

نتائج الاختبارات :

الاختبار ب 4 نياسب وطول 20000

ADD Synchronization execution task: 1265 ms

List length after add: 17676

Contain Synchronization execution task: 2928 ms

Total number of successes found: 4397, failures found: 15603

Remove Synchronization execution task: 2633 ms

List length after remove: 13906

Total number of successes removed: 3770, failures removed: 16230

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ADD RWLock execution task: 3607 ms

List length after add: 17676

Contain RWLock execution task: 673 ms

Total number of successes found: 4397, failures found: 15603

Remove RWLock execution task: 2198 ms

List length after remove: 13906

Total number of successes removed: 3770, failures removed: 16230

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ADD Lock execution task: 4073 ms

List length after add: 17676

Contain Lock execution task: 7817 ms

Total number of successes found: 4397, failures found: 15603

Remove Lock execution task: 6971 ms

List length after remove: 13906

Total number of successes removed: 3770, failures removed: 16230

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الاختبار ب 4 نياسب وطول 50000

ADD Synchronization execution task: 7399 ms

List length after add: 37255

Contain Synchronization execution task: 24842 ms

Total number of successes found: 23420, failures found: 26580

Remove Synchronization execution task: 16293 ms

List length after remove: 19979

Total number of successes removed: 17276, failures removed: 32724

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ADD RWLock execution task: 17140 ms

List length after add: 37255

Contain RWLock execution task: 6026 ms

Total number of successes found: 23420, failures found: 26580

Remove RWLock execution task: 26297 ms

List length after remove: 19979

Total number of successes removed: 17276, failures removed: 32724

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ADD Lock execution task: 11556 ms

List length after add: 37255

Contain Lock execution task: 23415 ms

Total number of successes found: 23420, failures found: 26580

Remove Lock execution task: 18819 ms

List length after remove: 19979

Total number of successes removed: 17276, failures removed: 32724

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الاختبار ب 4 نياسب وطول 100000

ADD Synchronization execution task: 33023 ms

List length after add: 57018

Contain Synchronization execution task: 102824 ms

Total number of successes found: 71172, failures found: 28828

Remove Synchronization execution task: 19254 ms

List length after remove: 16326

Total number of successes removed: 40692, failures removed: 59308

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ADD RWLock execution task: 67265 ms

List length after add: 57018

Contain RWLock execution task: 19697 ms

Total number of successes found: 71172, failures found: 28828

Remove RWLock execution task: 64654 ms

List length after remove: 16326

Total number of successes removed: 40692, failures removed: 59308

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ADD Lock execution task: 54709 ms

List length after add: 57018

Contain Lock execution task: 112906 ms

Total number of successes found: 71172, failures found: 28828

Remove Lock execution task: 63605 ms

List length after remove: 16326

Total number of successes removed: 40692, failures removed: 59308

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الاختبار ب 8 نياسب وطول 20000

ADD Synchronization execution task: 2058 ms

List length after add: 17676

Contain Synchronization execution task: 4565 ms

Total number of successes found: 4397, failures found: 15603

Remove Synchronization execution task: 4124 ms

List length after remove: 13906

Total number of successes removed: 3770, failures removed: 16230

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ADD RWLock execution task: 2518 ms

List length after add: 17676

Contain RWLock execution task: 483 ms

Total number of successes found: 4397, failures found: 15603

Remove RWLock execution task: 4129 ms

List length after remove: 13906

Total number of successes removed: 3770, failures removed: 16230

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ADD Lock execution task: 2215 ms

List length after add: 17676

Contain Lock execution task: 4017 ms

Total number of successes found: 4397, failures found: 15603

Remove Lock execution task: 3605 ms

List length after remove: 13906

Total number of successes removed: 3770, failures removed: 16230

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الاختبار بـ 8 نياسب وطول 50000

ADD Synchronization execution task: 13165 ms

List length after add: 37255

Contain Synchronization execution task: 25405 ms

Total number of successes found: 23420, failures found: 26580

Remove Synchronization execution task: 12651 ms

List length after remove: 19979

Total number of successes removed: 17276, failures removed: 32724

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ADD RWLock execution task: 5376 ms

List length after add: 37255
Contain RWLock execution task: 1690 ms
Total number of successes found: 23420, failures found: 26580
Remove RWLock execution task: 9076 ms
List length after remove: 19979
Total number of successes removed: 17276, failures removed: 32724

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ADD Lock execution task: 8267 ms
List length after add: 37255
Contain Lock execution task: 15732 ms
Total number of successes found: 23420, failures found: 26580
Remove Lock execution task: 13869 ms
List length after remove: 19979
Total number of successes removed: 17276, failures removed: 32724

