

1、串行gc (java -XX:+UseSerialGC -Xms512m -Xmx512m -XX:+PrintGCDetails -XX:+PrintGCDateStamps GCLogAnalysis) jdk8

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[kuzhudeMacBook-Pro:81jvm环境准备说明 root# java -XX:+UseSerialGC -Xms512m -Xmx512m -XX:+PrintGCDetails -XX:+PrintGCDateStamps GCLogAnalysis
正在执行 ...
2021-11-16T10:40:43.513-0800: [GC (Allocation Failure) 2021-11-16T10:40:43.513-0800: [DefNew: 139776K->17471K(157248K), 0.0275305 secs] 139776K->44247K(506816K), 0.0275860 secs] [Times: user=0.02 sys=0.01, real=0.03 secs]
2021-11-16T10:40:43.578-0800: [GC (Allocation Failure) 2021-11-16T10:40:43.578-0800: [DefNew: 157247K->17471K(157248K), 0.0528615 secs] 184023K->394795K(506816K), 0.0529037 secs] [Times: user=0.03 sys=0.02, real=0.06 secs]
2021-11-16T10:40:43.655-0800: [GC (Allocation Failure) 2021-11-16T10:40:43.655-0800: [DefNew: 157238K->17471K(157248K), 0.0318045 secs] 234562K->138915K(506816K), 0.0318435 secs] [Times: user=0.02 sys=0.02, real=0.03 secs]
2021-11-16T10:40:43.709-0800: [GC (Allocation Failure) 2021-11-16T10:40:43.709-0800: [DefNew: 157247K->17471K(157248K), 0.0314488 secs] 278691K->183001K(506816K), 0.0314884 secs] [Times: user=0.02 sys=0.01, real=0.04 secs]
2021-11-16T10:40:43.767-0800: [GC (Allocation Failure) 2021-11-16T10:40:43.767-0800: [DefNew: 157214K->17471K(157248K), 0.0362791 secs] 322743K->231748K(506816K), 0.0363184 secs] [Times: user=0.02 sys=0.02, real=0.04 secs]
2021-11-16T10:40:43.828-0800: [GC (Allocation Failure) 2021-11-16T10:40:43.828-0800: [DefNew: 157247K->17468K(157248K), 0.0309598 secs] 371524K->274251K(506816K), 0.0310022 secs] [Times: user=0.01 sys=0.01, real=0.03 secs]
2021-11-16T10:40:43.881-0800: [GC (Allocation Failure) 2021-11-16T10:40:43.881-0800: [DefNew: 157244K->17472K(157248K), 0.0367354 secs] 414027K->322560K(506816K), 0.0367839 secs] [Times: user=0.02 sys=0.02, real=0.03 secs]
2021-11-16T10:40:43.939-0800: [GC (Allocation Failure) 2021-11-16T10:40:43.939-0800: [DefNew: 157248K->157248K(157248K), 0.0000160 secs] 2021-11-16T10:40:43.939-0800: [Tenured: 305088K->265150K(349568K), 0.0470724 secs] 462336K->265150K(506816K), [Metaspace: 2578K->2578K(1056768K)], 0.0471386 secs] [Times: user=0.04 sys=0.00, real=0.05 secs]
2021-11-16T10:40:44.009-0800: [GC (Allocation Failure) 2021-11-16T10:40:44.009-0800: [DefNew: 139776K->17471K(157248K), 0.0072786 secs] 404926K->311483K(506816K), 0.0073165 secs] [Times: user=0.00 sys=0.00, real=0.01 secs]
2021-11-16T10:40:44.037-0800: [GC (Allocation Failure) 2021-11-16T10:40:44.037-0800: [DefNew: 157247K->17471K(157248K), 0.0308859 secs] 451259K->356874K(506816K), 0.0309411 secs] [Times: user=0.01 sys=0.01, real=0.03 secs]
2021-11-16T10:40:44.080-0800: [GC (Allocation Failure) 2021-11-16T10:40:44.080-0800: [DefNew: 157247K->157247K(157248K), 0.0000161 secs] 2021-11-16T10:40:44.080-0800: [Tenured: 339402K->298093K(349568K), 0.0506783 secs] 496650K->298093K(506816K), [Metaspace: 2578K->2578K(1056768K)], 0.0507445 secs] [Times: user=0.06 sys=0.00, real=0.06 secs]
2021-11-16T10:40:44.165-0800: [GC (Allocation Failure) 2021-11-16T10:40:44.165-0800: [DefNew: 139776K->17472K(157248K), 0.0067399 secs] 437869K->342507K(506816K), 0.0067755 secs] [Times: user=0.01 sys=0.00, real=0.01 secs]
2021-11-16T10:40:44.193-0800: [GC (Allocation Failure) 2021-11-16T10:40:44.193-0800: [DefNew: 157248K->157248K(157248K), 0.0000263 secs] 2021-11-16T10:40:44.193-0800: [Tenured: 325035K->310423K(349568K), 0.0511070 secs] 482283K->310423K(506816K), [Metaspace: 2578K->2578K(1056768K)], 0.0511861 secs] [Times: user=0.05 sys=0.00, real=0.05 secs]
2021-11-16T10:40:44.271-0800: [GC (Allocation Failure) 2021-11-16T10:40:44.271-0800: [DefNew: 139776K->139776K(157248K), 0.0000158 secs] 2021-11-16T10:40:44.271-0800: [Tenured: 310423K->292183K(349568K), 0.0510444 secs] 450199K->292183K(506816K), [Metaspace: 2578K->2578K(1056768K)], 0.0519324 secs] [Times: user=0.05 sys=0.00, real=0.05 secs]
2021-11-16T10:40:44.345-0800: [GC (Allocation Failure) 2021-11-16T10:40:44.345-0800: [DefNew: 139776K->17471K(157248K), 0.0062911 secs] 431959K->334709K(506816K), 0.0063270 secs] [Times: user=0.01 sys=0.00, real=0.01 secs]
