Week02

作业 1.

循环次数

	SerialGC	ParallelGC	CMS	G1GC
256M	4139	3330	4385	Not counted
512M	8955	9812	10849	10579
1G	7555	8856	13310	10223
4G	8286	7838	10314	12648

Full GC计数

	SerialGC	ParallelGC		
256M	43 (OOM)	34 (OOM)	24	13
512M	1	11	7	0
1G	0	1	0	0
4G	0	0	0	0

Young + Mixed GC计算

	Serial GC	ParallelGC		
256M	10	46	32	71 young + 11 mixed
512M	4	39	20	60 young + 28 mixed
1G	9	23	12	10 young + 8 mixed
4G	2	3	10	14 young

作业 2. -Xmx1G -Xms1G

Use G1GC

```
 ~~ wrk -t8 -c40 -d60s http://localhost:8088/api/hello

Running 1m test @ http://localhost:8088/api/hello
  8 threads and 40 connections
  Thread Stats   Avg      Stdev     Max   +/- Stdev
    Latency    14.00ms   35.14ms 470.33ms   90.71%
    Req/Sec     2.11k     0.89k    5.24k    65.88%
  1000404 requests in 1.00m, 119.44MB read
Requests/sec:  16651.12
Transfer/sec:      1.99MB
```

Use CMS

```
 ~~ wrk -t8 -c40 -d60s http://localhost:8088/api/hello

Running 1m test @ http://localhost:8088/api/hello
  8 threads and 40 connections
  Thread Stats   Avg      Stdev     Max   +/- Stdev
    Latency    14.17ms   33.19ms 410.07ms   90.48%
    Req/Sec     1.73k   757.63     4.25k    67.38%
  824167 requests in 1.00m, 98.40MB read
Requests/sec:  13718.15
Transfer/sec:      1.64MB
```

Use ParallelGC

```
 ~~ wrk -t8 -c40 -d60s http://localhost:8088/api/hello

Running 1m test @ http://localhost:8088/api/hello
  8 threads and 40 connections
  Thread Stats   Avg      Stdev     Max   +/- Stdev
    Latency    17.18ms   45.04ms 635.47ms   91.22%
    Req/Sec     1.90k     0.87k    6.48k    64.27%
  904916 requests in 1.00m, 108.04MB read
Requests/sec:  15059.90
Transfer/sec:      1.80MB
```

Use Serial GC

```
~~ wrk -t8 -c40 -d60s http://localhost:8088/api/hello
```

```
Running 1m test @ http://localhost:8088/api/hello
  8 threads and 40 connections
  Thread Stats   Avg      Stdev     Max   +/- Stdev
    Latency    13.97ms   36.79ms 428.27ms   91.30%
    Req/Sec     2.09k     0.95k    5.48k    64.01%
  994376 requests in 1.00m, 118.72MB read
Requests/sec:  16561.21
Transfer/sec:      1.98MB
```

作业 4.

从1中可见，Heap很小时，GC回收器的选择对系统性能影响不大。增加Heap，可以有效的减少GC，提高系统性能。当Heap 超过4G时，G1GC的优势明显。在1G时，CMS有微弱优势。还需要结合时间消耗得出更准确判断。

比较ParallelGC和CMS在Xmx1G时的表现，可以看出ParallelGC发生的GC更频繁，单次消耗时间更短，CMS消耗时间长但是STW更短。

从2中可见，G1GC表现最佳，吞吐量最高而延迟较低，CMS的延迟也很低但是吞吐量最低，ParallelGC的吞吐量表现不错但是延迟高。 SerialGC的表现出乎意料的好，仅次于G1GC, 可见测试最好跑在一个专用的机器以排除其它干扰因素。