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الاختبار ب 8 نياسب وطول 100000
ADD Synchronization execution task: 33093 ms
List length after add: 57018
Contain Synchronization execution task: 49239 ms
Total number of successes found: 71172, failures found: 28828
Remove Synchronization execution task: 30552 ms
List length after remove: 16326
Total number of successes removed: 40692, failures removed: 59308

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ADD RWLock execution task: 31535 ms
List length after add: 57018
Contain RWLock execution task: 7524 ms
Total number of successes found: 71172, failures found: 28828

Remove RWLock execution task: 30394 ms

List length after remove: 16326

Total number of successes removed: 40692, failures removed: 59308

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ADD Lock execution task: 28330 ms

List length after add: 57018

Contain Lock execution task: 49121 ms

Total number of successes found: 71172, failures found: 28828

Remove Lock execution task: 31299 ms

List length after remove: 16326

Total number of successes removed: 40692, failures removed: 59308

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الاختبار ب 16 نياسب وطول 20000

ADD Synchronization execution task: 1200 ms

List length after add: 17676

Contain Synchronization execution task: 2776 ms

Total number of successes found: 4397, failures found: 15603

Remove Synchronization execution task: 2403 ms

List length after remove: 13906

Total number of successes removed: 3770, failures removed: 16230

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ADD RWLock execution task: 1217 ms

List length after add: 17676

Contain RWLock execution task: 538 ms

Total number of successes found: 4397, failures found: 15603

Remove RWLock execution task: 660 ms

List length after remove: 13906

Total number of successes removed: 3770, failures removed: 16230

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ADD Lock execution task: 1189 ms

List length after add: 17676

Contain Lock execution task: 2548 ms

Total number of successes found: 4397, failures found: 15603

Remove Lock execution task: 2385 ms

List length after remove: 13906

Total number of successes removed: 3770, failures removed: 16230

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الاختبار ب 16 نياسب وطول 50000

ADD Synchronization execution task: 7626 ms

List length after add: 37255

Contain Synchronization execution task: 16198 ms

Total number of successes found: 23420, failures found: 26580

Remove Synchronization execution task: 11595 ms

List length after remove: 19979

Total number of successes removed: 17276, failures removed: 32724

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ADD RWLock execution task: 8271 ms

List length after add: 37255

Contain RWLock execution task: 2405 ms

Total number of successes found: 23420, failures found: 26580

Remove RWLock execution task: 12194 ms

List length after remove: 19979

Total number of successes removed: 17276, failures removed: 32724

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ADD Lock execution task: 7939 ms

List length after add: 37255

Contain Lock execution task: 16181 ms

Total number of successes found: 23420, failures found: 26580

Remove Lock execution task: 13113 ms

List length after remove: 19979

Total number of successes removed: 17276, failures removed: 32724

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الاختبار ب 16 نياسب وطول 100000

ADD Synchronization execution task: 30454 ms

List length after add: 57018

Contain Synchronization execution task: 56261 ms

Total number of successes found: 71172, failures found: 28828

Remove Synchronization execution task: 37906 ms

List length after remove: 16326

Total number of successes removed: 40692, failures removed: 59308

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ADD RWLock execution task: 31746 ms

List length after add: 57018

Contain RWLock execution task: 7255 ms

Total number of successes found: 71172, failures found: 28828

Remove RWLock execution task: 31009 ms

List length after remove: 16326

Total number of successes removed: 40692, failures removed: 59308

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ADD Lock execution task: 31549 ms

List length after add: 57018

Contain Lock execution task: 60353 ms

Total number of successes found: 71172, failures found: 28828

Remove Lock execution task: 12330 ms

List length after remove: 16326

Total number of successes removed: 40692, failures removed: 59308

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تحليل النتائج :

السبب	الأسوأ	الأفضل	العملية
قراءات متوازية vs قفل كامل	Synchronized	RWLock	البحث (Contain)
نفقات RWLock الإضافية	RWLock	Synchronized	الإضافة (Add)
تحسينات إدارة القفل	Lock	RWLock	الحذف (Remove)

ترتيب الأداء النهائي:

1- عمليات البحث: (Contain)

RWLock → Synchronized → Lock

2- عمليات الإضافة: (Add)

Synchronized → Lock → RWLock

3- عمليات الحذف: (Remove)

RWLock → Synchronized → Lock

لتحسين الأداء:

1. للقوائم كثيرة القراءة: استخدم RWLock دائماً

2. للقوائم كثيرة الكتابة Synchronized: قد يكون أفضل

3. للتطبيقات المختلطة RLock: يقدم أفضل توازن

تفسير اعداد الفشل والنجاحات:

Successes: 4,397 | Failures: 15,603

السبب :

نطاق الأرقام : 80000

عدد المحاولات : 20000

معظم محاولات الفشل الإضافية تمنع التكرار .