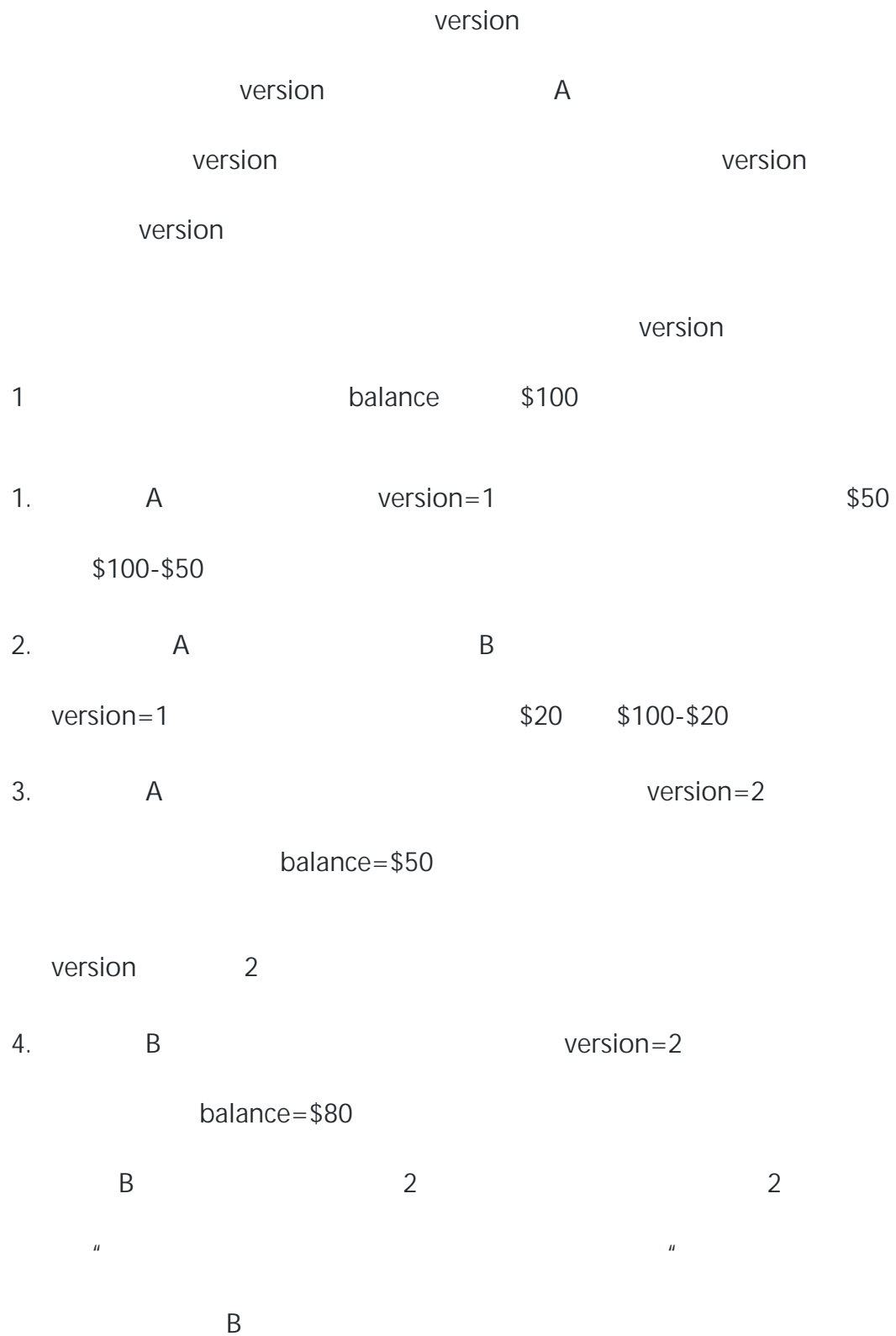
Java `java.util.concurrent.atomic`

CAS

retry

CAS

1.

version

version   A

version   version

version

version

1   balance $100

1.   A   version=1 $50

$100-$50

2.   A   B

version=1 $20 $100-$20

3.   A   version=2

balance=$50

version   2

4.   B   version=2

balance=$80

B   2   2

"   "

B

B　　　　version=1

A

2. CAS

compare and swap

Non-blocking

Synchronization　　**CAS**

- V

- A

- B

V　　　A　　CAS　　　　　　B　　V

ABA

1 ABA

V　　　　　　　A

A

A CAS

CAS **"ABA"**

JDK 1.5 `AtomicStampedReference`

`compareAndSet`

2

CAS

CPU JVM pause

pause

de-pipeline , CPU

memory order violation CPU

CPU pipeline flush CPU

3

CAS CAS

JDK 1.5 `AtomicReference`

CAS .

`AtomicReference`

CAS synchronized

CAS

synchronized

1.   synchronized

cpu   CAS

2.   CAS

          CPU   synchronized

Java   synchronized

"   "   JavaSE 1.6

synchronized

Lock-Free

CAS

CAS