```
Run 1 Output
[mnshirse@engr-ras-209 src]$ ./timsort.sh
Time to read input: 405618 nanoseconds.
Time to sort input: 28410 nanoseconds.
Lines: 2
Time to read input: 600515 nanoseconds.
Time to sort input: 1707119 nanoseconds.
Lines: 4
Time to read input: 840662 nanoseconds.
Time to sort input: 2739884 nanoseconds.
Lines: 8
Time to read input: 1897029 nanoseconds.
Time to sort input: 3345484 nanoseconds.
Lines: 16
Time to read input: 2939963 nanoseconds.
Time to sort input: 12012391 nanoseconds.
Lines: 32
Time to read input: 4011406 nanoseconds.
Time to sort input: 25392362 nanoseconds.
Lines: 64
Time to read input: 5223821 nanoseconds.
Time to sort input: 46455164 nanoseconds.
Lines: 128
Time to read input: 8178523 nanoseconds. Time to sort input: 57029002 nanoseconds.
Lines: 256
Time to read input: 11679290 nanoseconds. Time to sort input: 143795420 nanoseconds.
Lines: 512
Time to read input: 13580785 nanoseconds. Time to sort input: 233421869 nanoseconds.
Lines: 1024
Time to read input: 23166296 nanoseconds.
Time to sort input: 380895378 nanoseconds.
Lines: 2048
Time to read input: 41936363 nanoseconds.
Time to sort input: 624886006 nanoseconds.
Lines: 4096
Time to read input: 84959503 nanoseconds.
Time to sort input: 1005464474 nanoseconds.
Lines: 8192
Time to read input: 70184804 nanoseconds.
Time to sort input: 1731186159 nanoseconds.
Lines: 16384
Time to read input: 86784399 nanoseconds.
Time to sort input: 3184000890 nanoseconds.
Lines: 32768
Time to read input: 191539596 nanoseconds. Time to sort input: 6208496235 nanoseconds.
Lines: 65536
Time to read input: 344581783 nanoseconds. Time to sort input: 11767851115 nanoseconds.
Lines: 131072
Time to read input: 681170151 nanoseconds. Time to sort input: 24647281102 nanoseconds.
Lines: 262144
Time to read input: 1260153436 nanoseconds. Time to sort input: 51727308085 nanoseconds.
Lines: 524288
Time to read input: 2611928370 nanoseconds. Time to sort input: 104622426260 nanoseconds.
Lines: 1048576
Time to read input: 4897941590 nanoseconds.
Time to sort input: 208818012241 nanoseconds.
Lines: 2097152
Time to read input: 11310320746 nanoseconds.
Time to sort input: 427063662948 nanoseconds.
Lines: 4194304
Time to read input: 22036341478 nanoseconds.
```

```
java -cp bin TimSort
./timsort.sh: line 26: 1885 Killed
Project1/A/4194304.log outputs/A/timsort_4194304.log
Lines: 1
Time to read input: 452296 nanoseconds.
Time to sort input: 38069 nanoseconds.
Time to read input: 673102 nanoseconds.
Time to sort input: 1824277 nanoseconds.
Lines: 4
Time to read input: 895844 nanoseconds.
Time to sort input: 3123639 nanoseconds.
Lines: 8
Time to read input: 1832354 nanoseconds.
Time to sort input: 4878692 nanoseconds.
Lines: 16
Time to read input: 2544369 nanoseconds.
Time to sort input: 15219556 nanoseconds.
Lines: 32
Time to read input: 4322344 nanoseconds.
Time to sort input: 38758092 nanoseconds.
Lines: 64
Time to read input: 7046859 nanoseconds.
Time to sort input: 48349408 nanoseconds.
Lines: 128
Time to read input: 9265703 nanoseconds.
Time to sort input: 70531670 nanoseconds.
Lines: 256
Time to read input: 10327826 nanoseconds.
Time to sort input: 130145453 nanoseconds.
Lines: 512
Time to read input: 15073941 nanoseconds. Time to sort input: 221167010 nanoseconds.
Lines: 1024
Time to read input: 19369208 nanoseconds.
Time to sort input: 334165278 nanoseconds.
Lines: 2048
Time to read input: 35196506 nanoseconds.
