## 2022-2 객체지향 프로그래밍과 자료구조 Exam1B

2022. 9. 24. 담당교수 김영탁

### Section 1B. Class BigArray (30점) 1B.1 class BigArray

```
/* BigArray.h */
 . . . // 필요한 전처리기 설정
typedef struct
       int min;
      int max;
      double avg; // average
      double var; // variance
      double std dev; // standard deviation
} ArrayStatistics;
class BigArray
public:
       BigArray(int size); // constructor
       ~BigArray(); // destructor
       int get size() { return array size; }
      void shuffle();
      void genBigRandArray(int offset);
      void selection sort();
       void quick sort();
       void getStatistics();
       void fprintStatistics(ostream& fout);
      void fprintSample(ostream& fout, int elements per line, int num sample lines);
private:
      int *big array;
       int array size;
      ArrayStatistics stats;
```

- class BigArray는 데이터 멤버로 정수 (integer) pointer인 big\_array, 배열의 크기인 array\_size, 배열에 포함된 데이터의 통계분석결과 데이터를 저장하는 ArrayStaticstics 구조체 변수를 포함
- 큰 규모의 배열을 사용하기 위한 class BigArray를 Class BigArray.h에 구현

#### 1B.2 class BigArray 멤버함수 구현

- 생성자 (constructor)는 배열의 크기 (size)를 전달받아, 동적으로 정수 배열을 생성
- 소멸자 (destructor)는 동적으로 생성한 배열을 반환
- get size() 멤버함수는 array size를 반환
- shuffle() 멤버함수는 big array에 저장된 데이터들을 뒤섞어 줌
- genBigRandArray(int offset)은 class BigArray에 설정된 array\_size 개수의 정수형 난수를 (0~array\_size-1) + offset 구간에서 중복되지 않는 정수형 난수 배열로 구성
- selection sort()는 big array에 저장된 데이터들을 선택 정렬 방식으로 오름 차순 정렬
- quick\_sort() 멤버함수는 big\_array에 저장된 데이터들을 퀵 정렬 방식으로 오름 차순 정렬
- getStatistics() 멤버함수는 big\_array에 저장된 데이터들의 통계분석 자료(최소, 최대, 평균, 분산, 표준 편차)를 산출하여 데이터 멤버인 stats에 기록
- fprintStatistics() 멤버함수는 big\_array에 저장된 데이터들의 통계분석 자료(최소, 최대, 평균, 분산, 표 준편차)를 산출하며, 그 결과를 지정된 파일 fout에 출력
- fprintSample() 멤버함수는 big\_array에 저장된 데이터들 중 첫 부분과 끝 부분에서 한 줄에 elements\_per\_line 개 씩 num\_sample\_lines 줄의 데이터를 출력

- class BigArray의 멤버 함수들은 BigArray.cpp에 구현할 것

#### 1B.3 main() 함수 구현

```
/* main BigArray.cpp */
. . . // 필요한 헤더파일 추가, 전처리기 설정
#define ELEMENTS PER LINE 10
#define SAMPLE LINES 5
void main()
       ofstream fout;
       fout.open("output.txt");
       if (fout.fail())
              cout << "Error in opening output.txt !!" << endl;</pre>
              exit;
       }
       int big rand size = 1000;
       int base offset = 0;
       BigArray ba 1 (big rand size);
       fout << "Generating big rand array of " << ba 1.get size()
            << " elements with base offset (" << base offset << ") ... " << endl;
       ba 1.genBigRandArray(base offset);
       ba_1.fprintSample(fout, ELEMENTS_PER LINE, SAMPLE LINES);
       ba_1.fprintStatistics(fout);
       ba 1.selection sort();
       fout << "Sorted big random array :" << endl;</pre>
       ba 1.fprintSample(fout, ELEMENTS PER LINE, SAMPLE LINES);
       cout << endl;
       big rand size = 10000000;
       base offset = -big rand size / 2;
       BigArray ba 2 (big rand size);
       fout << endl << "Generating big rand array of " << ba 2.get size()</pre>
           << " elements with base offset (" << base offset << ") ... " << endl;</pre>
       ba 2.genBigRandArray(base offset);
       ba_2.fprintSample(fout, ELEMENTS_PER LINE, SAMPLE LINES);
       ba_2.fprintStatistics(fout);
ba_2.quick_sort();
       fout << "Sorted big random array :" << endl;</pre>
       ba 2.fprintSample(fout, ELEMENTS PER LINE, SAMPLE LINES);
