

ElementSorter.java

Objective: Using different sorting algorithms to organize custom objects.

Background:

Are you in Chemistry this year? Or do you have a friend who is taking Chemistry? One important area of study is the elements, the basic building blocks that make up all matter in the universe (excluding dark matter). The **Periodic Table** lists 118 elements. Each element has a number, a name, a symbol, and an atomic mass. The graphical table is shown below.

The Periodic Table of the Elements

1 IA IIA	1 H Hydrogen 1.00794	2 He Helium 4.00260	13 IIIA 3A	14 IVA 4A	15 VA 5A	16 VIA 6A	17 VIIA 7A	18 VIIIA 8A	2 He Helium 4.00260										
2 Li Lithium 6.941	3 Be Beryllium 9.01218	4 B Boron 10.811	5 C Carbon 12.011	6 N Nitrogen 14.007	7 O Oxygen 15.999	8 F Fluorine 18.998	9 Ne Neon 20.180	10 Ne Neon 20.180	10 Ne Neon 20.180										
3 Na Sodium 22.990	4 Mg Magnesium 24.305	5 Al Aluminum 26.982	6 Si Silicon 28.086	7 P Phosphorus 30.974	8 S Sulfur 32.065	9 Cl Chlorine 35.453	10 Ar Argon 39.948	11 Ar Argon 39.948	18 Ar Argon 39.948										
4 K Potassium 39.098	5 Ca Calcium 40.078	6 Sc Scandium 44.956	7 Ti Titanium 47.883	8 V Vanadium 50.942	9 Cr Chromium 51.996	10 Mn Manganese 54.938	11 Fe Iron 55.845	12 Co Cobalt 58.933	13 Ni Nickel 58.693	14 Cu Copper 63.546	15 Zn Zinc 65.38	16 Ga Gallium 69.723	17 Ge Germanium 72.64	18 As Arsenic 74.922	19 Se Selenium 78.96	20 Br Bromine 79.904	21 Kr Krypton 83.80	22 Kr Krypton 83.80	36 Kr Krypton 83.80
5 Rb Rubidium 85.468	6 Sr Strontium 87.62	7 Y Yttrium 88.906	8 Zr Zirconium 91.224	9 Nb Niobium 92.906	10 Mo Molybdenum 95.94	11 Tc Technetium 98	12 Ru Ruthenium 101.07	13 Rh Rhodium 102.91	14 Pd Palladium 106.42	15 Ag Silver 107.87	16 Cd Cadmium 112.41	17 In Indium 114.82	18 Sn Tin 118.71	19 Sb Antimony 121.76	20 Te Tellurium 127.6	21 I Iodine 126.91	22 Xe Xenon 131.29	23 Xe Xenon 131.29	54 Xe Xenon 131.29
6 Cs Cesium 132.91	7 Ba Barium 137.33	8 La Lanthanum 138.91	9 Hf Hafnium 178.49	10 Ta Tantalum 180.95	11 W Tungsten 183.85	12 Re Rhenium 186.21	13 Os Osmium 190.23	14 Ir Iridium 192.22	15 Pt Platinum 195.08	16 Au Gold 196.97	17 Hg Mercury 200.59	18 Tl Thallium 204.38	19 Pb Lead 207.2	20 Bi Bismuth 208.98	21 Po Polonium 209	22 At Astatine 210	23 Rn Radon 222	24 Rn Radon 222	86 Rn Radon 222
7 Fr Francium 223	8 Ra Radium 226	9 Ac Actinium 227	10 Rf Rutherfordium 261	11 Db Dubnium 262	12 Sg Seaborgium 266	13 Bh Bohrium 264	14 Hs Hassium 277	15 Mt Meitnerium 268	16 Ds Darmstadtium 271	17 Rg Roentgenium 272	18 Cn Copernicium 285	19 Uut Ununtrium 284	20 Fl Flerovium 289	21 Uup Ununpentium 288	22 Lv Livermorium 293	23 Uus Ununseptium 294	24 Uuo Ununoctium 294	25 Uuo Ununoctium 294	118 Uuo Ununoctium 294

Legend:

- Alkali metals
- Alkaline earth metals
- Other metals
- Transition metals
- Lanthanoids
- Actinoids
- Halogens
- Noble gases
- Hydrogen

In this project, you will order the elements in different ways:

- 1) By number
- 2) By name
- 3) By atomic mass
- 4) By symbol

Assignment:

1. Write a class **ElementEntry** which is the template for an element. It will have fields to store the name (`String`), the number (`int`), the symbol (`String`), and the atomic mass (`double`) of an element. **ElementEntry** should have `compareTo` methods, like `compareToName`, `compareToNumber`, etc. so elements can be compared and ordered by name, number, etc. A `toString` method should also be included to print out the element's information formatted properly as shown below. Refer to the sample run at the end for more examples.

```
89 Actinium Ac 227.03
```

2. Use the starter code provided to create **ElementSorter.java**. Use the data file **elements.txt** for the element information. The **ElementSorter** class should have a field to store the elements, an `ArrayList` of `ElementEntry`s called **elements**. Write the methods necessary to load the information from **elements.txt** into `ArrayList` **elements**.
3. In **ElementSorter.java**, you are given the `displayPrompt()` method to present the user with a menu to choose from: (1) sort the `ArrayList` of `ElementEntry`s by name using **Bubble Sort**, (2) sort the `ArrayList` of

ElementEntry's by number using **Selection Sort**, (3) sort the ArrayList of ElementEntry's by mass using **Insertion Sort**, (4) sort the ArrayList of ElementEntry's by symbol using **Merge Sort**, or (5) exit the program. All of the sorting algorithms can be found in Litvin Chapter 13. Write a private helper swap(index1, index2) method to be used by the sorting methods. The method swaps the two indexed objects in elements. Implement each sorting algorithm as a method operating on the ArrayList elements field.

Rubric:

You will be graded on your code and the output format on the screen.

Code:

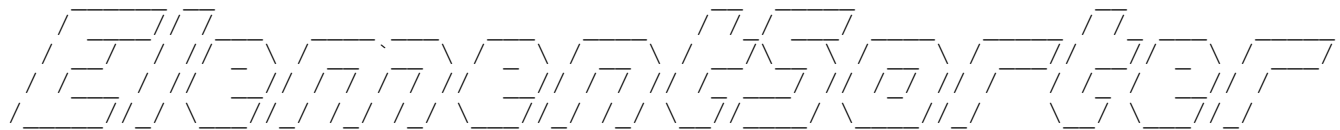
- a. Proper JavaDoc throughout each class you implement.
- b. Major functions are segmented into individual methods for better design.
- c. Each sort method is implemented completely. (e.g. No shortcut methods used, like java.util.ArrayList sort() method.)

Output: Use the sample output below as your model.

- d. Note the format of each element. The number and atomic mass are right justified, while the name and symbol are left justified.
- e. The table headings are aligned with the appropriate character of the information below them.
- f. Not all atomic masses are in the order of the element number. Check out elements number 27 and 28 in the table that sorts by mass.

Sample output:

```
% java ElementSorter
```



Welcome to ElementSorter, a sorting routine for the periodic table of elements.

Let's begin.

- 1: Bubble Sort by name
- 2: Selection Sort by number
- 3: Insertion Sort by atomic mass
- 4: Merge Sort by symbol
- 5: Exit

Please Enter 1 through 5, indicating your choice from the menu above: (1 - 5) -> **1**

```
+-----+
| List of Elements |
+-----+
| #   Element      Symbol  Atomic Mass |
|-----|
| 89  Actinium     Ac      227.02800 |
| 13  Aluminum     Al       26.98154 |
| 95  Americium    Am      243.00000 |
| 51  Antimony     Sb      121.75700 |
| 18  Argon        Ar       39.94800 |
|-----|
```