Time to sort input: 550058968 nanoseconds.
Lines: 4096
Time to read input: 36505886 nanoseconds.
Time to sort input: 890316701 nanoseconds.
Lines: 8192
Time to read input: 54676547 nanoseconds.
Time to sort input: 1584188456 nanoseconds.
Lines: 16384
Time to read input: 86226854 nanoseconds.
Time to sort input: 2867512728 nanoseconds.
Lines: 32768
Time to read input: 187277412 nanoseconds.
Time to sort input: 5458102029 nanoseconds.
Lines: 65536
Time to read input: 334753707 nanoseconds.
Time to sort input: 10854463435 nanoseconds.
Lines: 131072
Time to read input: 703740991 nanoseconds. Time to sort input: 21245217821 nanoseconds.
Lines: 262144
Time to read input: 1295693428 nanoseconds. Time to sort input: 44011595827 nanoseconds.
Lines: 524288
Time to read input: 2569850193 nanoseconds. Time to sort input: 85225173482 nanoseconds.
Lines: 1048576
Time to read input: 4904300500 nanoseconds.
Time to sort input: 175006736772 nanoseconds.
Lines: 2097152
Time to read input: 11226121768 nanoseconds. Time to sort input: 372925849059 nanoseconds.
Lines: 4194304
Time to read input: 21946594760 nanoseconds.
```

```
java -cp bin TimSort
./timsort.sh: line 52: 14796 Killed
Project1/B/4194304.log outputs/B/timsort_4194304.log
Lines: 1
Time to read input: 407204 nanoseconds.
Time to sort input: 28164 nanoseconds.
Time to read input: 619856 nanoseconds.
Time to sort input: 1614085 nanoseconds.
Lines: 4
Time to read input: 916833 nanoseconds.
Time to sort input: 2716859 nanoseconds.
Lines: 8
Time to read input: 1872666 nanoseconds. Time to sort input: 3204797 nanoseconds.
Lines: 16
Time to read input: 2859027 nanoseconds.
Time to sort input: 4905737 nanoseconds.
Lines: 32
Time to read input: 4012908 nanoseconds.
Time to sort input: 12340166 nanoseconds.
Lines: 64
Time to read input: 7779192 nanoseconds.
Time to sort input: 30569580 nanoseconds.
Lines: 128
Time to read input: 9541025 nanoseconds.
Time to sort input: 47583849 nanoseconds.
Lines: 256
Time to read input: 10055566 nanoseconds.
Time to sort input: 60733379 nanoseconds.
Lines: 512
Time to read input: 14985486 nanoseconds. Time to sort input: 94686605 nanoseconds.
Lines: 1024
Time to read input: 19245237 nanoseconds.
Time to sort input: 195635419 nanoseconds.
Lines: 2048
Time to read input: 45280759 nanoseconds.
Time to sort input: 241143086 nanoseconds.
Lines: 4096
Time to read input: 52533421 nanoseconds.
Time to sort input: 621956076 nanoseconds.
Lines: 8192
Time to read input: 54361157 nanoseconds.
Time to sort input: 1042920736 nanoseconds.
Lines: 16384
Time to read input: 91929022 nanoseconds.
Time to sort input: 1535530997 nanoseconds.
Lines: 32768
Time to read input: 193373773 nanoseconds.
Time to sort input: 3213610503 nanoseconds.
Lines: 65536
Time to read input: 335064354 nanoseconds.
Time to sort input: 6034877443 nanoseconds.
Lines: 131072
Time to read input: 727750362 nanoseconds. Time to sort input: 13321054894 nanoseconds.
Lines: 262144
Time to read input: 1265460393 nanoseconds. Time to sort input: 25752388593 nanoseconds.
Lines: 524288
Time to read input: 2594562632 nanoseconds. Time to sort input: 52499759776 nanoseconds.
Lines: 1048576
Time to read input: 4854647097 nanoseconds.
Time to sort input: 102779016574 nanoseconds.
Lines: 2097152
Time to read input: 10197850786 nanoseconds. Time to sort input: 231908699870 nanoseconds.
Lines: 4194304
Time to read input: 21549194129 nanoseconds.