       fout.close();
```

# 1B.4 실행 결과 화면출력

Canaratia	him		000 03						
Generating 831		array of 10		ts with bas	e_orrset 554	94	194	443	594
869		155	13	942	666	785	500	643	540
727		22	1975	4-5-1121	132		670	28	693
524					793		404	742	587
35			828		755	321	616	521	518
33	71	702	020	333	155	321	010	321	510
136		968	43	750	858	335	957	81	477
809		962			241		527	316	837
378					459		87	12	621
868		211		420	190	611	746	319	1
413					304	509	615	332	63
Statistics									
		ava (499	.50). var	(83333.25),	std dev	(288.67)			
Sorted big			.00// /41	(00000.20),	Dod_de,	(200.01)			
0			3	4	5	6	7	8	
10					15	16	17	18	1
20		22			25		27	28	25
30					35		37	38	3
40					45	46	47	48	4
950		952	953	954	955	956	957	958	95
960		962			965	966	967	968	96
		972			975	976	977	978	97
970					2,0		7000		
970			983	984	985	986	987	988	9.8
970 980 990 Generating	981 991	982 992	993	984 994 ements with	985 995 base offs	986 996 set (-50000	987 997	988	989
980 990 Generating 1	981 991 big rand a 2231664	982 992 rray of 10 3927757	993 000000 ele -2547427	994 ments with -2922335	995 base_offs -4999995	996 set (-50000 1065825	997 00) -3737709	998	-35828
980 990 Generating 1 3419425 -4999990	981 991 big rand a 2231664 1551057	982 992 rray of 10 3927757 -4158702	993 000000 ele -2547427 -2596753	994 ments with -2922335 -3040963	995 base_offs -499995 4111485	996 set (-50000 1065825 -260547	997 00) -3737709 3797836	998 -1615286 -3347002	-35828 -377594
980 990 Generating 1 3419425 -4999990 3597089	981 991 big rand a 2231664 1551057 -1516374	982 992 rray of 10 3927757 -4158702 -1687828	993 000000 ele -2547427 -2596753 3841874	994 ments with -2922335 -3040963 -2838727	995 base_offs -499995 4111485 3041650	996 set (-50000 1065825 -260547 -3646691	997 00)3737709 3797836 4473317	998 -1615286 -3347002 -1792894	-35828 -377594 -99726
980 990 Senerating 1 3419425 -4999990 3597089 -4999970	981 991 big rand a 2231664 1551057 -1516374 518337	982 992 rray of 10 3927757 -4158702 -1687828 2434387	993 000000 ele -2547427 -2596753 3841874 -156452	994 ments with -2922335 -3040963 -2838727 2200717	995 base_offs -4999995 4111485 3041650 3482337	996 set (-50000 1065825 -260547 -3646691 3470668	997 00)3737709 3797836 4473317 2898671	998 -1615286 -3347002 -1792894 3273337	-35828 -377594 -99726 -113477
980 990 Senerating 1 3419425 -4999990 3597089 -4999970	981 991 big rand a 2231664 1551057 -1516374	982 992 rray of 10 3927757 -4158702 -1687828 2434387	993 000000 ele -2547427 -2596753 3841874 -156452	994 ments with -2922335 -3040963 -2838727	995 base_offs -4999995 4111485 3041650 3482337	996 set (-50000 1065825 -260547 -3646691 3470668	997 00)3737709 3797836 4473317 2898671	998 -1615286 -3347002 -1792894 3273337	-35828 -377594 -99726 -113477
980 990 Senerating 1 3419425 -499990 3597089 -4999970 1926655	981 991 big rand a 2231664 1551057 -1516374 518337 -2564217	982 992 rray of 10 3927757 -4158702 -1687828 2434387 -3486532	993 000000 ele -2547427 -2596753 3841874 -156452 536305	994 ments with -2922335 -3040963 -2838727 2200717 -4999956	995 base_offs -499995 4111485 3041650 3482337 -1761013	996 set (-50000 1065825 -260547 -3646691 3470668 3900905	997  00)  -3737709  3797836  4473317  2898671  2970674	998 -1615286 -3347002 -1792894 3273337 429833	99 -35828 -377594 -99726 -113477 -424763
