

----- key\_range batch\_size record\_cnt ms\_per ms\_tot  
\*run 3\* spawn\_updates 10000000 200000 1000000 3000000 4000 60000

```
MyMacbookAir:cpp hkl120$ !!  
./driver test/spawn1.jitd  
Now using policy: Cracker[ pushdown balance inline ]  
Start[test/scan_for_1_min.jitd]  
Start Updates [10000000--30000000] by 2000000; every 4000 ms for 60000ms  
Scanning for 2000 s in [0,1000000000] -> 1000 keys/read  
Random Scan: 144901 scans over 2.37116 s  
Rate: 61109.8 scans/sec  
Scanning for 2000 s in [0,1000000000] -> 1000 keys/read  
Random Scan: 116726 scans over 2.00001 s  
Rate: 58362.8 scans/sec  
Scanning for 2000 s in [0,1000000000] -> 1000 keys/read  
Random Scan: 2365 scans over 2.20879 s  
Rate: 1070.72 scans/sec  
Scanning for 2000 s in [0,1000000000] -> 1000 keys/read  
Random Scan: 67694 scans over 2.66065 s  
Rate: 25442.6 scans/sec  
Scanning for 2000 s in [0,1000000000] -> 1000 keys/read  
Random Scan: 11 scans over 2.0066 s  
Rate: 5.48191 scans/sec  
gROOT [Cracker[ pushdown balance inline ]; 6000000 elements]  
  BTree[55345427]  
    BTree[24976755]  
      BTree[16644448]  
        SortedArray[1000000 elements]  
        SortedArray[500756 elements]  
      BTree[34121503]  
        Concat  
          SortedArray[365496 elements]  
          Array[182435 elements]  
        BTree[50785658]  
          SortedArray[1000000 elements]  
          SortedArray[273500 elements]  
      BTree[80264239]  
        Concat  
          SortedArray[1000000 elements]  
          SortedArray[499223 elements]  
      BTree[96956229]  
        SortedArray[1000000 elements]  
        SortedArray[178590 elements]  
Scanning for 2000 s in [0,1000000000] -> 1000 keys/read  
Random Scan: 14865 scans over 2.03322 s  
Rate: 7311.05 scans/sec  
Scanning for 2000 s in [0,1000000000] -> 1000 keys/read  
Random Scan: 9 scans over 2.11584 s  
Rate: 4.25363 scans/sec  
Scanning for 2000 s in [0,1000000000] -> 1000 keys/read  
Random Scan: 7 scans over 2.04122 s  
Rate: 3.42933 scans/sec  
Scanning for 2000 s in [0,1000000000] -> 1000 keys/read  
Random Scan: 8 scans over 2.10505 s  
Rate: 3.80038 scans/sec  
Scanning for 2000 s in [0,1000000000] -> 1000 keys/read  
Random Scan: 14 scans over 2.13319 s  
Rate: 6.56295 scans/sec  
gROOT [Cracker[ pushdown balance inline ]; 12000000 elements]  
  BTree[55345427]  
    BTree[24976755]  
      BTree[12486703]  
        Concat  
          BTree[9986945]  
            SortedArray[1000000 elements]  
            SortedArray[250358 elements]  
          Array[249311 elements]  
        BTree[16644448]  
          Concat  
            Concat  
              SortedArray[333239 elements]  
              SortedArray[83577 elements]  
              SortedArray[82975 elements]  
            Concat  
              SortedArray[833119 elements]  
              Array[166564 elements]  
          Concat  
            BTree[34121503]  
              SortedArray[914479 elements]  
            BTree[44093799]  
              SortedArray[1000000 elements]  
              BTree[46607314]  
                SortedArray[250561 elements]  
                SortedArray[873785 elements]  
              Array[609597 elements]  
          BTree[80264239]  
            Concat  
              BTree[71968562]  
                Concat  
                  BTree[67815966]  
                    SortedArray[1000000 elements]  
                    SortedArray[332508 elements]  
                  Array[333685 elements]  
                Concat  
                  SortedArray[665134 elements]  
                  SortedArray[165685 elements]  
                Array[498546 elements]  
            BTree[92752450]  
              BTree[90257166]  
                Concat  
                  SortedArray[1000000 elements]  
                  SortedArray[200155 elements]  
                Concat  
                  SortedArray[249443 elements]  
                  Array[50029 elements]  
              Concat  
                Concat  
                  SortedArray[571553 elements]  
                  Array[142874 elements]  
                Array[142823 elements]  
            Scanning for 2000 s in [0,1000000000] -> 1000 keys/read  
            Random Scan: 9 scans over 2.08239 s  
            Rate: 4.32196 scans/sec  
            Scanning for 2000 s in [0,1000000000] -> 1000 keys/read  
            Random Scan: 11 scans over 2.6526 s  
            Rate: 4.14687 scans/sec  
            Scanning for 2000 s in [0,1000000000] -> 1000 keys/read  
            Random Scan: 12 scans over 2.18158 s  
            Rate: 5.5006 scans/sec
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Scanning for 2000 s in [0,100000000) -> 1000 keys/read
Random Scan: 3 scans over 2.0043 s
Rate: 1.49678 scans/sec
Scanning for 2000 s in [0,100000000) -> 1000 keys/read
Random Scan: 6 scans over 3.46096 s
Rate: 1.73362 scans/sec
gROOT [Cracker[ pushdown balance inline ]; 14000000 elements]
Concat
  BTree[55345427]
  BTree[24976755]
  BTree[12486703]
  BTree[7141736]
  Delete
    SortedArray[1000000 elements]
    SortedArray[142641 elements]
    SortedArray[642143 elements]
  Delete
    BTree[16644448]
    Concat
      Concat
        SortedArray[416816 elements]
        SortedArray[82975 elements]
        SortedArray[83467 elements]
      Concat
        Concat
          SortedArray[833119 elements]
          SortedArray[166564 elements]
          SortedArray[167487 elements]
        Array[250262 elements]
    BTree[44093799]
  Delete
    BTree[34121503]
    Concat
      Concat
        SortedArray[914479 elements]
        SortedArray[182757 elements]
        SortedArray[182053 elements]
      BTree[42427604]
      Concat
        SortedArray[1000000 elements]
        Array[166428 elements]
      Concat
        SortedArray[200679 elements]
        SortedArray[33371 elements]
      Array[382451 elements]
    BTree[46607314]
  Delete
    Concat
      SortedArray[300771 elements]
      SortedArray[50490 elements]
      Array[50004 elements]
    BTree[54930695]
      SortedArray[999690 elements]
    Delete
      Concat
        SortedArray[49736 elements]
        Array[8398 elements]
        SortedArray[8255 elements]
    BTree[80264239]
  BTree[67815966]
  BTree[65307842]
  BTree[63650717]
    SortedArray[999810 elements]
  Delete
    Concat
      SortedArray[199933 elements]
      SortedArray[33290 elements]
      Array[33476 elements]
  Delete
    Concat
      Concat
        SortedArray[250862 elements]
        SortedArray[50299 elements]
        SortedArray[50161 elements]
      Array[50375 elements]
    BTree[71968562]
  Delete
    Concat
      Concat
        SortedArray[332508 elements]
        SortedArray[82823 elements]
        SortedArray[82675 elements]
        SortedArray[83206 elements]
      Array[83031 elements]
      SortedArray[996275 elements]
    BTree[90257166]
  Delete
    BTree[88592364]
    Concat
      SortedArray[1000000 elements]
      SortedArray[166352 elements]
    Concat
      SortedArray[200155 elements]
      Array[33577 elements]
      Array[200157 elements]
    BTree[92752450]
  Delete
    Concat
      SortedArray[299472 elements]
      SortedArray[50022 elements]
      SortedArray[49552 elements]
  Delete
    Concat
      Concat
        SortedArray[714427 elements]
        SortedArray[142823 elements]
        SortedArray[142818 elements]
        SortedArray[142707 elements]
      Array[2000000 elements]
  Scanning for 2000 s in [0,100000000) -> 1000 keys/read
  Random Scan: 2 scans over 3.92363 s
  Rate: 0.509732 scans/sec
  Scanning for 2000 s in [0,100000000) -> 1000 keys/read
  Random Scan: 2 scans over 3.36719 s
  Rate: 0.593967 scans/sec

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Scanning for 2000 s in [0,100000000) -> 1000 keys/read  
Random Scan: 1 scans over 2.40829 s  
Rate: 0.415233 scans/sec  
Scanning for 2000 s in [0,100000000) -> 1000 keys/read  
Random Scan: 1 scans over 4.53038 s  
Rate: 0.220732 scans/sec  
Scanning for 2000 s in [0,100000000) -> 1000 keys/read  
Random Scan: 1 scans over 3.22905 s  
Rate: 0.309689 scans/sec  
gROOT [[Cracker[ pushdown balance inline ]; 18000000 elements]