33	Arsenic	As	74.92159
85	Astatine	At	210.00000
56	Barium	Ba	137.32700
97	Berkelium	Bk	247.00000
4	Beryllium	Be	9.01218
83	Bismuth	Bi	208.98037
107	Bohrium	Bh	262.00000
5	Boron	B	10.81100
35	Bromine	Br	79.90400
48	Cadmium	Cd	112.41100
20	Calcium	Ca	40.07800
98	Californium	Cf	251.00000
6	Carbon	C	12.01100
58	Cerium	Ce	140.11500
55	Cesium	Cs	132.90543
17	Chlorine	Cl	35.45270
24	Chromium	Cr	51.99610
27	Cobalt	Co	58.93320
112	Copernicium	Cn	285.00000
29	Copper	Cu	63.54600
96	Curium	Cm	247.00000
110	Darmstadtium	Ds	281.00000
105	Dubnium	Db	262.00000
66	Dysprosium	Dy	162.50000
99	Einsteinium	Es	252.00000
68	Erbium	Er	167.26000
63	Europium	Eu	151.96500
100	Fermium	Fm	257.00000
114	Flerovium	Fl	289.00000
9	Fluorine	F	18.99840
87	Francium	Fr	223.00000
64	Gadolinium	Gd	157.25000
31	Gallium	Ga	69.72300
32	Germanium	Ge	72.61000
79	Gold	Au	196.96654
72	Hafnium	Hf	178.49000
108	Hassium	Hs	265.00000
2	Helium	He	4.00260
67	Holmium	Ho	164.93032
1	Hydrogen	H	1.00794
49	Indium	In	114.82000
53	Iodine	I	126.90447
77	Iridium	Ir	192.22000
26	Iron	Fe	55.84700
36	Krypton	Kr	83.80000
57	Lanthanum	La	138.90550
103	Lawrencium	Lr	262.00000
82	Lead	Pb	207.20000
3	Lithium	Li	6.94100
116	Livermorium	Lv	292.00000
71	Lutetium	Lu	174.96700
12	Magnesium	Mg	24.30500
25	Manganese	Mn	54.93805
109	Meitnerium	Mt	266.00000
101	Mendelevium	Md	258.00000

80	Mercury	Hg	200.59000
42	Molybdenum	Mo	95.94000
60	Neodymium	Nd	144.24000
10	Neon	Ne	20.17970
93	Neptunium	Np	237.04800
28	Nickel	Ni	58.69340
41	Niobium	Nb	92.90638
7	Nitrogen	N	14.00674
102	Nobelium	No	259.00000
76	Osmium	Os	190.20000
8	Oxygen	O	15.99940
46	Palladium	Pd	106.42000
15	Phosphorus	P	30.97376
78	Platinum	Pt	195.08000
94	Plutonium	Pu	244.00000
84	Polonium	Po	209.00000
19	Potassium	K	39.09830
59	Praseodymium	Pr	140.90765
61	Promethium	Pm	145.00000
91	Protactinium	Pa	231.03590
88	Radium	Ra	226.02500
86	Radon	Rn	222.00000
75	Rhenium	Re	186.20700
45	Rhodium	Rh	102.90550
111	Roentgenium	Rg	272.00000
37	Rubidium	Rb	85.46780
44	Ruthenium	Ru	101.07000
104	Rutherfordium	Rf	261.00000
62	Samarium	Sm	150.36000
21	Scandium	Sc	44.95591
106	Seaborgium	Sg	263.00000
34	Selenium	Se	78.96000
14	Silicon	Si	28.08550
47	Silver	Ag	107.86820
11	Sodium	Na	22.98977
38	Strontium	Sr	87.62000
16	Sulfur	S	32.06600
73	Tantalum	Ta	180.94790
43	Technetium	Tc	98.00000
52	Tellurium	Te	127.60000
65	Terbium	Tb	158.92534
81	Thallium	Tl	204.38330
90	Thorium	Th	232.03810
69	Thulium	Tm	168.93421
50	Tin	Sn	118.71000
22	Titanium	Ti	47.88000
74	Tungsten	W	183.85000
118	Ununoctium	Uuo	294.00000
115	Ununpentium	Uup	288.00000
117	Ununseptium	Uus	294.00000
113	Ununtrium	Uut	284.00000
92	Uranium	U	238.02890
23	Vanadium	V	50.94150
54	Xenon	Xe	131.29000