980 990 Senerating 1 3419425 -499990 3597089 -4999970 1926655 	981 991 big rand a 2231664 1551057 -1516374 518337 -2564217	982 992 rray of 10 3927757 -4158702 -1687828 2434387 -3486532	993 000000 ele -2547427 -2596753 3841874 -156452 536305	994 ments with -2922335 -3040963 -2838727 2200717 -4999956	995 base_offs -499995 4111485 3041650 3482337 -1761013	996  set (-50000 1065825 -260547 -3646691 3470668 3900905	997  00)  -3737709 3797836 4473317 2898671 2970674  -191478	998 -1615286 -3347002 -1792894 3273337 429833	-35828 -377594 -99726 -113477 -424763
980 990 Generating 1 3419425 -499990 3597089 -4999970 1926655  1335108 -2987468	981 991 big rand a 2231664 1551057 -1516374 518337 -2564217 	982 992 rray of 10 3927757 -4158702 -1687828 2434387 -3486532 730514 1156056	993 000000 ele -2547427 -2596753 3841874 -156452 536305 4999953 4454483	994 ments with -2922335 -3040963 -2838727 2200717 -4999956	995 base_offs -499995 4111485 3041650 3482337 -1761013 4999955 -4775958	996  set (-50000 1065825 -260547 -3646691 3470668 3900905 -4402349 4999966	997  00)  -3737709 3797836 4473317 2898671 2970674  -191478 2706355	998 -1615286 -3347002 -1792894 3273337 429833 4982041 -2153128	-35828 -377594 -99726 -113477 -424763 -269538 -290496
980 990 Senerating 1 3419425 -499990 3597089 -4999970 1926655  1335108 -2987468 -3255081	981 991 big rand a 2231664 1551057 -1516374 518337 -2564217 	982 992 rray of 10 3927757 -4158702 -1687828 2434387 -3486532 730514 1156056 2019192	993 000000 ele -2547427 -2596753 3841874 -156452 536305 4999953 4454483 4813573	994 ements with -2922335 -3040963 -2838727 2200717 -4999956  942073 -4685791 4374740	995 base_offs -499995 4111485 3041650 3482337 -1761013 4999955 -4775958 3379848	996  set (-50000 1065825 -260547 -3646691 3470668 3900905 -4402349 4999966 4505806	997  00)  -3737709 3797836 4473317 2898671 2970674  -191478 2706355 4999977	998 -1615286 -3347002 -1792894 3273337 429833 4982041 -2153128 3597532	-35828 -377594 -99726 -113477 -424763 -269538 -290496 -133371
980 990 Senerating 1 3419425 -499990 3597089 -4999970 1926655  1335108 -2987468 -3255081	981 991 big rand a 2231664 1551057 -1516374 518337 -2564217 	982 992 rray of 10 3927757 -4158702 -1687828 2434387 -3486532 730514 1156056 2019192 -2561807	993 000000 ele -2547427 -2596753 3841874 -156452 536305 4999953 4454483 4813573	994 ments with -2922335 -3040963 -2838727 2200717 -4999956  942073 -4685791 4374740 398045	995 base_offs -499995 4111485 3041650 3482337 -1761013 4999955 -4775958	996  set (-50000 1065825 -260547 -3646691 3470668 3900905 -4402349 4999966 4505806	997  00)  -3737709 3797836 4473317 2898671 2970674  -191478 2706355 4999977 4589337	998 -1615286 -3347002 -1792894 3273337 429833 4982041 -2153128	-35828 -377594 -99726 -113477 -424763 -269538 -290496 -133371 499998
980 990 Generating 1 3419425 -499990 3597089 -4999970 1926655  1335108 -2987468 -3255081 2918233 4999990	981 991 big rand a 2231664 1551057 -1516374 518337 -2564217 	982 992 rray of 10 3927757 -4158702 -1687828 2434387 -3486532 730514 1156056 2019192 -2561807	993 000000 ele -2547427 -2596753 3841874 -156452 536305 4999953 4454483 4813573 -1308424	994 ments with -2922335 -3040963 -2838727 2200717 -4999956  942073 -4685791 4374740 398045	995 base_offs -499995 4111485 3041650 3482337 -1761013 4999955 -4775958 3379848 -2564273	996  set (-50000 1065825 -260547 -3646691 3470668 3900905 -4402349 4999966 4505806 4999986	997  00)  -3737709 3797836 4473317 2898671 2970674  -191478 2706355 4999977 4589337	998 -1615286 -3347002 -1792894 3273337 429833 4982041 -2153128 3597532 4368457	-35828 -377594 -99726 -113477 -424763 -269538 -290496 -133371 499998