```
Concat
  BTree[55345427]
Delete
  BTree[24976755]
  BTree[12486703]
Concat
  BTree[7141736]
Concat
  Concat
  Delete
    SortedArray[100000 elements]
    SortedArray[142641 elements]
    Array[142872 elements]
    Array[143154 elements]
  Concat
    SortedArray[748676 elements]
    SortedArray[107008 elements]
  Array[248853 elements]
Concat
  Concat
  BTree[16644448]
Concat
  Delete
    SortedArray[583258 elements]
    SortedArray[83155 elements]
    SortedArray[82806 elements]
  Concat
  Delete
    Concat
      SortedArray[999683 elements]
      SortedArray[167487 elements]
      SortedArray[167107 elements]
      SortedArray[166337 elements]
      SortedArray[250270 elements]
    SortedArray[250116 elements]
Concat
  Concat
  Concat
  BTree[44093799]
Delete
  BTree[34121503]
Concat
  Concat
    SortedArray[914479 elements]
    SortedArray[182757 elements]
    SortedArray[182053 elements]
  BTree[42427604]
Concat
  SortedArray[1000000 elements]
  Array[166428 elements]
Concat
  SortedArray[200679 elements]
  SortedArray[33371 elements]
  Array[382451 elements]
  BTree[46607314]
Delete
  Concat
    SortedArray[300771 elements]
    SortedArray[50490 elements]
    Array[50004 elements]
  BTree[54930695]
  SortedArray[999690 elements]
Delete
  Concat
    SortedArray[49736 elements]
    Array[8398 elements]
    SortedArray[8255 elements]
  Array[608540 elements]
  Array[608622 elements]
  Array[607574 elements]
  Array[1107003 elements]
Delete
  BTree[80264239]
  BTree[67815966]
  BTree[65307842]
  BTree[63650717]
Concat
  BTree[62471320]
  BTree[61579330]
  SortedArray[1000000 elements]
  SortedArray[142868 elements]
Concat
  SortedArray[165782 elements]
  SortedArray[23633 elements]
  SortedArray[165872 elements]
Concat
  Concat
  Concat
  Delete
    Concat
      SortedArray[199933 elements]
      SortedArray[33290 elements]
      Array[33476 elements]
      Array[33267 elements]
      Array[33339 elements]
    SortedArray[33061 elements]
Concat
  Concat
  Concat
  Delete
    Concat
      SortedArray[301161 elements]
      SortedArray[50161 elements]
      SortedArray[50375 elements]
      SortedArray[50613 elements]
      SortedArray[50229 elements]
```