```

```
java -cp bin TimSort
./timsort.sh: line 78: 24914 Killed
Project1/C/4194304.log outputs/C/timsort_4194304.log
./timsort.sh: line 82: syntax error near unexpected token `done' ./timsort.sh: line 82: `done'
Run 2 Output
[mnshirse@engr-ras-209 src]$ ./timsort.sh
Time to read input: 412835 nanoseconds.
Time to sort input: 28931 nanoseconds.
Lines: 2
Time to read input: 603087 nanoseconds.
Time to sort input: 1776114 nanoseconds.
Lines: 4
Time to read input: 910176 nanoseconds.
Time to sort input: 3125412 nanoseconds.
Lines: 8
Time to read input: 1862486 nanoseconds.
Time to sort input: 3270083 nanoseconds.
Lines: 16
Time to read input: 2911529 nanoseconds.
Time to sort input: 11143715 nanoseconds.
Lines: 32
Time to read input: 4220539 nanoseconds. Time to sort input: 23237460 nanoseconds.
Lines: 64
Time to read input: 5340802 nanoseconds. Time to sort input: 44352125 nanoseconds.
Lines: 128
Time to read input: 8047028 nanoseconds.
Time to sort input: 53882634 nanoseconds.
Time to read input: 10617211 nanoseconds.
Time to sort input: 130896961 nanoseconds.
Lines: 512
Time to read input: 12447547 nanoseconds.
Time to sort input: 225141297 nanoseconds.
Lines: 1024
Time to read input: 18460876 nanoseconds.
Time to sort input: 370868577 nanoseconds.
Lines: 2048
Time to read input: 43205504 nanoseconds.
Time to sort input: 621292922 nanoseconds.
Lines: 4096
Time to read input: 54826080 nanoseconds.
Time to sort input: 1032384280 nanoseconds.
Lines: 8192
Time to read input: 85540561 nanoseconds.
Time to sort input: 1798339526 nanoseconds.
Lines: 16384
Time to read input: 101442434 nanoseconds. Time to sort input: 3245053360 nanoseconds.
Lines: 32768
Time to read input: 197240693 nanoseconds. Time to sort input: 6057176255 nanoseconds.
Lines: 65536
Time to read input: 336943996 nanoseconds.
Time to sort input: 12833178236 nanoseconds. Lines: 131072
Time to read input: 704368603 nanoseconds.
Time to sort input: 24987824439 nanoseconds.
Lines: 262144
Time to read input: 1289841404 nanoseconds.
Time to sort input: 50067872535 nanoseconds.
Lines: 524288
Time to read input: 2589897943 nanoseconds.
Time to sort input: 106775332683 nanoseconds.
Lines: 1048576
Time to read input: 4783125292 nanoseconds.
Time to sort input: 219482449345 nanoseconds.
```

```
Lines: 2097152
Time to read input: 11491102966 nanoseconds. Time to sort input: 442656195546 nanoseconds.
Lines: 4194304
Time to read input: 22269558724 nanoseconds. ./timsort.sh: line 26: 36093 Killed Project1/A/4194304.log outputs/A/timsort_4194304.log
                                                              java -cp bin TimSort
Lines: 1
Time to read input: 398985 nanoseconds.
Time to sort input: 27980 nanoseconds.
Time to read input: 589101 nanoseconds.
Time to sort input: 1675880 nanoseconds.
Lines: 4
Time to read input: 838379 nanoseconds.
Time to sort input: 3136197 nanoseconds.
Lines: 8
Time to read input: 1742651 nanoseconds.
Time to sort input: 4613188 nanoseconds.
Lines: 16
Time to read input: 4354622 nanoseconds.
Time to sort input: 25055588 nanoseconds.
Lines: 32
Time to read input: 4835330 nanoseconds. Time to sort input: 41898593 nanoseconds.
Lines: 64
Time to read input: 5293999 nanoseconds. Time to sort input: 47278865 nanoseconds.
Lines: 128
Time to read input: 7655475 nanoseconds.
Time to sort input: 53772694 nanoseconds.
Time to read input: 10141131 nanoseconds.
Time to sort input: 123845259 nanoseconds.
Lines: 512
Time to read input: 12912839 nanoseconds.