2021-11-16T10:40:44.374-0800: [GC (Allocation Failure) 2021-11-16T10:40:44.374-0800: [DefNew: 157247K->157247K(157248K), 0.0000163 secs] 2021-11-16T10:40:44.374-0800: [Tenured: 317237K->314718K(349568K), 0.0465074 secs] 474485K->314718K(506816K), [Metaspace: 2578K->2578K(1056768K)], 0.0465733 secs] [Times: user=0.04 sys=0.00, real=0.05 secs]
执行结束!共生成对象次数:8436
Heap
def new generation      total 157248K, used 5265K [0x00000007a0000000, 0x00000007aaaa0000, 0x00000007aaaa0000)
  eden space 139776K,    4% used [0x00000007a0000000, 0x00000007a05d3460, 0x00000007a8800000)
    from space 17472K,   0% used [0x00000007a9990000, 0x00000007a9990000, 0x00000007aaaa0000)
    to   space 17472K,   0% used [0x00000007a8800000, 0x00000007a8800000, 0x00000007a9990000)
tenured generation      total 349568K, used 314718K [0x00000007aaaa0000, 0x00000007c0000000, 0x00000007c0000000)
  the space 349568K,    90% used [0x00000007aaaa0000, 0x00000007bddf7900, 0x00000007bddf7a00, 0x00000007c0000000)
Metaspace                used 2584K, capacity 4486K, committed 4864K, reserved 1856768K
class space              used 278K, capacity 386K, committed 512K, reserved 1048576K
kuzhudeMacBook-Pro:81jvm环境准备说明 root#
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2、并行gc (java -XX:+UseParallelGC -Xms512m -Xmx512m -XX:+PrintGCDetails -XX:+PrintGCDateStamps GCLogAnalysis)

a:堆内存512M gc情况

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kuzhudeMacBook-Pro:~$ java -XX:+UseParallelGC -Xms512m -Xmx512m -XX:+PrintGCDetails -XX:+PrintGCDateStamps GLogAnalysis
正在执行...
2021-11-16T10:46:42.237-0800: [GC (Allocation Failure) [PSYoungGen: 131584K->21487K(153088K)] 131584K->44011K(502784K), 0.0129946 secs] [Times: user=0.02 sys=0.07, real=0.02 secs]
2021-11-16T10:46:42.275-0800: [GC (Allocation Failure) [PSYoungGen: 153071K->21495K(153088K)] 175595K->83123K(502784K), 0.0216638 secs] [Times: user=0.03 sys=0.08, real=0.02 secs]
2021-11-16T10:46:42.329-0800: [GC (Allocation Failure) [PSYoungGen: 153079K->21503K(153088K)] 214707K->129169K(502784K), 0.0187403 secs] [Times: user=0.04 sys=0.05, real=0.02 secs]
2021-11-16T10:46:42.377-0800: [GC (Allocation Failure) [PSYoungGen: 153087K->21495K(153088K)] 260753K->176237K(502784K), 0.020716 secs] [Times: user=0.06 sys=0.07, real=0.03 secs]
2021-11-16T10:46:42.428-0800: [GC (Allocation Failure) [PSYoungGen: 153095K->21498K(153088K)] 307821K->215797K(502784K), 0.0238070 secs] [Times: user=0.05 sys=0.07, real=0.03 secs]
2021-11-16T10:46:42.475-0800: [GC (Allocation Failure) [PSYoungGen: 153098K->21503K(153088K)] 347257K->259158K(430000K), 0.0254577 secs] [Times: user=0.06 sys=0.07, real=0.03 secs]
2021-11-16T10:46:42.512-0800: [GC (Allocation Failure) [PSYoungGen: 80011K->35722K(116736K)] 317664K->278917K(466432K), 0.0076583 secs] [Times: user=0.03 sys=0.01, real=0.01 secs]
2021-11-16T10:46:42.535-0800: [GC (Allocation Failure) [PSYoungGen: 94135K->48376K(116736K)] 337338K->298072K(466432K), 0.0178464 secs] [Times: user=0.08 sys=0.01, real=0.02 secs]
2021-11-16T10:46:42.572-0800: [GC (Allocation Failure) [PSYoungGen: 107256K->57748K(116736K)] 356952K->316658K(466432K), 0.0133527 secs] [Times: user=0.06 sys=0.01, real=0.01 secs]
2021-11-16T10:46:42.607-0800: [GC (Allocation Failure) [PSYoungGen: 116628K->39549K(116736K)] 375538K->334424K(466432K), 0.0170449 secs] [Times: user=0.04 sys=0.05, real=0.02 secs]
2021-11-16T10:46:42.624-0800: [Full GC (Ergonomics) [PSYoungGen: 39549K->0K(116736K)] [ParOldGen: 294874K->238153K(349696K)] 334424K->238153K(466432K), [Metaspace: 2578K->2578K(1056768K)], 0.0490523 sec
s] [Times: user=0.23 sys=0.02, real=0.05 secs]
2021-11-16T10:46:42.658-0800: [GC (Allocation Failure) [PSYoungGen: 58808K->23432K(116736K)] 297033K->261508K(466432K), 0.0069145 secs] [Times: user=0.03 sys=0.00, real=0.01 secs]
2021-11-16T10:46:42.727-0800: [GC (Allocation Failure) [PSYoungGen: 82312K->20134K(116736K)] 320465K->2080438K(466432K), 0.0074576 secs] [Times: user=0.03 sys=0.00, real=0.01 secs]
2021-11-16T10:46:42.748-0800: [GC (Allocation Failure) [PSYoungGen: 79014K->17089K(116736K)] 339318K->297676K(466432K), 0.0128637 secs] [Times: user=0.08 sys=0.00, real=0.02 secs]
2021-11-16T10:46:42.772-0800: [GC (Allocation Failure) [PSYoungGen: 76683K->20998K(116736K)] 356556K->317506K(466432K), 0.0045021 secs] [Times: user=0.03 sys=0.01, real=0.00 secs]