```

        SortedArray[50584 elements]
Concat
Concat
    BTree[71968562]
        Concat
        Delete
            Concat
            Concat
                SortedArray[415331 elements]
                SortedArray[82675 elements]
                SortedArray[83206 elements]
                SortedArray[83031 elements]
                SortedArray[83272 elements]
            Concat
                SortedArray[996275 elements]
                Array[166256 elements]
                SortedArray[248515 elements]
                SortedArray[250226 elements]
Concat
Concat
Concat
    BTree[90257166]
        Delete
        BTree[88592364]
            Concat
                SortedArray[1000000 elements]
                SortedArray[166352 elements]
            Concat
                SortedArray[200155 elements]
                Array[33577 elements]
                Array[200157 elements]
        BTree[92752450]
            Delete
            Concat
                SortedArray[299472 elements]
                SortedArray[50022 elements]
                SortedArray[49552 elements]
        Delete
        Concat
        Concat
            SortedArray[714427 elements]
            SortedArray[142823 elements]
            SortedArray[142818 elements]
            SortedArray[142707 elements]
        Array[393532 elements]
        Array[392362 elements]
        SortedArray[393714 elements]
        SortedArray[892997 elements]
        Array[2000000 elements]
Scanning for 2000 s in [0,100000000) -> 1000 keys/read
Random Scan: 1 scans over 5.56979 s
Rate: 0.17954 scans/sec
Scanning for 2000 s in [0,100000000) -> 1000 keys/read
Random Scan: 1 scans over 5.96527 s
Rate: 0.167637 scans/sec
Scanning for 2000 s in [0,100000000) -> 1000 keys/read
End Updates
Random Scan: 1 scans over 2.97115 s
Rate: 0.33657 scans/sec
Scanning for 2000 s in [0,100000000) -> 1000 keys/read
Random Scan: 2 scans over 3.4463 s
Rate: 0.580333 scans/sec
Scanning for 2000 s in [0,100000000) -> 1000 keys/read
Random Scan: 5 scans over 2.19774 s
Rate: 2.27507 scans/sec
gROOT [Cracker[ pushdown balance inline ]; 20000000 elements]
Delete
Concat
    BTree[55345427]
        Concat
        Concat
            BTree[24976755]
            BTree[12486703]
            BTree[6248050]
            SortedArray[999394 elements]
            BTree[7140085]
        Delete
        Concat
            SortedArray[143123 elements]
            SortedArray[17859 elements]
            SortedArray[17896 elements]
        BTree[7141736]
        Delete
        Concat
        Concat
            SortedArray[231 elements]
            SortedArray[31 elements]
            SortedArray[29 elements]
            SortedArray[29 elements]
        Delete
        Concat
        Concat
            SortedArray[748676 elements]
            SortedArray[107008 elements]
            Array[106389 elements]
            SortedArray[106694 elements]
        Delete
        BTree[16644448]
        Concat
        Concat
            SortedArray[582909 elements]
            SortedArray[83577 elements]
            SortedArray[83229 elements]
        Concat
        Concat
        Concat
        Delete
            BTree[23783370]
            SortedArray[1000000 elements]
            SortedArray[167170 elements]
            SortedArray[167107 elements]
            SortedArray[166337 elements]
            SortedArray[166693 elements]
            SortedArray[166887 elements]
            SortedArray[249985 elements]
        Delete

```

```
BTree[44093799]
Concat
BTree[34121503]
Concat
Concat
BTree[33309621]
SortedArray[999204 elements]
Delete
Concat
SortedArray[97236 elements]
SortedArray[16061 elements]
SortedArray[16131 elements]
SortedArray[183099 elements]
SortedArray[183313 elements]
Concat
Concat
BTree[42427604]
Delete
Concat
SortedArray[1000000 elements]
SortedArray[166428 elements]
SortedArray[166430 elements]
Delete
Concat
SortedArray[200679 elements]
SortedArray[33371 elements]
Array[33102 elements]
SortedArray[199676 elements]
SortedArray[199606 elements]
SortedArray[382595 elements]
Concat
Concat
BTree[46607314]
Concat
Delete
Concat
SortedArray[300771 elements]
SortedArray[50490 elements]
Array[50004 elements]
Array[50235 elements]
BTree[54930695]
Concat
SortedArray[999690 elements]
SortedArray[167232 elements]
Concat
Delete
Concat
SortedArray[49736 elements]
Array[8398 elements]
SortedArray[8255 elements]
Array[8298 elements]
SortedArray[225703 elements]
SortedArray[224979 elements]
SortedArray[607217 elements]
BTree[45385750]
SortedArray[908559 elements]
SortedArray[200642 elements]
BTree[21731134]
SortedArray[435403 elements]
SortedArray[672666 elements]
BTree[80264239]
BTree[67815966]
Concat
BTree[65307842]
BTree[63650717]
Concat
BTree[62471320]
BTree[61579330]
SortedArray[999270 elements]
Delete
SortedArray[160890 elements]
SortedArray[18052 elements]
Delete
Concat
Concat
SortedArray[165782 elements]
SortedArray[23633 elements]
SortedArray[23378 elements]
SortedArray[23563 elements]
SortedArray[165961 elements]
Concat
Delete
Concat
Concat
Concat
Delete
Concat
SortedArray[199933 elements]
SortedArray[33290 elements]
Array[33476 elements]
Array[33267 elements]
Array[33339 elements]
SortedArray[33061 elements]
SortedArray[33205 elements]
SortedArray[33061 elements]
Concat
Delete
Concat
Concat
Concat
Delete
Concat
Concat
SortedArray[301161 elements]
SortedArray[50161 elements]
SortedArray[50375 elements]
SortedArray[50613 elements]
SortedArray[50229 elements]
SortedArray[50584 elements]
SortedArray[50090 elements]
SortedArray[50105 elements]
SortedArray[249949 elements]
Concat
Concat
Delete
BTree[71968562]
Concat
```