Time to sort input: 223059920 nanoseconds.
Lines: 1024
Time to read input: 33903705 nanoseconds.
Time to sort input: 313478474 nanoseconds.
Lines: 2048
Time to read input: 35676678 nanoseconds.
Time to sort input: 600847896 nanoseconds.
Lines: 4096
Time to read input: 37493129 nanoseconds.
Time to sort input: 975568347 nanoseconds.
Lines: 8192
Time to read input: 47839950 nanoseconds.
Time to sort input: 1604759113 nanoseconds.
Lines: 16384
Time to read input: 87309281 nanoseconds. Time to sort input: 2753635172 nanoseconds.
Lines: 32768
Time to read input: 193419716 nanoseconds. Time to sort input: 5585937504 nanoseconds.
Lines: 65536
Time to read input: 343785639 nanoseconds.
Time to sort input: 10508888770 nanoseconds. Lines: 131072
Time to read input: 705189979 nanoseconds.
Time to sort input: 21613529532 nanoseconds.
Lines: 262144
Time to read input: 1294852597 nanoseconds.
Time to sort input: 43866329476 nanoseconds.
Lines: 524288
Time to read input: 2610653567 nanoseconds.
Time to sort input: 87306835110 nanoseconds.
Lines: 1048576
Time to read input: 4962406249 nanoseconds.
Time to sort input: 170999851605 nanoseconds.
```

```
Lines: 2097152
Time to read input: 11449856069 nanoseconds. Time to sort input: 365243971147 nanoseconds.
Lines: 4194304
Time to read input: 21980038415 nanoseconds. ./timsort.sh: line 52: 46200 Killed Project1/B/4194304.log outputs/B/timsort_4194304.log
                                                              java -cp bin TimSort
Lines: 1
Time to read input: 395045 nanoseconds.
Time to sort input: 28075 nanoseconds.
Lines: 2
Time to read input: 659448 nanoseconds.
Time to sort input: 1679787 nanoseconds.
Lines: 4
Time to read input: 881288 nanoseconds.
Time to sort input: 2486473 nanoseconds.
Lines: 8
Time to read input: 1807312 nanoseconds.
Time to sort input: 3095524 nanoseconds.
Lines: 16
Time to read input: 2882097 nanoseconds.
Time to sort input: 5429855 nanoseconds.
Lines: 32
Time to read input: 4269660 nanoseconds.
Time to sort input: 12505614 nanoseconds.
Lines: 64
Time to read input: 7582455 nanoseconds. Time to sort input: 27814257 nanoseconds.
Lines: 128
Time to read input: 9241371 nanoseconds.
Time to sort input: 47471574 nanoseconds.
Time to read input: 10861823 nanoseconds.
Time to sort input: 65903648 nanoseconds.
Lines: 512
Time to read input: 14205148 nanoseconds.
Time to sort input: 95989297 nanoseconds.
Lines: 1024
Time to read input: 19575323 nanoseconds.
Time to sort input: 186451843 nanoseconds.
Lines: 2048
Time to read input: 64192429 nanoseconds.
Time to sort input: 263558397 nanoseconds.
Lines: 4096
Time to read input: 38340029 nanoseconds.
Time to sort input: 561149572 nanoseconds.
Lines: 8192
Time to read input: 48010910 nanoseconds.
Time to sort input: 1069701776 nanoseconds.
Lines: 16384
Time to read input: 93269324 nanoseconds.
Time to sort input: 1533446937 nanoseconds.
Lines: 32768
Time to read input: 218334974 nanoseconds. Time to sort input: 3355373583 nanoseconds.
Lines: 65536
Time to read input: 300434119 nanoseconds.
Time to sort input: 6135490555 nanoseconds. Lines: 131072
Time to read input: 692088925 nanoseconds.
Time to sort input: 13324315987 nanoseconds.
Lines: 262144
Time to read input: 1234920271 nanoseconds.
Time to sort input: 26261785929 nanoseconds.
Lines: 524288
Time to read input: 2424732666 nanoseconds.
Time to sort input: 55128987975 nanoseconds.
Lines: 1048576
Time to read input: 4760479586 nanoseconds.
Time to sort input: 107532908072 nanoseconds.