2021-11-16T10:46:42.776-0800: [Full GC (Ergonomics) [PSYoungGen: 20998K->0K(116736K)] [ParOldGen: 296508K->263465K(349696K)] 317506K->263465K(466432K), [Metaspace: 2578K->2578K(1056768K)], 0.0356054 sec
s] [Times: user=0.21 sys=0.00, real=0.04 secs]
2021-11-16T10:46:42.822-0800: [GC (Allocation Failure) [PSYoungGen: 58808K->20574K(116736K)] 322345K->204040K(466432K), 0.0023079 secs] [Times: user=0.01 sys=0.00, real=0.00 secs]
2021-11-16T10:46:42.837-0800: [GC (Allocation Failure) [PSYoungGen: 79454K->19420K(116736K)] 342928K->302625K(466432K), 0.0069843 secs] [Times: user=0.04 sys=0.00, real=0.01 secs]
2021-11-16T10:46:42.855-0800: [GC (Allocation Failure) [PSYoungGen: 78300K->21261K(116736K)] 361508K->322969K(466432K), 0.0057258 secs] [Times: user=0.03 sys=0.01, real=0.01 secs]
2021-11-16T10:46:42.878-0800: [GC (Allocation Failure) [PSYoungGen: 80061K->19415K(116736K)] 381768K->341297K(466432K), 0.0092364 secs] [Times: user=0.02 sys=0.03, real=0.01 secs]
2021-11-16T10:46:42.887-0800: [Full GC (Ergonomics) [PSYoungGen: 19415K->0K(116736K)] [ParOldGen: 321881K->287723K(349696K)] 341297K->287723K(466432K), [Metaspace: 2578K->2578K(1056768K)], 0.0401860 sec
s] [Times: user=0.19 sys=0.01, real=0.04 secs]
2021-11-16T10:46:42.942-0800: [GC (Allocation Failure) [PSYoungGen: 58712K->20458K(116736K)] 344435K->308182K(466432K), 0.0027768 secs] [Times: user=0.02 sys=0.00, real=0.00 secs]
2021-11-16T10:46:42.961-0800: [GC (Allocation Failure) [PSYoungGen: 79313K->20332K(116736K)] 367037K->326432K(466432K), 0.0051634 secs] [Times: user=0.02 sys=0.00, real=0.00 secs]
2021-11-16T10:46:42.978-0800: [GC (Allocation Failure) [PSYoungGen: 79086K->24742K(116736K)] 385386K->350814K(466432K), 0.0088879 secs] [Times: user=0.03 sys=0.01, real=0.01 secs]
2021-11-16T10:46:42.988-0800: [Full GC (Ergonomics) [PSYoungGen: 24742K->0K(116736K)] [ParOldGen: 326072K->304372K(349696K)] 350814K->304372K(466432K), [Metaspace: 2578K->2578K(1056768K)], 0.0472111 sec
s] [Times: user=0.21 sys=0.01, real=0.05 secs]
2021-11-16T10:46:43.047-0800: [GC (Allocation Failure) [PSYoungGen: 58808K->19455K(116736K)] 363252K->323828K(466432K), 0.0029266 secs] [Times: user=0.01 sys=0.00, real=0.01 secs]
2021-11-16T10:46:43.067-0800: [GC (Allocation Failure) [PSYoungGen: 78251K->20687K(116736K)] 382624K->343121K(466432K), 0.0049535 secs] [Times: user=0.03 sys=0.00, real=0.01 secs]
2021-11-16T10:46:43.072-0800: [Full GC (Ergonomics) [PSYoungGen: 20687K->0K(116736K)] [ParOldGen: 322433K->310226K(349696K)] 343121K->310226K(466432K), [Metaspace: 2578K->2578K(1056768K)], 0.0439479 sec
s] [Times: user=0.10 sys=0.01, real=0.04 secs]
2021-11-16T10:46:43.133-0800: [GC (Allocation Failure) [PSYoungGen: 58539K->18238K(116736K)] 368765K->328464K(466432K), 0.0024635 secs] [Times: user=0.02 sys=0.00, real=0.00 secs]
2021-11-16T10:46:43.145-0800: [GC (Allocation Failure) [PSYoungGen: 76877K->20664K(116736K)] 387103K->348806K(466432K), 0.0042543 secs] [Times: user=0.02 sys=0.00, real=0.00 secs]
2021-11-16T10:46:43.149-0800: [Full GC (Ergonomics) [PSYoungGen: 20664K->0K(116736K)] [ParOldGen: 328221K->315587K(349696K)] 348806K->315587K(466432K), [Metaspace: 2578K->2578K(1056768K)], 0.0528154 sec
s] [Times: user=0.23 sys=0.01, real=0.06 secs]
执行结束!共生成对象次数:7244
Heap
PSYoungGen total 116736K, used 2810K [0x00000007b5580000, 0x00000007c0000000, 0x00000007c0000000)
 eden space 58808K, 4% used [0x00000007b5580000, 0x00000007b583e930, 0x00000007b583e930)
  from space 57856K, 0% used [0x00000007b583e930, 0x00000007b583e930, 0x00000007b583e930)
   to space 57856K, 0% used [0x00000007b583e930, 0x00000007b583e930, 0x00000007b583e930)
 ParOldGen total 349696K, used 315587K [0x00000007a0000000, 0x00000007b5580000, 0x00000007b5580000)
 object space 349696K, 90% used [0x00000007a0000000, 0x00000007b543e0d0, 0x00000007b5580000)
 Metaspace used 2584K, capacity 4486K, committed 4864K, reserved 1056768K
 class space used 278K, capacity 386K, committed 512K, reserved 1048576K
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b:堆内存4g gc情况

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kuzhudeMacBook-Pro:~$ java -XX:+UseParallelGC -Xms4g -Xmx4g -XX:+PrintGCDetails -XX:+PrintGCDateStamps GLogAnalysis
正在执行...