```

Concat
Concat
Delete
SortedArray[581212 elements]
SortedArray[83031 elements]
SortedArray[83272 elements]
SortedArray[82772 elements]
SortedArray[83370 elements]
Concat
Concat
Concat
SortedArray[996275 elements]
Array[166256 elements]
SortedArray[165743 elements]
SortedArray[166856 elements]
SortedArray[249829 elements]
SortedArray[249183 elements]
SortedArray[248484 elements]
Concat
Concat
Delete
Concat
Concat
BTree[90257166]
Concat
BTree[88592364]
Concat
SortedArray[999498 elements]
SortedArray[167437 elements]
Concat
Delete
Concat
SortedArray[200155 elements]
Array[33577 elements]
Array[33303 elements]
SortedArray[33574 elements]
SortedArray[199530 elements]
BTree[92752450]
Concat
Concat
Delete
Concat
SortedArray[299472 elements]
SortedArray[50022 elements]
SortedArray[49552 elements]
Array[49281 elements]
SortedArray[49868 elements]
Concat
Concat
Delete
BTree[99999525]
SortedArray[1000000 elements]
SortedArray[68 elements]
SortedArray[142707 elements]
SortedArray[143240 elements]
SortedArray[142964 elements]
SortedArray[393714 elements]
SortedArray[393056 elements]
SortedArray[392489 elements]
SortedArray[393498 elements]
BTree[53404499]
BTree[33527163]
SortedArray[671608 elements]
SortedArray[397909 elements]
SortedArray[930483 elements]
BTree[25628974]
SortedArray[513981 elements]
BTree[75335421]
SortedArray[993806 elements]
SortedArray[492213 elements]
Scanning for 2000 s in [0,100000000] -> 1000 keys/read
Random Scan: 5 scans over 2.01004 s
Rate: 2.48752 scans/sec
Scanning for 2000 s in [0,100000000] -> 1000 keys/read
Random Scan: 6 scans over 2.15268 s
Rate: 2.78722 scans/sec
Scanning for 2000 s in [0,100000000] -> 1000 keys/read
Random Scan: 7 scans over 2.25746 s
Rate: 3.10083 scans/sec
Scanning for 2000 s in [0,100000000] -> 1000 keys/read
Random Scan: 7 scans over 2.27387 s
Rate: 3.07845 scans/sec
Scanning for 2000 s in [0,100000000] -> 1000 keys/read
Random Scan: 11 scans over 2.29426 s
Rate: 4.79457 scans/sec
gROOT [[Cracker[ pushdown balance inline ]; 20000000 elements]
Delete
Concat
BTree[55345427]
Concat
Concat
BTree[24976755]
BTree[12486703]
BTree[6248050]
SortedArray[999394 elements]
SortedArray[998727 elements]
BTree[16644448]
Delete
Concat
SortedArray[666486 elements]
SortedArray[83229 elements]
SortedArray[83543 elements]
Delete
BTree[23783370]
BTree[22895505]
BTree[22198804]
SortedArray[1000000 elements]
SortedArray[125480 elements]
Concat
SortedArray[142171 elements]
SortedArray[17622 elements]
Concat
Concat
SortedArray[167016 elements]
SortedArray[23906 elements]
SortedArray[23785 elements]
SortedArray[166442 elements]

```

```

BTree[44093799]
  BTree[34121503]
    BTree[32122530]
      BTree[30534288]
        SortedArray[888781 elements]
      BTree[31226297]
        Delete
          SortedArray[125147 elements]
          SortedArray[13669 elements]
        Delete
          SortedArray[160841 elements]
          SortedArray[17908 elements]
      BTree[33309621]
        Delete
          Concat
            Concat
              SortedArray[166051 elements]
              SortedArray[23874 elements]
              SortedArray[23776 elements]
              SortedArray[23622 elements]
            Delete
          Concat
            Concat
              Concat
                Delete
                  Concat
                    SortedArray[97236 elements]
                    SortedArray[16061 elements]
                    SortedArray[16131 elements]
                    SortedArray[16252 elements]
                    SortedArray[16437 elements]
                    SortedArray[15953 elements]
                    SortedArray[16159 elements]
              BTree[42427604]
            BTree[41242255]
          BTree[40356018]
            SortedArray[999288 elements]
          Delete
            Concat
              SortedArray[142319 elements]
              SortedArray[17842 elements]
              SortedArray[17662 elements]
          Delete
            Concat
              SortedArray[190217 elements]
              SortedArray[23670 elements]
              SortedArray[23588 elements]
          Delete
            Concat
              Concat
                Concat
                  SortedArray[200948 elements]
                  SortedArray[33175 elements]
                  SortedArray[33569 elements]
                  SortedArray[33449 elements]
                  SortedArray[33330 elements]
                Delete
              BTree[46607314]
            Concat
              Concat
                Concat
                  SortedArray[301257 elements]
                  SortedArray[50235 elements]
                  SortedArray[50460 elements]
                  SortedArray[50082 elements]
              Concat
                BTree[54930695]
              Concat
                BTree[53740066]
                SortedArray[1000000 elements]
                SortedArray[166922 elements]
                SortedArray[166949 elements]
              Concat
                Concat
                  Delete
                    Concat
                      SortedArray[49736 elements]
                      Array[8398 elements]
                      SortedArray[8255 elements]
                      Array[8298 elements]
                      SortedArray[8294 elements]
                      SortedArray[174897 elements]
                      SortedArray[224429 elements]
                    BTree[45385750]
                      SortedArray[908559 elements]
                      SortedArray[200642 elements]
                    BTree[21731134]
                      SortedArray[435403 elements]
                      SortedArray[672666 elements]
                    BTree[80264239]
                      BTree[67815966]
                      BTree[63650717]
                        Concat
                          BTree[62471320]
                          BTree[61579330]
                          BTree[60889139]
                            SortedArray[1000000 elements]
                            SortedArray[123986 elements]
                          Concat
                            Delete
                              SortedArray[160890 elements]
                              SortedArray[18052 elements]
                              SortedArray[17801 elements]
                          Concat
                            Delete
                              Concat
                                Concat
                                  SortedArray[165782 elements]
                                  SortedArray[23633 elements]
                                  SortedArray[23378 elements]
                                  SortedArray[23563 elements]
                                  SortedArray[23444 elements]
                                  SortedArray[166705 elements]
                                BTree[65307842]
                              Concat
                                Concat

```