```

```
Lines: 2097152
Time to read input: 10106508819 nanoseconds. Time to sort input: 237141934373 nanoseconds.
Lines: 4194304
Time to read input: 21627001468 nanoseconds. ./timsort.sh: line 78: 51443 Killed Project1/C/4194304.log outputs/C/timsort_4194304.log
                                                                     java -cp bin TimSort
./timsort.sh: line 82: syntax error near unexpected token `done' ./timsort.sh: line 82: `done'
Run 3 Output
[mnshirse@engr-ras-209 src]$ ./timsort.sh
Lines: 1
Time to read input: 403648 nanoseconds. Time to sort input: 27087 nanoseconds.
Time to read input: 614229 nanoseconds.
Time to sort input: 1781191 nanoseconds.
Lines: 4
Time to read input: 814095 nanoseconds.
Time to sort input: 3120833 nanoseconds.
Lines: 8
Time to read input: 1860781 nanoseconds.
Time to sort input: 3423373 nanoseconds.
Lines: 16
Time to read input: 4254167 nanoseconds.
Time to sort input: 12282071 nanoseconds.
Lines: 32
Time to read input: 4134100 nanoseconds.
Time to sort input: 23752858 nanoseconds.
Lines: 64
Time to read input: 5476211 nanoseconds.
Time to sort input: 44122754 nanoseconds.
Lines: 128
Time to read input: 9158033 nanoseconds.
Time to sort input: 55473009 nanoseconds.
Lines: 256
Time to read input: 10623645 nanoseconds. Time to sort input: 127661334 nanoseconds.
Lines: 512
Time to read input: 14344055 nanoseconds. Time to sort input: 220595646 nanoseconds.
Lines: 1024
Time to read input: 18568665 nanoseconds.
Time to sort input: 361218165 nanoseconds.
Lines: 2048
Time to read input: 39477760 nanoseconds.
Time to sort input: 603104355 nanoseconds.
Lines: 4096
Time to read input: 57119164 nanoseconds.
Time to sort input: 926552358 nanoseconds.
Lines: 8192
Time to read input: 86166276 nanoseconds.
Time to sort input: 1754281921 nanoseconds.
Lines: 16384
Time to read input: 88599991 nanoseconds.
Time to sort input: 3156800049 nanoseconds.
Lines: 32768
Time to read input: 171939394 nanoseconds.
Time to sort input: 6053373210 nanoseconds.
Lines: 65536
Time to read input: 307554559 nanoseconds.
Time to sort input: 12037062996 nanoseconds.
Lines: 131072
Time to read input: 695383932 nanoseconds. Time to sort input: 24757555994 nanoseconds.
Lines: 262144
Time to read input: 1275070816 nanoseconds. Time to sort input: 50769874919 nanoseconds.
Lines: 524288
```

```
Time to read input: 2609630315 nanoseconds.
Time to sort input: 106278276134 nanoseconds.
Lines: 1048576
Time to read input: 4809376639 nanoseconds.
Time to sort input: 208408779694 nanoseconds.
Lines: 2097152
Time to read input: 11252048518 nanoseconds.
Time to sort input: 432586676396 nanoseconds.
Lines: 4194304
Time to read input: 22202187029 nanoseconds.
./timsort.sh: line 26: 56837 Killed
                                                                  java -cp bin TimSort
Project1/A/4194304.log outputs/A/timsort_4194304.log
Lines: 1
Time to read input: 420010 nanoseconds. Time to sort input: 31330 nanoseconds.
Time to read input: 649212 nanoseconds.
Time to sort input: 1709378 nanoseconds.
Time to read input: 868579 nanoseconds. Time to sort input: 3052745 nanoseconds.
Lines: 8
Time to read input: 1810092 nanoseconds.
Time to sort input: 4533930 nanoseconds.
Lines: 16
Time to read input: 3018005 nanoseconds.
Time to sort input: 15782360 nanoseconds.
Lines: 32
Time to read input: 4139429 nanoseconds.
Time to sort input: 37910611 nanoseconds.
Lines: 64
Time to read input: 5158137 nanoseconds.
Time to sort input: 47062569 nanoseconds.
Lines: 128
Time to read input: 9345869 nanoseconds.