2021-11-16T10:47:38.495-0800: [GC (Allocation Failure) [PSYoungGen: 1048576K->174590K(1223168K)] 1048576K->222778K(4019712K), 0.0730005 secs] [Times: user=0.11 sys=0.37, real=0.07 secs]
2021-11-16T10:47:38.774-0800: [GC (Allocation Failure) [PSYoungGen: 1223168K->174585K(1223168K)] 1271354K->348511K(4019712K), 0.1426420 secs] [Times: user=0.15 sys=0.35, real=0.14 secs]
执行结束!共生成对象次数:7870
Heap
PSYoungGen total 1223168K, used 216789K [0x000000076ab00000, 0x00000007c0000000, 0x00000007c0000000)
 eden space 1048576K, 4% used [0x000000076ab00000, 0x000000076d436e38, 0x000000076d436e38)
  from space 174592K, 9% used [0x00000007b5580000, 0x00000007b5fffe648, 0x00000007b5fffe648)
   to space 174592K, 0% used [0x00000007b5fffe648, 0x00000007b5fffe648, 0x00000007b5fffe648)
 ParOldGen total 2796544K, used 173925K [0x00000006c0000000, 0x000000076ab00000, 0x000000076ab00000)
 object space 2796544K, 6% used [0x00000006c0000000, 0x00000006c9d9748, 0x000000076ab00000)
 Metaspace used 2584K, capacity 4486K, committed 4864K, reserved 1056768K
 class space used 278K, capacity 386K, committed 512K, reserved 1048576K
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c: 不配置XMS

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kuzhudeMacBook-Pro:~$ java -XX:+UseParallelGC -XX:+PrintGCDetails -XX:+PrintGCDateStamps GLogAnalysis
正在执行...
2021-11-16T10:51:21.004-0800: [GC (Allocation Failure) [PSYoungGen: 65536K->10742K(76288K)] 65536K->25679K(251392K), 0.0100153 secs] [Times: user=0.03 sys=0.03, real=0.01 secs]
2021-11-16T10:51:21.121-0800: [GC (Allocation Failure) [PSYoungGen: 76278K->10739K(141824K)] 91215K->47175K(316928K), 0.0111144 secs] [Times: user=0.02 sys=0.05, real=0.01 secs]
2021-11-16T10:51:21.150-0800: [GC (Allocation Failure) [PSYoungGen: 141811K->310748K(141824K)] 178247K->88908K(316928K), 0.0168037 secs] [Times: user=0.03 sys=0.08, real=0.01 secs]
2021-11-16T10:51:21.225-0800: [GC (Allocation Failure) [PSYoungGen: 141820K->310750K(172896K)] 220052K->131123K(448000K), 0.0171473 secs] [Times: user=0.03 sys=0.08, real=0.02 secs]
2021-11-16T10:51:21.340-0800: [GC (Allocation Failure) [PSYoungGen: 272833K->10746K(272896K)] 393207K->212339K(474624K), 0.0249929 secs] [Times: user=0.04 sys=0.12, real=0.02 secs]
2021-11-16T10:51:21.365-0800: [Full GC (Ergonomics) [PSYoungGen: 10746K->0K(272896K)] [ParOldGen: 208159K->174860K(335872K)] 212339K->174860K(608768K), [Metaspace: 2578K->2578K(1056768K)], 0.0228646 s
s] [Times: user=0.13 sys=0.01, real=0.02 secs]
2021-11-16T10:51:21.445-0800: [GC (Allocation Failure) [PSYoungGen: 262144K->80206K(562688K)] 437004K->256926K(898560K), 0.0325680 secs] [Times: user=0.06 sys=0.16, real=0.03 secs]
2021-11-16T10:51:21.450-0800: [GC (Allocation Failure) [PSYoungGen: 562322K->104958K(596480K)] 737182K->305248K(932352K), 0.1401321 secs] [Times: user=0.12 sys=0.19, real=0.15 secs]
2021-11-16T10:51:21.086-0800: [Full GC (Ergonomics) [PSYoungGen: 104958K->0K(596480K)] [ParOldGen: 253209K->266160K(453120K)] 358248K->266160K(1049600K), [Metaspace: 2578K->2578K(1056768K)], 0.0499044 s
ecs] [Times: user=0.16 sys=0.02, real=0.05 secs]
2021-11-16T10:51:21.982-0800: [GC (Allocation Failure) [PSYoungGen: 491520K->310955K(1038336K)] 757600K->397115K(1491456K), 0.1015753 secs] [Times: user=0.07 sys=0.15, real=0.10 secs]
执行结束!共生成对象次数:7150
Heap
PSYoungGen total 1038336K, used 166673K [0x000000076ab00000, 0x00000007b6580000, 0x00000007c0000000)
 eden space 876032K, 4% used [0x000000076ab00000, 0x000000076cde1720, 0x000000076cde1720)
  from space 162304K, 0% used [0x00000007a0280000, 0x00000007b2ee2d68, 0x00000007b2ee2d68)
   to space 176640K, 0% used [0x00000007a0280000, 0x00000007a0280000, 0x00000007a0280000)
 ParOldGen total 453120K, used 266160K [0x00000006c0000000, 0x00000006dba00000, 0x000000076ab00000)
 object space 453120K, 58% used [0x00000006c0000000, 0x00000006d03ec290, 0x00000006dba00000)
 Metaspace used 2584K, capacity 4486K, committed 4864K, reserved 1056768K
 class space used 278K, capacity 386K, committed 512K, reserved 1048576K
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3、CMSgc (java -XX:+UseConcMarkSweepGC -Xms1g -Xmx1g -XX:+PrintGCDetails -XX:+PrintGCDateStamps GLogAnalysis)

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kuzhudeMacBook-Pro:01jvm环境准备说明 root# java -XX:+UseConcMarkSweepGC -Xms1g -Xmx1g -XX:+PrintGCDetails -XX:+PrintGCDateStamps GCLogAnalysis
正在执行...