```

Delete
Concat
Concat
Concat
Delete
SortedArray[233223 elements]
SortedArray[33476 elements]
SortedArray[33267 elements]
SortedArray[33339 elements]
SortedArray[33061 elements]
SortedArray[33205 elements]
SortedArray[33061 elements]
SortedArray[33069 elements]
Concat
Concat
Delete
Concat
Concat
Concat
Delete
Concat
Concat
SortedArray[301161 elements]
SortedArray[50161 elements]
SortedArray[50375 elements]
SortedArray[50613 elements]
SortedArray[50229 elements]
SortedArray[50584 elements]
SortedArray[50090 elements]
SortedArray[50105 elements]
SortedArray[50175 elements]
BTree[71968562]
Concat
Concat
Delete
SortedArray[747595 elements]
SortedArray[83454 elements]
SortedArray[83297 elements]
SortedArray[82731 elements]
Concat
Concat
Delete
Concat
BTree[79106433]
BTree[78215557]
SortedArray[1000000 elements]
SortedArray[142425 elements]
Concat
SortedArray[162531 elements]
SortedArray[23318 elements]
SortedArray[166856 elements]
SortedArray[166375 elements]
SortedArray[165886 elements]
SortedArray[165753 elements]
BTree[90257166]
BTree[88592364]
BTree[87408867]
Concat
BTree[86515935]
BTree[85819683]
SortedArray[999902 elements]
Concat
Delete
SortedArray[125730 elements]
SortedArray[14046 elements]
SortedArray[14016 elements]
Concat
Delete
SortedArray[160843 elements]
SortedArray[17867 elements]
SortedArray[17688 elements]
SortedArray[143040 elements]
Concat
Concat
Delete
SortedArray[213985 elements]
SortedArray[23868 elements]
SortedArray[23651 elements]
SortedArray[23700 elements]
Concat
Concat
Delete
Concat
Concat
Delete
Concat
SortedArray[200155 elements]
Array[33577 elements]
Array[33303 elements]
SortedArray[33574 elements]
SortedArray[33201 elements]
SortedArray[33353 elements]
SortedArray[33631 elements]
SortedArray[33294 elements]
SortedArray[33531 elements]
BTree[92752450]
Concat
Concat
Delete
Concat
Concat
SortedArray[349223 elements]
SortedArray[49868 elements]
SortedArray[49716 elements]
SortedArray[49912 elements]
SortedArray[50111 elements]
SortedArray[49793 elements]
Concat
Concat
Delete
Concat
BTree[99995554]
BTree[99084723]
SortedArray[1000000 elements]
SortedArray[142872 elements]
Concat

```



```

        SortedArray[601 elements]
        SortedArray[92 elements]
        SortedArray[143351 elements]
        SortedArray[142870 elements]
        SortedArray[142965 elements]
        SortedArray[143434 elements]
BTree[53404499]
  BTree[33527163]
    SortedArray[671608 elements]
    SortedArray[397909 elements]
    SortedArray[930483 elements]
BTree[25628974]
  SortedArray[513981 elements]
  BTree[75335421]
    SortedArray[993806 elements]
    SortedArray[492213 elements]
Time[test/scan_for_1_min.jitd]: 82 s
Start[test/scan_for_1_min.jitd]
Scanning for 2000 s in [0,1000000000] -> 1000 keys/read
Random Scan: 17 scans over 2.17956 s
Rate: 7.79974 scans/sec
Scanning for 2000 s in [0,1000000000] -> 1000 keys/read
Random Scan: 10 scans over 2.01117 s
Rate: 4.97224 scans/sec
Scanning for 2000 s in [0,1000000000] -> 1000 keys/read
Random Scan: 25 scans over 2.03693 s
Rate: 12.2734 scans/sec
Scanning for 2000 s in [0,1000000000] -> 1000 keys/read
Random Scan: 19 scans over 2.33754 s
Rate: 8.12819 scans/sec
Scanning for 2000 s in [0,1000000000] -> 1000 keys/read
Random Scan: 33 scans over 2.23717 s
Rate: 14.7508 scans/sec
gROOT [Cracker[ pushdown balance inline ]; 20111100 elements]
Delete
Concat
  BTree[55345427]
Concat
  Concat
    BTree[24976755]
    BTree[12486703]
    BTree[6248050]
      SortedArray[999394 elements]
      SortedArray[998727 elements]
    BTree[16644448]
      SortedArray[666172 elements]
      BTree[22198804]
        SortedArray[100000 elements]
        SortedArray[444638 elements]
    BTree[44093799]
    BTree[34121503]
    BTree[30534288]
      SortedArray[888781 elements]
      SortedArray[574139 elements]
    BTree[40356018]
      SortedArray[999288 elements]
      SortedArray[600609 elements]
    BTree[46607314]
    Delete
    Concat
    Concat
      SortedArray[351492 elements]
      SortedArray[50460 elements]
      SortedArray[50082 elements]
      SortedArray[50137 elements]
    BTree[52845892]
      SortedArray[999888 elements]
      SortedArray[401059 elements]
    BTree[45385750]
      SortedArray[908559 elements]
      SortedArray[200642 elements]
    BTree[21731134]
      SortedArray[435403 elements]
      SortedArray[672666 elements]
    BTree[80264239]
    BTree[67815966]
    BTree[60889139]
    BTree[60334823]
      SortedArray[1000000 elements]
      SortedArray[111134 elements]
    BTree[63650717]
      SortedArray[552870 elements]
      SortedArray[834902 elements]
    BTree[71968562]
      SortedArray[830169 elements]
      BTree[76963521]
        SortedArray[1000000 elements]
        SortedArray[660394 elements]
    BTree[90257166]
    BTree[85265714]
      SortedArray[1000000 elements]
      BTree[87408867]
        SortedArray[429306 elements]
        SortedArray[571219 elements]
    BTree[92752450]
    Concat
    Concat
      SortedArray[398895 elements]
      SortedArray[50111 elements]
      SortedArray[49793 elements]
    BTree[98374992]
    BTree[97804471]
      SortedArray[1000000 elements]
      SortedArray[111429 elements]
    BTree[99084723]
    BTree[98376078]
    Concat
      SortedArray[175 elements]
      SortedArray[21 elements]
    Concat
    Concat
      Delete
      SortedArray[125483 elements]
      SortedArray[13890 elements]
      SortedArray[14016 elements]
      SortedArray[14034 elements]

```