70	Ytterbium	Yb	173.04000
39	Yttrium	Y	88.90585
30	Zinc	Zn	65.39000
40	Zirconium	Zr	91.22400

- 1: Bubble Sort by name
- 2: Selection Sort by number
- 3: Insertion Sort by atomic mass
- 4: Merge Sort by symbol
- 5: Exit

Please Enter 1 through 5, indicating your choice from the menu above: (1 - 5) -> **2**

#	Element	Symbol	Atomic Mass
1	Hydrogen	H	1.00794
2	Helium	He	4.00260
3	Lithium	Li	6.94100
4	Beryllium	Be	9.01218
5	Boron	B	10.81100
6	Carbon	C	12.01100
7	Nitrogen	N	14.00674
8	Oxygen	O	15.99940
9	Fluorine	F	18.99840
10	Neon	Ne	20.17970
11	Sodium	Na	22.98977
12	Magnesium	Mg	24.30500
13	Aluminum	Al	26.98154
14	Silicon	Si	28.08550
15	Phosphorus	P	30.97376
16	Sulfur	S	32.06600
17	Chlorine	Cl	35.45270
18	Argon	Ar	39.94800
19	Potassium	K	39.09830
20	Calcium	Ca	40.07800
21	Scandium	Sc	44.95591
22	Titanium	Ti	47.88000
23	Vanadium	V	50.94150
24	Chromium	Cr	51.99610
25	Manganese	Mn	54.93805
26	Iron	Fe	55.84700
27	Cobalt	Co	58.93320
28	Nickel	Ni	58.69340
29	Copper	Cu	63.54600
30	Zinc	Zn	65.39000
31	Gallium	Ga	69.72300
32	Germanium	Ge	72.61000
33	Arsenic	As	74.92159
34	Selenium	Se	78.96000
35	Bromine	Br	79.90400
36	Krypton	Kr	83.80000
37	Rubidium	Rb	85.46780

38	Strontium	Sr	87.62000
39	Yttrium	Y	88.90585
40	Zirconium	Zr	91.22400
41	Niobium	Nb	92.90638
42	Molybdenum	Mo	95.94000
43	Technetium	Tc	98.00000
44	Ruthenium	Ru	101.07000
45	Rhodium	Rh	102.90550
46	Palladium	Pd	106.42000
47	Silver	Ag	107.86820
48	Cadmium	Cd	112.41100
49	Indium	In	114.82000
50	Tin	Sn	118.71000
51	Antimony	Sb	121.75700
52	Tellurium	Te	127.60000
53	Iodine	I	126.90447
54	Xenon	Xe	131.29000
55	Cesium	Cs	132.90543
56	Barium	Ba	137.32700
57	Lanthanum	La	138.90550
58	Cerium	Ce	140.11500
59	Praseodymium	Pr	140.90765
60	Neodymium	Nd	144.24000
61	Promethium	Pm	145.00000
62	Samarium	Sm	150.36000
63	Europium	Eu	151.96500
64	Gadolinium	Gd	157.25000
65	Terbium	Tb	158.92534
66	Dysprosium	Dy	162.50000
67	Holmium	Ho	164.93032
68	Erbium	Er	167.26000
69	Thulium	Tm	168.93421
70	Ytterbium	Yb	173.04000
71	Lutetium	Lu	174.96700
72	Hafnium	Hf	178.49000
73	Tantalum	Ta	180.94790
74	Tungsten	W	183.85000
75	Rhenium	Re	186.20700
76	Osmium	Os	190.20000
77	Iridium	Ir	192.22000
78	Platinum	Pt	195.08000
79	Gold	Au	196.96654
80	Mercury	Hg	200.59000
81	Thallium	Tl	204.38330
82	Lead	Pb	207.20000
83	Bismuth	Bi	208.98037
84	Polonium	Po	209.00000
85	Astatine	At	210.00000
86	Radon	Rn	222.00000
87	Francium	Fr	223.00000
88	Radium	Ra	226.02500
89	Actinium	Ac	227.02800
90	Thorium	Th	232.03810
91	Protactinium	Pa	231.03590