980 990 Generating 1 3419425 -499990 3597089 -499970 1926655  1335108 -2987468 -3255081 2918233 4999990	981 991 big rand a 2231664 1551057 -1516374 518337 -2564217 	982 992 rray of 10 3927757 -4158702 -1687828 2434387 -3486532 730514 1156056 2019192 -2561807 3460441	993 000000 ele -2547427 -2596753 3841874 -156452 536305 4999953 4454483 4813573 -1308424 -1658043	994 ments with -2922335 -3040963 -2838727 2200717 -4999956  942073 -4685791 4374740 398045 -3920889	995 base_offs -499995 4111485 3041650 3482337 -1761013 4999955 -4775958 3379848 -2564273 2129381	996  set (-50000 1065825 -260547 -3646691 3470668 3900905 -4402349 4999966 4505806 4999986 4999996	997  00)  -3737709 3797836 4473317 2898671 2970674  -191478 2706355 4999977 4589337 3951290	998 -1615286 -3347002 -1792894 3273337 429833 4982041 -2153128 3597532 4368457 -3306124	-35828 -377594 -99726 -113477 -424763 -269538 -290496 -133371 499998
980 990 Senerating 1 3419425 -499990 3597089 -4999970 1926655  1335108 -2987468 -3255081 2918233 4999990 Statistics: min (-500	981 991 big rand a 2231664 1551057 -1516374 518337 -2564217 	982 992 rray of 10 3927757 -4158702 -1687828 2434387 -3486532 730514 1156056 2019192 -2561807 3460441 (4999999)	993 000000 ele -2547427 -2596753 3841874 -156452 536305 4999953 4454483 4813573 -1308424 -1658043	994 ments with -2922335 -3040963 -2838727 2200717 -4999956  942073 -4685791 4374740 398045	995 base_offs -499995 4111485 3041650 3482337 -1761013 4999955 -4775958 3379848 -2564273 2129381	996  set (-50000 1065825 -260547 -3646691 3470668 3900905 -4402349 4999966 4505806 4999986 4999996	997  00)  -3737709 3797836 4473317 2898671 2970674  -191478 2706355 4999977 4589337 3951290	998 -1615286 -3347002 -1792894 3273337 429833 4982041 -2153128 3597532 4368457 -3306124	-35828 -377594 -99726 -113477 -424763 -269538 -290496 -133371 499998
980 990 Generating 1 3419425 -499990 3597089 -4999970 1926655  1335108 -2987468 -3255081 2918233 4999990 Statistics: min (-500) Sorted big :	981 991 big rand a 2231664 1551057 -1516374 518337 -2564217 	982 992 rray of 10 3927757 -4158702 -1687828 2434387 -3486532 730514 1156056 2019192 -2561807 3460441 (4999999) ay:	993  000000 ele -2547427 -2596753 3841874 -156452 536305  4999953 4454483 4813573 -1308424 -1658043  , avg (-0.	994 ments with -2922335 -3040963 -2838727 2200717 -4999956  942073 -4685791 4374740 398045 -3920889  50), var (	995 base_offs -499995 4111485 3041650 3482337 -1761013 4999955 -4775958 3379848 -2564273 2129381	996  set (-50000 1065825 -260547 -3646691 3470668 3900905 -4402349 4999966 4505806 4999986 4999996	997  00)  -3737709 3797836 4473317 2898671 2970674  -191478 2706355 499977 4589337 3951290	998 -1615286 -3347002 -1792894 3273337 429833 4982041 -2153128 3597532 4368457 -3306124	999 -35828 -377594 -99726 -113477 -424763 -269538 -290496 -133371 499998 -21923