```

BTree[99995554]
  Concat
    Concat
      Delete
        Concat
          SortedArray[142872 elements]
          SortedArray[17765 elements]
          SortedArray[18066 elements]
          SortedArray[17859 elements]
          SortedArray[17852 elements]
        Concat
          Concat
            Delete
              Concat
                Concat
                  SortedArray[601 elements]
                  SortedArray[92 elements]
                  SortedArray[103 elements]
                  SortedArray[82 elements]
                  SortedArray[83 elements]
                  SortedArray[98 elements]
            BTree[53404499]
              BTree[33527163]
                SortedArray[671608 elements]
                SortedArray[397909 elements]
                SortedArray[930483 elements]
          BTree[25628974]
            SortedArray[513981 elements]
            BTree[75335421]
              SortedArray[993806 elements]
              SortedArray[492213 elements]
Scanning for 2000 s in [0,100000000] -> 1000 keys/read
Random Scan: 4786 scans over 2.00012 s
Rate: 2392.85 scans/sec
Scanning for 2000 s in [0,100000000] -> 1000 keys/read
Random Scan: 9075 scans over 2.00011 s
Rate: 4537.26 scans/sec
Scanning for 2000 s in [0,100000000] -> 1000 keys/read
Random Scan: 9552 scans over 2.00012 s
Rate: 4775.72 scans/sec
Scanning for 2000 s in [0,100000000] -> 1000 keys/read
Random Scan: 9612 scans over 2.00014 s
Rate: 4805.67 scans/sec
Scanning for 2000 s in [0,100000000] -> 1000 keys/read
Random Scan: 9524 scans over 2.00038 s
Rate: 4761.1 scans/sec
gROOT [Cracker[ pushdown balance inline ]; 20111100 elements]
  Delete
    Concat
      BTree[55345427]
        Concat
          Concat
            BTree[24976755]
              BTree[12486703]
                BTree[6248050]
                  SortedArray[999394 elements]
                  SortedArray[998727 elements]
                BTree[16644448]
                  SortedArray[666172 elements]
                BTree[22198804]
                  SortedArray[1000000 elements]
                  SortedArray[444638 elements]
              BTree[44093799]
                BTree[34121503]
                  BTree[30534288]
                    SortedArray[888781 elements]
                    SortedArray[574139 elements]
                  BTree[40356018]
                    SortedArray[999288 elements]
                    SortedArray[600609 elements]
                  BTree[46607314]
                    SortedArray[401897 elements]
                    BTree[52845892]
                      SortedArray[999888 elements]
                      SortedArray[401059 elements]
                  BTree[45385750]
                    SortedArray[908559 elements]
                    SortedArray[200642 elements]
              BTree[21731134]
                SortedArray[435403 elements]
                SortedArray[672666 elements]
            BTree[80264239]
              BTree[67815966]
                BTree[60889139]
                  BTree[60334823]
                    SortedArray[1000000 elements]
                    SortedArray[111134 elements]
                  BTree[63650717]
                    SortedArray[352870 elements]
                    SortedArray[834902 elements]
                BTree[71968562]
                  SortedArray[830169 elements]
                  BTree[76963521]
                    SortedArray[1000000 elements]
                    SortedArray[660394 elements]
              BTree[90257166]
                BTree[85265714]
                  SortedArray[1000000 elements]
                BTree[87408867]
                  SortedArray[429306 elements]
                  SortedArray[571219 elements]
              BTree[92752450]
                SortedArray[498799 elements]
                BTree[97804471]
                  SortedArray[1000000 elements]
                  SortedArray[430445 elements]
            BTree[53404499]
              BTree[33527163]
                SortedArray[671608 elements]
                SortedArray[397909 elements]
                SortedArray[930483 elements]
          BTree[25628974]
            SortedArray[513981 elements]
            BTree[75335421]
              SortedArray[993806 elements]
              SortedArray[492213 elements]