Time to sort input: 57789290 nanoseconds.
Lines: 256
Time to read input: 10430341 nanoseconds. Time to sort input: 131145256 nanoseconds.
Lines: 512
Time to read input: 13645768 nanoseconds. Time to sort input: 225050235 nanoseconds.
Lines: 1024
Time to read input: 20431101 nanoseconds.
Time to sort input: 332156987 nanoseconds.
Lines: 2048
Time to read input: 33967985 nanoseconds. Time to sort input: 591826030 nanoseconds.
Lines: 4096
Time to read input: 24973198 nanoseconds.
Time to sort input: 869247763 nanoseconds.
Lines: 8192
Time to read input: 53053279 nanoseconds.
Time to sort input: 1502019846 nanoseconds.
Lines: 16384
Time to read input: 82085695 nanoseconds.
Time to sort input: 2696581477 nanoseconds.
Lines: 32768
Time to read input: 211409879 nanoseconds.
Time to sort input: 5568529688 nanoseconds.
Lines: 65536
Time to read input: 305749353 nanoseconds.
Time to sort input: 10491311808 nanoseconds.
Lines: 131072
Time to read input: 678617659 nanoseconds. Time to sort input: 21339854975 nanoseconds.
Lines: 262144
Time to read input: 1247197674 nanoseconds. Time to sort input: 43045357469 nanoseconds.
Lines: 524288
```

```
Time to read input: 2497496345 nanoseconds.
Time to sort input: 85897686410 nanoseconds.
Lines: 1048576
Time to read input: 4846854753 nanoseconds.
Time to sort input: 174899063110 nanoseconds.
Lines: 2097152
Time to read input: 11313599763 nanoseconds.
Time to sort input: 367555334926 nanoseconds.
Lines: 4194304
Time to read input: 21952147646 nanoseconds. ./timsort.sh: line 52: 65036 Killed
                                                               java -cp bin TimSort
Project1/B/4194304.log outputs/B/timsort_4194304.log
Lines: 1
Time to read input: 419999 nanoseconds. Time to sort input: 27676 nanoseconds.
Time to read input: 593886 nanoseconds.
Time to sort input: 1722685 nanoseconds.
Lines: 4
Time to read input: 906216 nanoseconds.
Time to sort input: 2486170 nanoseconds.
Lines: 8
Time to read input: 1889406 nanoseconds.
Time to sort input: 3500718 nanoseconds.
Lines: 16
Time to read input: 2876235 nanoseconds.
Time to sort input: 5126531 nanoseconds.
Lines: 32
Time to read input: 4178758 nanoseconds.
Time to sort input: 12583603 nanoseconds.
Lines: 64
Time to read input: 7442035 nanoseconds.
Time to sort input: 26223315 nanoseconds.
Lines: 128
Time to read input: 9200928 nanoseconds.
Time to sort input: 46372921 nanoseconds.
Lines: 256
Time to read input: 10130432 nanoseconds.
Time to sort input: 64001026 nanoseconds.
Lines: 512
Time to read input: 13554359 nanoseconds. Time to sort input: 95226199 nanoseconds.
Lines: 1024
Time to read input: 18703337 nanoseconds.
Time to sort input: 185316125 nanoseconds.
Lines: 2048
Time to read input: 34427039 nanoseconds. Time to sort input: 264235046 nanoseconds.
Lines: 4096
Time to read input: 38110851 nanoseconds.
Time to sort input: 556705272 nanoseconds.
Lines: 8192
Time to read input: 51257303 nanoseconds.
Time to sort input: 998055371 nanoseconds.
Lines: 16384
Time to read input: 101817277 nanoseconds.
Time to sort input: 1574378562 nanoseconds.
Lines: 32768
Time to read input: 168310458 nanoseconds.
Time to sort input: 3081343749 nanoseconds.
Lines: 65536
Time to read input: 298432095 nanoseconds.
Time to sort input: 6018195693 nanoseconds.
Lines: 131072
Time to read input: 669490563 nanoseconds.
Time to sort input: 12944319721 nanoseconds.
Lines: 262144
Time to read input: 1211015431 nanoseconds. Time to sort input: 26196204699 nanoseconds.
Lines: 524288
```