980 990 Generating 1 3419425 -499990 3597089 -4999970 1926655  1335108 -2987468 -3255081 2918233 4999990 Statistics: min (-500 Gorted big: -50000000	981 991 big rand a 2231664 1551057 -1516374 518337 -2564217 	982 992 rray of 10 3927757 -4158702 -1687828 2434387 -3486532 730514 1156056 2019192 -2561807 3460441 (4999999) ay: -4999998	993  000000 ele -2547427 -2596753 3841874 -156452 536305  4999953 4454483 4813573 -1308424 -1658043  , avg (-0.	994 ments with -2922335 -3040963 -2838727 2200717 -4999956  942073 -4685791 4374740 398045 -3920889  50), var (	995 base_offs -499995 4111485 3041650 3482337 -1761013 4999955 -4775958 3379848 -2564273 2129381 83333333333333333333333333333333333	996  set (-50000 1065825 -260547 -3646691 3470668 3900905 -4402349 4999966 4505806 4999986 4999996	997  00)  -3737709 3797836 4473317 2898671 2970674  -191478 2706355 499977 4589337 3951290  atd_dev (28  -4999993	998 -1615286 -3347002 -1792894 3273337 429833 4982041 -2153128 3597532 4368457 -3306124	-35828 -377594 -99726 -113477 -424763 -269538 -290496 -133371 499998 -21923
980 990 Senerating 1 3419425 -499990 3597089 -4999970 1926655  1335108 -2987468 -3255081 2918233 4999990 Statistics: min (-500 Sorted big: -5000000 -4999990	981 991 big rand a 2231664 1551057 -1516374 518337 -2564217 	982 992 rray of 10 3927757 -4158702 -1687828 2434387 -3486532 730514 1156056 2019192 -2561807 3460441 (4999999) ay: -4999998	993  000000 ele -2547427 -2596753 3841874 -156452 536305  4999953 4454483 4813573 -1308424 -1658043  , avg (-04999997 -4999987	994 ments with -2922335 -3040963 -2838727 2200717 -4999956  942073 -4685791 4374740 398045 -3920889  50), var ( -4999996 -4999986	995 base_offs -499995 4111485 3041650 3482337 -1761013 4999955 -4775958 3379848 -2564273 2129381 83333333333333333333333333333333333	996  set (-50000 1065825 -260547 -3646691 3470668 3900905 -4402349 4999966 4505806 4999986 4999998 3333.80), s	997  00)  -3737709 3797836 4473317 2898671 2970674  -191478 2706355 499977 4589337 3951290  atd_dev (28  -4999993 -4999983	998  -1615286 -3347002 -1792894 3273337 429833  4982041 -2153128 3597532 4368457 -3306124  886751.35) -4999992 -4999982	-35828 -377594 -99726 -113477 -424763 -269538 -290496 -133371 499998 -21923
980 990 Senerating 1 3419425 -499990 3597089 -4999970 1926655 1335108 -2987468 -3255081 2918233 4999990 Statistics: min (-500 Sorted big: -5000000 -4999990 -49999980	981 991 big rand a 2231664 1551057 -1516374 518337 -2564217 	982 992 rray of 10 3927757 -4158702 -1687828 2434387 -3486532 730514 1156056 2019192 -2561807 3460441 (4999999) ay: -4999998 -4999988 -4999978	993  000000 ele -2547427 -2596753 3841874 -156452 536305  4999953 4454483 4813573 -1308424 -1658043  , avg (-04999997 -4999987 -4999977	994 ments with -2922335 -3040963 -2838727 2200717 -4999956  942073 -4685791 4374740 398045 -3920889  50), var ( -4999996 -4999986 -4999976	995 base_offs -499995 4111485 3041650 3482337 -1761013 4999955 -4775958 3379848 -2564273 2129381 8333333333 -4999995 -4999995 -4999975	996  set (-50000 1065825 -260547 -3646691 3470668 3900905 -4402349 4999966 4505806 4999986 4999996 3333.80), s -499994 -499994 -4999974	997  00)  -3737709 3797836 4473317 2898671 2970674  -191478 2706355 499977 4589337 3951290  td_dev (28  -4999993 -4999983 -4999973	998 -1615286 -3347002 -1792894 3273337 429833 4982041 -2153128 3597532 4368457 -3306124 886751.35) -4999992 -4999992 -4999972	-35828 -377594 -99726 -113477 -424763 -269538 -290496 -133371 499998 -21923