2021-11-16T10:53:29.053-0800: [GC (Allocation Failure) 2021-11-16T10:53:29.053-0800: [ParNew: 279616K->34943K(314560K), 0.0260035 secs] 279616K->80231K(1013632K), 0.0260733 secs] [Times: user=0.06 sys=0
.12, real=0.02 secs]
2021-11-16T10:53:29.138-0800: [GC (Allocation Failure) 2021-11-16T10:53:29.138-0800: [ParNew: 314559K->34944K(314560K), 0.0336717 secs] 359847K->158662K(1013632K), 0.0337132 secs] [Times: user=0.08 sys=
0.10, real=0.04 secs]
2021-11-16T10:53:29.520-0800: [GC (Allocation Failure) 2021-11-16T10:53:29.520-0800: [ParNew: 314560K->34944K(314560K), 0.0653926 secs] 438278K->237432K(1013632K), 0.0654390 secs] [Times: user=0.42 sys=
0.04, real=0.06 secs]
2021-11-16T10:53:29.336-0800: [GC (Allocation Failure) 2021-11-16T10:53:29.336-0800: [ParNew: 314560K->34944K(314560K), 0.0698930 secs] 517048K->321675K(1013632K), 0.0699342 secs] [Times: user=0.46 sys=
0.04, real=0.07 secs]
2021-11-16T10:53:29.449-0800: [GC (Allocation Failure) 2021-11-16T10:53:29.449-0800: [ParNew: 314560K->34942K(314560K), 0.0750517 secs] 601291K->401063K(1013632K), 0.0750952 secs] [Times: user=0.43 sys=
0.06, real=0.08 secs]
2021-11-16T10:53:29.527-0800: [GC (CMS Initial Mark) [1 CMS-initial-mark: 366121K(699072K)] 418360K(1013632K), 0.0012784 secs] [Times: user=0.00 sys=0.00, real=0.00 secs]
2021-11-16T10:53:29.520-0800: [CMS-concurrent-mark-start]
2021-11-16T10:53:29.532-0800: [CMS-concurrent-mark: 0.004/0.004 secs] [Times: user=0.01 sys=0.01, real=0.01 secs]
2021-11-16T10:53:29.532-0800: [CMS-concurrent-preclean-start]
2021-11-16T10:53:29.535-0800: [CMS-concurrent-preclean: 0.003/0.003 secs] [Times: user=0.01 sys=0.00, real=0.00 secs]
2021-11-16T10:53:29.535-0800: [CMS-concurrent-abortable-preclean-start]
2021-11-16T10:53:29.570-0800: [GC (Allocation Failure) 2021-11-16T10:53:29.570-0800: [ParNew2021-11-16T10:53:29.641-0800: [CMS-concurrent-abortable-preclean: 0.001/0.106 secs] [Times: user=0.40 sys=0.05
, real=0.11 secs]
: 314558K->34943K(314560K), 0.0790961 secs] 680679K->480214K(1013632K), 0.0791430 secs] [Times: user=0.41 sys=0.05, real=0.07 secs]
2021-11-16T10:53:29.650-0800: [GC (CMS Final Remark) [YG occupancy: 35527 K (314560 K)]2021-11-16T10:53:29.650-0800: [Rescan (parallel) , 0.0006366 secs]2021-11-16T10:53:29.650-0800: [weak refs processi
ng, 0.0000120 secs]2021-11-16T10:53:29.650-0800: [class unloading, 0.0002862 secs]2021-11-16T10:53:29.651-0800: [scrub symbol table, 0.0006194 secs]2021-11-16T10:53:29.651-0800: [scrub string table, 0.0
002614 secs][1 CMS-remark: 445270K(699072K)] 480798K(1013632K), 0.0019238 secs] [Times: user=0.01 sys=0.00, real=0.00 secs]
2021-11-16T10:53:29.652-0800: [CMS-concurrent-sweep-start]
2021-11-16T10:53:29.653-0800: [CMS-concurrent-sweep: 0.001/0.001 secs] [Times: user=0.00 sys=0.00, real=0.00 secs]
2021-11-16T10:53:29.652-0800: [CMS-concurrent-mark-start]
2021-11-16T10:53:29.656-0800: [CMS-concurrent-reset: 0.003/0.003 secs] [Times: user=0.00 sys=0.01, real=0.00 secs]
2021-11-16T10:53:29.702-0800: [GC (Allocation Failure) 2021-11-16T10:53:29.702-0800: [ParNew: 314559K->34943K(314560K), 0.0243500 secs] 623491K->417923K(1013632K), 0.0243962 secs] [Times: user=0.16 sys=
0.00, real=0.02 secs]
2021-11-16T10:53:29.782-0800: [GC (Allocation Failure) 2021-11-16T10:53:29.782-0800: [ParNew: 314559K->34943K(314560K), 0.0596436 secs] 697539K->495211K(1013632K), 0.0597069 secs] [Times: user=0.25 sys=
0.03, real=0.06 secs]
2021-11-16T10:53:29.842-0800: [GC (CMS Initial Mark) [1 CMS-initial-mark: 460267K(699072K)] 495513K(1013632K), 0.0002632 secs] [Times: user=0.00 sys=0.00, real=0.00 secs]
2021-11-16T10:53:29.842-0800: [CMS-concurrent-mark-start]
2021-11-16T10:53:29.846-0800: [CMS-concurrent-mark: 0.004/0.004 secs] [Times: user=0.01 sys=0.00, real=0.00 secs]
2021-11-16T10:53:29.846-0800: [CMS-concurrent-preclean-start]
2021-11-16T10:53:29.847-0800: [CMS-concurrent-preclean: 0.001/0.001 secs] [Times: user=0.00 sys=0.00, real=0.00 secs]
2021-11-16T10:53:29.847-0800: [CMS-concurrent-abortable-preclean-start]
执行结束!共生成为数次数:9190
Heap
 par new generation total 314560K, used 244481K [0x0000000780000000, 0x0000000795550000, 0x0000000795550000]
 eden space 279616K, 74% used [0x0000000780000000, 0x000000078cca05a0, 0x0000000791110000]
 from space 34944K, 99% used [0x0000000791110000, 0x000000079332fec8, 0x0000000793330000]
 to space 34944K, 0% used [0x0000000793330000, 0x0000000793330000, 0x0000000795550000]
 concurrent mark-sweep generation total 699072K, used 460267K [0x0000000795550000, 0x00000007c0000000, 0x00000007c0000000]
 Metaspace used 2584K, capacity 4486K, committed 4864K, reserved 1056768K
 class space used 278K, capacity 386K, committed 512K, reserved 1048576K
```

xmx/xms设置4g:

```
kuzhudeMacBook-Pro:01jvm环境准备说明 root# java -XX:+UseConcMarkSweepGC -Xms4g -Xmx4g -XX:+PrintGCDetails -XX:+PrintGCDateStamps GCLogAnalysis
正在执行...