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```

Scanning for 2000 s in [0,100000000) -> 1000 keys/read
Random Scan: 5561 scans over 2.00016 s
Rate: 2780.28 scans/sec
Scanning for 2000 s in [0,100000000) -> 1000 keys/read
Random Scan: 7725 scans over 2.00227 s
Rate: 3858.11 scans/sec
Scanning for 2000 s in [0,100000000) -> 1000 keys/read
Random Scan: 7787 scans over 2.00013 s
Rate: 3893.24 scans/sec
Scanning for 2000 s in [0,100000000) -> 1000 keys/read
Random Scan: 6825 scans over 2.00015 s
Rate: 3412.24 scans/sec
Scanning for 2000 s in [0,100000000) -> 1000 keys/read
Random Scan: 7789 scans over 2.0009 s
Rate: 3892.75 scans/sec
gROOT [Cracker[ pushdown balance inline ]; 20111100 elements]
Delete
Concat
  BTree[55345427]
Concat
  Concat
    BTree[24976755]
    BTree[12486703]
    BTree[6248050]
    SortedArray[999394 elements]
    SortedArray[998727 elements]
    BTree[16644448]
    SortedArray[666172 elements]
    BTree[22198804]
    SortedArray[1000000 elements]
    SortedArray[444638 elements]
    BTree[44093799]
    BTree[34121503]
    BTree[30534288]
    SortedArray[888781 elements]
    SortedArray[574139 elements]
    BTree[40356018]
    SortedArray[999288 elements]
    SortedArray[600609 elements]
    BTree[46607314]
    SortedArray[401897 elements]
    BTree[52845892]
    SortedArray[999888 elements]
    SortedArray[401059 elements]
    BTree[45385750]
    SortedArray[908559 elements]
    SortedArray[200642 elements]
    BTree[21731134]
    SortedArray[435403 elements]
    SortedArray[672666 elements]
    BTree[80264239]
    BTree[67815966]
    BTree[60889139]
    BTree[60334823]
    SortedArray[1000000 elements]
    SortedArray[111134 elements]
    BTree[63650717]
    SortedArray[552870 elements]
    SortedArray[834902 elements]
    BTree[71968562]
    SortedArray[830169 elements]
    BTree[76963521]
    SortedArray[1000000 elements]
    SortedArray[660394 elements]
    BTree[90257166]
    BTree[85265714]
    SortedArray[1000000 elements]
    BTree[87408867]
    SortedArray[429306 elements]
    SortedArray[571219 elements]
    BTree[92752450]
    SortedArray[498799 elements]
    BTree[97804471]
    SortedArray[1000000 elements]
    SortedArray[430445 elements]
    BTree[53404499]
    BTree[33527163]
    SortedArray[671608 elements]
    SortedArray[397909 elements]
    SortedArray[930483 elements]
    BTree[25628974]
    SortedArray[513981 elements]
    BTree[75335421]
    SortedArray[993806 elements]
    SortedArray[492213 elements]
Scanning for 2000 s in [0,100000000) -> 1000 keys/read
Random Scan: 9179 scans over 2.00007 s
Rate: 4589.34 scans/sec
Scanning for 2000 s in [0,100000000) -> 1000 keys/read
Random Scan: 9503 scans over 2.00013 s
Rate: 4751.19 scans/sec
Scanning for 2000 s in [0,100000000) -> 1000 keys/read
Random Scan: 9594 scans over 2.00005 s
Rate: 4796.88 scans/sec
Scanning for 2000 s in [0,100000000) -> 1000 keys/read
Random Scan: 9046 scans over 2.0002 s
Rate: 4522.55 scans/sec
Scanning for 2000 s in [0,100000000) -> 1000 keys/read
Random Scan: 9378 scans over 2.00008 s
Rate: 4688.81 scans/sec
gROOT [Cracker[ pushdown balance inline ]; 20111100 elements]
Delete
Concat
  BTree[55345427]
Concat
  Concat
    BTree[24976755]
    BTree[12486703]
    BTree[6248050]
    SortedArray[999394 elements]
    SortedArray[998727 elements]
    BTree[16644448]
    SortedArray[666172 elements]
    BTree[22198804]
    SortedArray[1000000 elements]
    SortedArray[444638 elements]

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```

    BTree[44093799]
    BTree[34121503]
    BTree[30534288]
    SortedArray[888781 elements]
    SortedArray[574139 elements]
    BTree[40356018]
    SortedArray[999288 elements]
    SortedArray[600609 elements]
    BTree[46607314]
    SortedArray[401897 elements]
    BTree[52845892]
    SortedArray[999888 elements]
    SortedArray[401059 elements]
    BTree[45385750]
    SortedArray[908559 elements]
    SortedArray[200642 elements]
    BTree[21731134]
    SortedArray[435403 elements]
    SortedArray[672666 elements]
    BTree[80264239]
    BTree[67815966]
    BTree[60889139]
    BTree[60334823]
    SortedArray[1000000 elements]
    SortedArray[111134 elements]
    BTree[63650717]
    SortedArray[552870 elements]
    SortedArray[834902 elements]
    BTree[71968562]
    SortedArray[830169 elements]
    BTree[76963521]
    SortedArray[1000000 elements]
    SortedArray[660394 elements]
    BTree[90257166]
    BTree[85265714]
    SortedArray[1000000 elements]
    BTree[87408867]
    SortedArray[429306 elements]
    SortedArray[571219 elements]
    BTree[92752450]
    SortedArray[498799 elements]
    BTree[97804471]
    SortedArray[1000000 elements]
    SortedArray[430445 elements]
    BTree[53404499]
    BTree[33527163]
    SortedArray[671608 elements]
    SortedArray[397909 elements]
    SortedArray[930483 elements]
    BTree[25628974]
    SortedArray[513981 elements]
    BTree[75335421]
    SortedArray[993806 elements]
    SortedArray[492213 elements]
    Scanning for 2000 s in [0,100000000) -> 1000 keys/read
    Random Scan: 9418 scans over 2.00006 s
    Rate: 4708.87 scans/sec
    Scanning for 2000 s in [0,100000000) -> 1000 keys/read
    Random Scan: 9427 scans over 2.00014 s
    Rate: 4713.17 scans/sec
    Scanning for 2000 s in [0,100000000) -> 1000 keys/read
    Random Scan: 9144 scans over 2.00008 s
    Rate: 4571.82 scans/sec
    Scanning for 2000 s in [0,100000000) -> 1000 keys/read
    Random Scan: 9439 scans over 2.00003 s
    Rate: 4719.42 scans/sec
    Scanning for 2000 s in [0,100000000) -> 1000 keys/read
    Random Scan: 9461 scans over 2.00009 s
    Rate: 4730.29 scans/sec
    gROOT [Cracker[ pushdown balance inline ]; 20111100 elements]
    Delete
    Concat
    BTree[55345427]
    Concat
    Concat
    BTree[24976755]
    BTree[12486703]
    BTree[6248050]
    SortedArray[999394 elements]
    SortedArray[998727 elements]
    BTree[1664448]
    SortedArray[666172 elements]
    BTree[22198804]
    SortedArray[1000000 elements]
    SortedArray[444638 elements]
    BTree[44093799]
    BTree[34121503]
    BTree[30534288]
    SortedArray[888781 elements]
    SortedArray[574139 elements]
    BTree[40356018]
    SortedArray[999288 elements]
    SortedArray[600609 elements]
    BTree[46607314]
    SortedArray[401897 elements]
    BTree[52845892]
    SortedArray[999888 elements]
    SortedArray[401059 elements]
    BTree[45385750]
    SortedArray[908559 elements]
    SortedArray[200642 elements]
    BTree[21731134]
    SortedArray[435403 elements]
    SortedArray[672666 elements]
    BTree[80264239]
    BTree[67815966]
    BTree[60889139]
    BTree[60334823]
    SortedArray[1000000 elements]
    SortedArray[111134 elements]
    BTree[63650717]
    SortedArray[552870 elements]
    SortedArray[834902 elements]
    BTree[71968562]
    SortedArray[830169 elements]
    BTree[76963521]