980 990 Generating 1 3419425 -499990 3597089 -4999970 1926655 1335108 -2987468 -3255081 2918233 4999990 Statistics: min (-500 Sorted big: -5000000 -4999990 -4999990 -4999970	981 991 big rand a 2231664 1551057 -1516374 518337 -2564217 	982 992 rray of 10 3927757 -4158702 -1687828 2434387 -3486532 730514 1156056 2019192 -2561807 3460441 (4999999) ay: -4999998 -4999988 -4999978 -4999968	993  000000 ele -2547427 -2596753 3841874 -156452 536305  4999953 4454483 4813573 -1308424 -1658043  , avg (-04999997 -4999987 -4999967	994 ments with -2922335 -3040963 -2838727 2200717 -4999956  942073 -4685791 4374740 398045 -3920889  50), var ( -4999996 -4999986	995 base_offs -499995 4111485 3041650 3482337 -1761013 4999955 -4775958 3379848 -2564273 2129381 8333333333 -4999995 -4999995 -4999975 -4999965	996  set (-50000 1065825 -260547 -3646691 3470668 3900905 -4402349 4999966 4505806 4999986 4999996 3333.80), s -499994 -499994 -499994 -4999964	997  00)  -3737709 3797836 4473317 2898671 2970674  -191478 2706355 4999977 4589337 3951290  atd_dev (28  -4999993 -4999993 -4999973 -4999963	998  -1615286 -3347002 -1792894 3273337 429833  4982041 -2153128 3597532 4368457 -3306124  886751.35) -4999992 -4999982 -4999972 -4999962	-35828 -377594 -99726 -113477 -424763 -269538 -290496 -133371 499998 -21923 -499999 -499999 -499999
980 990 Senerating 1 3419425 -4999990 3597089 -4999970 1926655  1335108 -2987468 -3255081 2918233 4999990 Statistics: min (-500 Sorted big : -5000000 -4999990 -4999990 -4999990 -4999960	981 991 big rand a 2231664 1551057 -1516374 518337 -2564217 	982 992 rray of 10 3927757 -4158702 -1687828 2434387 -3486532 730514 1156056 2019192 -2561807 3460441 (4999999) ay: -4999998 -4999988 -4999978 -4999968	993  000000 ele -2547427 -2596753 3841874 -156452 536305  4999953 4454483 4813573 -1308424 -1658043  , avg (-04999997 -4999987 -4999967	994 ments with -2922335 -3040963 -2838727 2200717 -4999956  942073 -4685791 4374740 398045 -3920889  50), var ( -4999996 -4999986 -4999976 -4999966	995 base_offs -499995 4111485 3041650 3482337 -1761013 4999955 -4775958 3379848 -2564273 2129381 8333333333 -4999995 -4999995 -4999975 -4999965	996  set (-50000 1065825 -260547 -3646691 3470668 3900905 -4402349 4999966 4505806 4999986 4999996 3333.80), s -499994 -499994 -499994 -4999964	997  00)  -3737709 3797836 4473317 2898671 2970674  -191478 2706355 4999977 4589337 3951290  atd_dev (28  -4999993 -4999993 -4999973 -4999963	998  -1615286 -3347002 -1792894 3273337 429833  4982041 -2153128 3597532 4368457 -3306124  886751.35) -4999992 -4999982 -4999972 -4999962	-499998 -499998 -499998 -499998
980 990 Generating 1 3419425 -499990 3597089 -4999970 1926655  1335108 -2987468 -3255081 2918233 4999990 Statistics: min (-500 50rted big: -5000000 -4999990 -4999990 -4999960	981 991 big rand a 2231664 1551057 -1516374 518337 -2564217 	982 992 rray of 10 3927757 -4158702 -1687828 2434387 -3486532 730514 1156056 2019192 -2561807 3460441 (4999999) ay: -4999998 -4999988 -4999978 -4999988 -4999958	993  000000 ele -2547427 -2596753 3841874 -156452 536305  4999953 4454483 4813573 -1308424 -1658043  , avg (-04999997 -4999987 -4999987 -4999957	994  ments with -2922335 -3040963 -2838727 2200717 -4999956  942073 -4685791 4374740 398045 -3920889  50), var ( -499996 -499996 -4999966 -4999956	995 base_offs -499995 4111485 3041650 3482337 -1761013 4999955 -4775958 3379848 -2564273 2129381 8333333333 -4999995 -4999985 -4999975 -4999955	996  set (-50000 1065825 -260547 -3646691 3470668 3900905 -4402349 4999966 4505806 4999986 4999996 3333.80), s -499994 -499994 -4999954	997  00)  -3737709 3797836 4473317 2898671 2970674  -191478 2706355 4999977 4589337 3951290  td_dev (28  -499993 -499993 -499993 -4999953	998  -1615286 -3347002 -1792894 3273337 429833  4982041 -2153128 3597532 4368457 -3306124  886751.35) -4999992 -4999982 -4999972 -4999952	999 -35828 -377594 -99726 -113477 -424763 -269538 -290496 -133371 499998 -21923 -499999 -499999 -499999 -499995
980 990 Senerating 1 3419425 -499990 3597089 -4999970 1926655 1335108 -2987468 -3255081 2918233 4999990 Statistics: min (-500 Sorted big: -5000000 -4999990 -4999990 -4999960 4999950	981 991 big rand a 2231664 1551057 -1516374 518337 -2564217 	982 992 rray of 10 3927757 -4158702 -1687828 2434387 -3486532 730514 1156056 2019192 -2561807 3460441 (4999999) ay: -4999998 -4999988 -4999988 -4999958	993  000000 ele -2547427 -2596753 3841874 -156452 536305  4999953 4454483 4813573 -1308424 -1658043  , avg (-04999997 -4999987 -4999957 -4999957	994  ments with -2922335 -3040963 -2838727 2200717 -4999956  942073 -4685791 4374740 398045 -3920889  50), var ( -499996 -499996 -4999966 -4999956	995 base_offs -499995 4111485 3041650 3482337 -1761013 4999955 -4775958 3379848 -2564273 2129381 833333333 -4999995 -4999955 -4999955 -4999955	996  set (-50000 1065825 -260547 -3646691 3470668 3900905  -4402349 4999966 4505806 4999986 4999996 3333.80), s -499994 -499994 -4999954	997  00)  -3737709 3797836 4473317 2898671 2970674  -191478 2706355 4999977 4589337 3951290  td_dev (28  -4999993 -4999983 -4999973 -4999953  4999957	998  -1615286 -3347002 -1792894 3273337 429833  4982041 -2153128 3597532 4368457 -3306124  886751.35)  -4999992 -4999982 -4999972 -4999952  4999958	99  -35828 -377594 -99726 -113477 -424763  -269538 -290496 -133371 499998 -21923  -499998 -499995 -499995
980 990 Generating 1 3419425 -499990 3597089 -4999970 1926655 1335108 -2987468 -3255081 2918233 4999990 Statistics: min (-500 Sorted big: -5000000 -4999990 -4999980 -4999960 4999950 4999950 4999960	981 991 big rand a 2231664 1551057 -1516374 518337 -2564217 	982 992 rray of 10 3927757 -4158702 -1687828 2434387 -3486532 730514 1156056 2019192 -2561807 3460441 (4999999) ay: -4999998 -4999988 -4999988 -4999988 -4999958	993  000000 ele -2547427 -2596753 3841874 -156452 536305  4999953 4454483 4813573 -1308424 -1658043  , avg (-04999997 -4999987 -4999957 -4999957 -4999953 4999953 4999963	994  ments with -2922335 -3040963 -2838727 2200717 -4999956  942073 -4685791 4374740 398045 -3920889  50), var ( -499996 -499996 -4999966 -4999956 4999954 4999964	995 base_offs -499995 4111485 3041650 3482337 -1761013 4999955 -4775958 3379848 -2564273 2129381 833333333 -4999995 -4999955 -4999955 -4999955 4999955 4999965	996  set (-50000 1065825 -260547 -3646691 3470668 3900905  -4402349 4999966 4505806 4999986 4999996 3333.80), s -499994 -499994 -4999954 4999956 4999966	997  00)  -3737709 3797836 4473317 2898671 2970674  -191478 2706355 4999977 4589337 3951290  td_dev (28  -499993 -499993 -499993 -4999953 -4999953	998  -1615286 -3347002 -1792894 3273337 429833  4982041 -2153128 3597532 4368457 -3306124  886751.35)  -4999992 -4999982 -4999972 -4999952  4999958 4999968	-35828 -377594 -99726 -113477 -424763 -269538 -290496 -133371 499998 -499999 -499999 -499995 499995 499995