2021-11-16T10:54:58.170-0800: [GC (Allocation Failure) 2021-11-16T10:54:58.170-0800: [ParNew: 545344K->68095K(613440K), 0.0517866 secs] 545344K->144195K(4126208K), 0.0518470 secs] [Times: user=0.12 sys=
0.23, real=0.05 secs]
2021-11-16T10:54:58.329-0800: [GC (Allocation Failure) 2021-11-16T10:54:58.329-0800: [ParNew: 613439K->68096K(613440K), 0.0901578 secs] 689539K->262891K(4126208K), 0.0902036 secs] [Times: user=0.16 sys=
0.21, real=0.09 secs]
2021-11-16T10:54:58.514-0800: [GC (Allocation Failure) 2021-11-16T10:54:58.514-0800: [ParNew: 613440K->68095K(613440K), 0.1231038 secs] 808235K->398464K(4126208K), 0.1231554 secs] [Times: user=0.63 sys=
0.08, real=0.12 secs]
2021-11-16T10:54:58.732-0800: [GC (Allocation Failure) 2021-11-16T10:54:58.732-0800: [ParNew: 613439K->68096K(613440K), 0.1329998 secs] 943808K->523119K(4126208K), 0.1330557 secs] [Times: user=0.65 sys=
0.09, real=0.13 secs]
执行结束!共生成为数次数:8342
Heap
 par new generation total 613440K, used 89963K [0x00000006c0000000, 0x00000006e9990000, 0x00000006e9990000]
 eden space 545344K, 4% used [0x00000006c0000000, 0x00000006c155ae10, 0x00000006e1490000]
 from space 68096K, 100% used [0x00000006e1490000, 0x00000006e5710000, 0x00000006e5710000]
 to space 68096K, 0% used [0x00000006e5710000, 0x00000006e5710000, 0x00000006e9990000]
 concurrent mark-sweep generation total 3512768K, used 455023K [0x00000006e9990000, 0x00000007c0000000, 0x00000007c0000000]
 Metaspace used 2584K, capacity 4486K, committed 4864K, reserved 1056768K
 class space used 278K, capacity 386K, committed 512K, reserved 1048576K
```

4.G1gc()

Xmx/Xms 1g

```
kuzhudeMacBook-Pro:01jvm环境准备说明 root# java -XX:+UseG1GC -Xms1g -Xmx1g -XX:+PrintGCDetails -XX:+PrintGCDateStamps GCLogAnalysis
正在执行...
2021-11-16T10:58:02.496-0800: [GC pause (G1 Evacuation Pause) (young), 0.0076681 secs]
  [Parallel Time: 7.0 ms, GC Workers: 8]
    [GC Worker Start (ms): Min: 156.7, Avg: 156.7, Max: 157.0, Diff: 0.3]
    [Ext Root Scanning (ms): Min: 0.0, Avg: 0.2, Max: 0.3, Diff: 0.3, Sum: 1.4]
    [Update RS (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.0]
    [Processed Buffers: Min: 0, Avg: 0.0, Max: 0, Diff: 0, Sum: 0]
    [Scan RS (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.1]
    [Code Root Scanning (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.0]
    [Object Copy (ms): Min: 6.2, Avg: 6.3, Max: 6.5, Diff: 0.3, Sum: 50.5]
    [Termination (ms): Min: 0.0, Avg: 0.2, Max: 0.4, Diff: 0.4, Sum: 1.9]
    [Termination Attempts: Min: 1, Avg: 1.2, Max: 2, Diff: 1, Sum: 10]
    [GC Worker Other (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.1]
    [GC Worker Total (ms): Min: 6.5, Avg: 6.8, Max: 6.8, Diff: 0.3, Sum: 54.0]
    [GC Worker End (ms): Min: 163.5, Avg: 163.5, Max: 163.5, Diff: 0.0]
  [Code Root Fixup: 0.0 ms]
  [Code Root Purge: 0.0 ms]
  [Clear CT: 0.1 ms]
  [Other: 0.6 ms]
    [Choose CSet: 0.0 ms]
    [Ref Proc: 0.2 ms]
    [Ref Enq: 0.0 ms]
    [Redirty Cards: 0.1 ms]
    [Humongous Register: 0.1 ms]
    [Humongous Reclaim: 0.0 ms]
    [Free CSet: 0.0 ms]
  [Eden: 51.0M(51.0M)->0.0B(44.0M) Survivors: 0.0B->7168.0K Heap: 67.6M(1024.0M)->21.3M(1024.0M)]
  [Times: user=0.02 sys=0.03, real=0.01 secs]
2021-11-16T10:58:02.516-0800: [GC pause (G1 Evacuation Pause) (young), 0.0045534 secs]
  [Parallel Time: 4.1 ms, GC Workers: 8]
    [GC Worker Start (ms): Min: 177.5, Avg: 177.5, Max: 177.4, Diff: 0.1]
    [Ext Root Scanning (ms): Min: 0.1, Avg: 0.1, Max: 0.3, Diff: 0.2, Sum: 1.0]
    [Update RS (ms): Min: 0.1, Avg: 0.1, Max: 0.2, Diff: 0.1, Sum: 1.1]
    [Processed Buffers: Min: 1, Avg: 2.6, Max: 8, Diff: 7, Sum: 21]