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```

        SortedArray[1000000 elements]
        SortedArray[660394 elements]
BTree[90257166]
    BTree[85265714]
        SortedArray[1000000 elements]
        BTree[87408867]
            SortedArray[429306 elements]
            SortedArray[571219 elements]
        BTree[92752450]
            SortedArray[498799 elements]
            BTree[97804471]
                SortedArray[1000000 elements]
                SortedArray[430445 elements]
BTree[53404499]
    BTree[33527163]
        SortedArray[671608 elements]
        SortedArray[397909 elements]
        SortedArray[930483 elements]
BTree[25628974]
    SortedArray[513981 elements]
    BTree[75335421]
        SortedArray[993806 elements]
        SortedArray[492213 elements]
Scanning for 2000 s in [0,100000000] -> 1000 keys/read
Random Scan: 9425 scans over 2.00009 s
Rate: 4712.29 scans/sec
Scanning for 2000 s in [0,100000000] -> 1000 keys/read
Random Scan: 9286 scans over 2.00009 s
Rate: 4642.78 scans/sec
Scanning for 2000 s in [0,100000000] -> 1000 keys/read
Random Scan: 9373 scans over 2.00015 s
Rate: 4686.16 scans/sec
Scanning for 2000 s in [0,100000000] -> 1000 keys/read
Random Scan: 9497 scans over 2.00097 s
Rate: 4746.2 scans/sec
Scanning for 2000 s in [0,100000000] -> 1000 keys/read
Random Scan: 9532 scans over 2.00002 s
Rate: 4765.95 scans/sec
gROOT [Cracker[ pushdown balance inline ]; 20111100 elements]
Delete
Concat
    BTree[55345427]
        Concat
            Concat
                BTree[24976755]
                BTree[12486703]
                BTree[6248050]
                    SortedArray[999394 elements]
                    SortedArray[998727 elements]
                BTree[16644448]
                    SortedArray[666172 elements]
                    BTree[22198804]
                        SortedArray[1000000 elements]
                        SortedArray[444638 elements]
                BTree[44093799]
                    BTree[34121503]
                    BTree[30534288]
                        SortedArray[888781 elements]
                        SortedArray[574139 elements]
                    BTree[40356018]
                        SortedArray[999288 elements]
                        SortedArray[600609 elements]
                BTree[46607314]
                    SortedArray[401897 elements]
                    BTree[52845892]
                        SortedArray[999888 elements]
                        SortedArray[401059 elements]
                BTree[45385750]
                    SortedArray[908559 elements]
                    SortedArray[200642 elements]
                BTree[21731134]
                    SortedArray[435403 elements]
                    SortedArray[672666 elements]
BTree[80264239]
    BTree[67815966]
        BTree[60889139]
        BTree[60334823]
            SortedArray[1000000 elements]
            SortedArray[111134 elements]
        BTree[63650717]
            SortedArray[552870 elements]
            SortedArray[834902 elements]
        BTree[71968562]
            SortedArray[830169 elements]
            BTree[76963521]
                SortedArray[1000000 elements]
                SortedArray[660394 elements]
BTree[90257166]
    BTree[85265714]
        SortedArray[1000000 elements]
        BTree[87408867]
            SortedArray[429306 elements]
            SortedArray[571219 elements]
        BTree[92752450]
            SortedArray[498799 elements]
            BTree[97804471]
                SortedArray[1000000 elements]
                SortedArray[430445 elements]
BTree[53404499]
    BTree[33527163]
        SortedArray[671608 elements]
        SortedArray[397909 elements]
        SortedArray[930483 elements]
BTree[25628974]
    SortedArray[513981 elements]
    BTree[75335421]
        SortedArray[993806 elements]
        SortedArray[492213 elements]
Time[test/scan_for_1_min.jitd]: 60 s
Time[test/spawn1.jitd]: 143 s
MyMacbookAir:cpp hkl120$

```