980 990 Generating 1 3419425 -4999990 3597089 -4999970 1926655  1335108 -2987468 -3255081 2918233 4999990 Statistics: min (-500 Sorted big: -5000000 -4999990 -4999970 -4999960 4999950 4999970	981 991 big rand a 2231664 1551057 -1516374 518337 -2564217 	982 992 rray of 10 3927757 -4158702 -1687828 2434387 -3486532 730514 1156056 2019192 -2561807 3460441 (4999999) ay: -499998 -499998 -499998 -499998 -499998 -499998 -4999952 4999952 4999972	993  000000 ele -2547427 -2596753 3841874 -156452 536305  4999953 4454483 4813573 -1308424 -1658043  , avg (-0499997 -499997 -499997 -499997 -4999953 4999953 4999953 4999973	994  ments with -2922335 -3040963 -2838727 2200717 -4999956  942073 -4685791 4374740 398045 -3920889  50), var ( -499996 -499996 -499996 -499996 -499996 -499996 -499996 -4999974	995 base_offs -499995 4111485 3041650 3482337 -1761013 4999955 -4775958 3379848 -2564273 2129381 8333333333 -499995 -499995 -499995 -499995 -499995 499995 499995 499995 499995	996  set (-50000 1065825 -260547 -3646691 3470668 3900905  -4402349 4999966 4505806 4999986 4999996 3333.80), s -499994 -499994 -499994 -4999954 4999956 4999966 4999976	997  00)  -3737709 3797836 4473317 2898671 2970674  -191478 2706355 4999977 4589337 3951290  td_dev (28  -499993 -499993 -499993 -4999953 -4999953 4999977 4999967 4999977	998  -1615286 -3347002 -1792894 3273337 429833  4982041 -2153128 3597532 4368457 -3306124  886751.35) -4999992 -4999982 -4999972 -4999952 4999952 4999958 4999958 4999978	999 -35828 -377594 -99726 -113477 -424763 -269538 -290496 -133371 499998 -499999 -499999 -499995 499995 499995
980 990 Generating 1 3419425 -499990 3597089 -4999970 1926655 1335108 -2987468 -3255081 2918233 4999990 Statistics: min (-500 Sorted big: -5000000 -4999990 -4999980 -4999960 4999970 4999980	981 991 big rand a 2231664 1551057 -1516374 518337 -2564217 	982 992 rray of 10 3927757 -4158702 -1687828 2434387 -3486532 730514 1156056 2019192 -2561807 3460441 (4999999) ay: -4999998 -4999988 -4999988 -4999988 -4999958 4999952 4999952 4999962 4999982	993  000000 ele -2547427 -2596753 3841874 -156452 536305  4999953 4454483 4813573 -1308424 -1658043  , avg (-0499997 -499997 -499997 -4999957 4999957 4999953 4999953 4999953 4999953 4999983	994  ments with -2922335 -3040963 -2838727 2200717 -4999956  942073 -4685791 4374740 398045 -3920889  50), var ( -499996 -499996 -4999966 -4999956 4999954 4999964	995 base_offs -499995 4111485 3041650 3482337 -1761013 4999955 -4775958 3379848 -2564273 2129381 8333333333 -499995 -499995 -499995 -499995 499995 499995 499995 499995 499995 499995 499995	996  set (-50000 1065825 -260547 -3646691 3470668 3900905  -4402349 4999966 4505806 4999986 4999996 3333.80), s -499994 -499994 -499994 -4999954 4999956 4999956 4999966 4999966 4999966 4999986	997  00)  -3737709 3797836 4473317 2898671 2970674  -191478 2706355 4999977 4589337 3951290  td_dev (28  -499993 -499993 -499993 -4999953  4999957 4999957 4999967 4999987	998  -1615286 -3347002 -1792894 3273337 429833  4982041 -2153128 3597532 4368457 -3306124  886751.35) -4999992 -4999952 -4999952 -4999952 4999958 4999958 4999978 4999988	99  -35828 -377594 -99726 -113477 -424763  -269538 -290496 -133371 499998 -499998 -499998 499995 499995 499998