    [Scan RS (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.0]
    [Code Root Scanning (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.0]
    [Object Copy (ms): Min: 3.3, Avg: 3.5, Max: 3.6, Diff: 0.4, Sum: 27.8]
    [Termination (ms): Min: 0.0, Avg: 0.2, Max: 0.4, Diff: 0.4, Sum: 1.8]
    [Termination Attempts: Min: 1, Avg: 1.0, Max: 1, Diff: 0, Sum: 8]
    [GC Worker Other (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.1]
    [GC Worker Total (ms): Min: 4.0, Avg: 4.0, Max: 4.0, Diff: 0.1, Sum: 31.9]
    [GC Worker End (ms): Min: 181.5, Avg: 181.5, Max: 181.5, Diff: 0.0]
  [Code Root Fixup: 0.0 ms]
  [Code Root Purge: 0.0 ms]
  [Clear CT: 0.1 ms]
  [Other: 0.4 ms]
    [Choose CSet: 0.0 ms]
    [Ref Proc: 0.1 ms]
    [Ref Enq: 0.0 ms]
    [Redirty Cards: 0.1 ms]
    [Humongous Register: 0.0 ms]
2021-11-16T10:58:03.422-0800: [GC pause (G1 Humongous Allocation) (young) (initial-mark), 0.0014372 secs]
  [Parallel Time: 0.3 ms, GC Workers: 8]
    [GC Worker Start (ms): Min: 1083.4, Avg: 1083.4, Max: 1083.5, Diff: 0.1]
    [Ext Root Scanning (ms): Min: 0.0, Avg: 0.1, Max: 0.2, Diff: 0.1, Sum: 0.8]
    [Update RS (ms): Min: 0.1, Avg: 0.2, Max: 0.5, Diff: 0.4, Sum: 1.6]
    [Processed Buffers: Min: 1, Avg: 1.1, Max: 2, Diff: 1, Sum: 9]
    [Scan RS (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.0]
    [Code Root Scanning (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.0]
    [Object Copy (ms): Min: 0.0, Avg: 0.3, Max: 0.4, Diff: 0.4, Sum: 2.2]
    [Termination (ms): Min: 0.0, Avg: 0.1, Max: 0.1, Diff: 0.1, Sum: 0.5]
    [Termination Attempts: Min: 1, Avg: 1.0, Max: 1, Diff: 0, Sum: 8]
    [GC Worker Other (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.1]
    [GC Worker Total (ms): Min: 0.6, Avg: 0.6, Max: 0.7, Diff: 0.1, Sum: 5.2]
    [GC Worker End (ms): Min: 1084.1, Avg: 1084.1, Max: 1084.1, Diff: 0.0]
  [Code Root Fixup: 0.0 ms]
  [Code Root Purge: 0.0 ms]
  [Clear CT: 0.2 ms]
  [Other: 0.5 ms]
    [Choose CSet: 0.0 ms]
    [Ref Proc: 0.2 ms]
    [Ref Enq: 0.0 ms]
    [Redirty Cards: 0.1 ms]
    [Humongous Register: 0.0 ms]
    [Humongous Reclaim: 0.0 ms]
    [Free CSet: 0.0 ms]
  [Eden: 1024.0K(320.0M)->0.0B(339.0M) Survivors: 7168.0K->8192.0K Heap: 447.1M(1024.0M)->446.7M(1024.0M)]
  [Times: user=0.01 sys=0.00, real=0.00 secs]
2021-11-16T10:58:03.424-0800: [GC concurrent-root-region-scan-start]
2021-11-16T10:58:03.424-0800: [GC concurrent-root-region-scan-end, 0.0001190 secs]
2021-11-16T10:58:03.424-0800: [GC concurrent-mark-start]
2021-11-16T10:58:03.425-0800: [GC concurrent-mark-end, 0.0011940 secs]
2021-11-16T10:58:03.425-0800: [GC remark 2021-11-16T10:58:03.425-0800: [Finalize Marking, 0.0001864 secs] 2021-11-16T10:58:03.426-0800: [GC ref-proc, 0.0000402 secs] 2021-11-16T10:58:03.426-0800: [Unload, 0.0003669 secs], 0.0014455 secs]
  [Times: user=0.01 sys=0.00, real=0.00 secs]
2021-11-16T10:58:03.427-0800: [GC cleanup 452M->449M(1024M), 0.0010054 secs]
  [Times: user=0.00 sys=0.00, real=0.00 secs]
2021-11-16T10:58:03.428-0800: [GC concurrent-cleanup-start]
2021-11-16T10:58:03.428-0800: [GC concurrent-cleanup-end, 0.0000236 secs]
执行结束!共生成年象次数:9406
Heap
garbage-first heap   total 1048576K, used 497257K [0x0000000780000000, 0x000000078102000, 0x00000007c0000000)
region size 1024K, 44 young (45056K), 8 survivors (8192K)
Metaspace            used 2584K, capacity 4406K, committed 4864K, reserved 1056768K
class space          used 278K, capacity 386K, committed 512K, reserved 1048576K
```

Xmx/Xms 4g

```
kuzhudeMacBook-Pro:01jvm环境准备说明 root# java -XX:+UseG1GC -Xms4g -Xmx4g -XX:+PrintGCDetails -XX:+PrintGCDateStamps GCLogAnalysis
正在执行...
```

```
2021-11-16T11:02:07.580-0800: [GC pause (G1 Evacuation Pause) (young), 0.0203565 secs]
[Parallel Time: 19.5 ms, GC Workers: 8]
[GC Worker Start (ms): Min: 254.1, Avg: 254.1, Max: 254.2, Diff: 0.1]
[Ext Root Scanning (ms): Min: 0.0, Avg: 0.1, Max: 0.4, Diff: 0.3, Sum: 1.2]
[Update RS (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.0]
[Processed Buffers: Min: 0, Avg: 0.0, Max: 0, Diff: 0, Sum: 0]
[Scan RS (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.1]
[Code Root Scanning (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.0]
[Object Copy (ms): Min: 18.8, Avg: 18.9, Max: 19.1, Diff: 0.3, Sum: 151.4]
[Termination (ms): Min: 0.0, Avg: 0.2, Max: 0.4, Diff: 0.4, Sum: 1.6]
[Termination Attempts: Min: 1, Avg: 1.0, Max: 1, Diff: 0, Sum: 8]
[GC Worker Other (ms): Min: 0.0, Avg: 0.0, Max: 0.1, Diff: 0.1, Sum: 0.4]
[GC Worker Total (ms): Min: 19.3, Avg: 19.3, Max: 19.4, Diff: 0.1, Sum: 154.8]
[GC Worker End (ms): Min: 273.5, Avg: 273.5, Max: 273.5, Diff: 0.0]
[Code Root Fixup: 0.0 ms]
[Code Root Purge: 0.0 ms]
[Clear CT: 0.1 ms]
[Other: 0.7 ms]
[Choose CSet: 0.0 ms]
[Ref Proc: 0.2 ms]
[Ref Enq: 0.0 ms]
[Redirty Cards: 0.1 ms]
[Humongous Register: 0.1 ms]
[Humongous Reclaim: 0.0 ms]
[Free CSet: 0.1 ms]
[Eden: 204.0M(204.0M)->0.0B(178.0M) Survivors: 0.0B->26.0M Heap: 204.0M(4096.0M)->66.1M(4096.0M)]
[Times: user=0.03 sys=0.10, real=0.02 secs]
2021-11-16T11:02:07.644-0800: [GC pause (G1 Evacuation Pause) (young), 0.0281898 secs]
[Parallel Time: 27.4 ms, GC Workers: 8]
[GC Worker Start (ms): Min: 317.4, Avg: 317.5, Max: 317.5, Diff: 0.1]
[Ext Root Scanning (ms): Min: 0.1, Avg: 0.1, Max: 0.3, Diff: 0.2, Sum: 1.1]
[Update RS (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.1]
[Processed Buffers: Min: 0, Avg: 1.0, Max: 2, Diff: 2, Sum: 8]
[Scan RS (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.1]
[Code Root Scanning (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.1]
[Object Copy (ms): Min: 26.8, Avg: 26.9, Max: 27.1, Diff: 0.3, Sum: 215.5]
[Termination (ms): Min: 0.0, Avg: 0.2, Max: 0.3, Diff: 0.3, Sum: 1.4]
[Termination Attempts: Min: 1, Avg: 1.0, Max: 1, Diff: 0, Sum: 8]
[GC Worker Other (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.1]
```

```
[Free CSet: 0.1 ms]
[Eden: 250.0M(250.0M)->0.0B(264.0M) Survivors: 34.0M->36.0M Heap: 795.7M(4096.0M)->616.5M(4096.0M)]
[Times: user=0.06 sys=0.08, real=0.05 secs]
2021-11-16T11:02:08.405-0800: [GC pause (G1 Evacuation Pause) (young), 0.0734450 secs]
[Parallel Time: 72.4 ms, GC Workers: 8]
[GC Worker Start (ms): Min: 1078.5, Avg: 1078.6, Max: 1078.9, Diff: 0.4]
[Ext Root Scanning (ms): Min: 0.0, Avg: 0.1, Max: 0.2, Diff: 0.2, Sum: 1.0]
[Update RS (ms): Min: 0.0, Avg: 0.1, Max: 0.2, Diff: 0.2, Sum: 0.6]
[Processed Buffers: Min: 0, Avg: 1.1, Max: 2, Diff: 2, Sum: 9]
[Scan RS (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.2]
[Code Root Scanning (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.0]
[Object Copy (ms): Min: 71.4, Avg: 71.7, Max: 72.0, Diff: 0.5, Sum: 573.9]
[Termination (ms): Min: 0.0, Avg: 0.3, Max: 0.5, Diff: 0.5, Sum: 2.1]
[Termination Attempts: Min: 1, Avg: 1.0, Max: 1, Diff: 0, Sum: 8]
[GC Worker Other (ms): Min: 0.0, Avg: 0.0, Max: 0.0, Diff: 0.0, Sum: 0.1]
[GC Worker Total (ms): Min: 71.9, Avg: 72.2, Max: 72.4, Diff: 0.4, Sum: 577.8]
[GC Worker End (ms): Min: 1150.8, Avg: 1150.8, Max: 1150.9, Diff: 0.0]
[Code Root Fixup: 0.0 ms]
[Code Root Purge: 0.0 ms]
[Clear CT: 0.2 ms]
[Other: 0.9 ms]
[Choose CSet: 0.0 ms]
[Ref Proc: 0.3 ms]
[Ref Enq: 0.0 ms]
[Redirty Cards: 0.1 ms]
[Humongous Register: 0.1 ms]
[Humongous Reclaim: 0.0 ms]
[Free CSet: 0.1 ms]
[Eden: 264.0M(264.0M)->0.0B(296.0M) Survivors: 36.0M->38.0M Heap: 880.5M(4096.0M)->688.0M(4096.0M)]
[Times: user=0.06 sys=0.09, real=0.07 secs]
```

执行结束!共生成对象次数:8054

```
Heap
garbage-first heap total 4194304K, used 704482K [0x00000006c0000000, 0x00000006c0204000, 0x00000007c0000000)
region size 2048K, 20 young (40960K), 19 survivors (38912K)
Metaspace used 2584K, capacity 4486K, committed 4864K, reserved 1056768K
class space used 278K, capacity 386K, committed 512K, reserved 1048576K
```