92	Uranium	U	238.02890
93	Neptunium	Np	237.04800
94	Plutonium	Pu	244.00000
95	Americium	Am	243.00000
96	Curium	Cm	247.00000
97	Berkelium	Bk	247.00000
98	Californium	Cf	251.00000
99	Einsteinium	Es	252.00000
100	Fermium	Fm	257.00000
101	Mendelevium	Md	258.00000
102	Nobelium	No	259.00000
103	Lawrencium	Lr	262.00000
104	Rutherfordium	Rf	261.00000
105	Dubnium	Db	262.00000
106	Seaborgium	Sg	263.00000
107	Bohrium	Bh	262.00000
108	Hassium	Hs	265.00000
109	Meitnerium	Mt	266.00000
110	Darmstadtium	Ds	281.00000
111	Roentgenium	Rg	272.00000
112	Copernicium	Cn	285.00000
113	Ununtrium	Uut	284.00000
114	Flerovium	Fl	289.00000
115	Ununpentium	Uup	288.00000
116	Livermorium	Lv	292.00000
117	Ununseptium	Uus	294.00000
118	Ununoctium	Uuo	294.00000

- 1: Bubble Sort by name
2: Selection Sort by number
3: Insertion Sort by atomic mass
4: Merge Sort by symbol
5: Exit

Please Enter 1 through 5, indicating your choice from the menu above: (1 - 5) -> **3**

#	Element	Symbol	Atomic Mass
1	Hydrogen	H	1.00794
2	Helium	He	4.00260
3	Lithium	Li	6.94100
4	Beryllium	Be	9.01218
5	Boron	B	10.81100
6	Carbon	C	12.01100
7	Nitrogen	N	14.00674
8	Oxygen	O	15.99940
9	Fluorine	F	18.99840
10	Neon	Ne	20.17970
11	Sodium	Na	22.98977
12	Magnesium	Mg	24.30500
13	Aluminum	Al	26.98154
14	Silicon	Si	28.08550
15	Phosphorus	P	30.97376

16	Sulfur	S	32.06600
17	Chlorine	Cl	35.45270
19	Potassium	K	39.09830
18	Argon	Ar	39.94800
20	Calcium	Ca	40.07800
21	Scandium	Sc	44.95591
22	Titanium	Ti	47.88000
23	Vanadium	V	50.94150
24	Chromium	Cr	51.99610
25	Manganese	Mn	54.93805
26	Iron	Fe	55.84700
28	Nickel	Ni	58.69340
27	Cobalt	Co	58.93320
29	Copper	Cu	63.54600
30	Zinc	Zn	65.39000
31	Gallium	Ga	69.72300
32	Germanium	Ge	72.61000
33	Arsenic	As	74.92159
34	Selenium	Se	78.96000
35	Bromine	Br	79.90400
36	Krypton	Kr	83.80000
37	Rubidium	Rb	85.46780
38	Strontium	Sr	87.62000
39	Yttrium	Y	88.90585
40	Zirconium	Zr	91.22400
41	Niobium	Nb	92.90638
42	Molybdenum	Mo	95.94000
43	Technetium	Tc	98.00000
44	Ruthenium	Ru	101.07000
45	Rhodium	Rh	102.90550
46	Palladium	Pd	106.42000
47	Silver	Ag	107.86820
48	Cadmium	Cd	112.41100
49	Indium	In	114.82000
50	Tin	Sn	118.71000
51	Antimony	Sb	121.75700
53	Iodine	I	126.90447
52	Tellurium	Te	127.60000
54	Xenon	Xe	131.29000
55	Cesium	Cs	132.90543
56	Barium	Ba	137.32700
57	Lanthanum	La	138.90550
58	Cerium	Ce	140.11500
59	Praseodymium	Pr	140.90765
60	Neodymium	Nd	144.24000
61	Promethium	Pm	145.00000
62	Samarium	Sm	150.36000
63	Europium	Eu	151.96500
64	Gadolinium	Gd	157.25000
65	Terbium	Tb	158.92534
66	Dysprosium	Dy	162.50000
67	Holmium	Ho	164.93032
68	Erbium	Er	167.26000
69	Thulium	Tm	168.93421

70	Ytterbium	Yb	173.04000
71	Lutetium	Lu	174.96700
72	Hafnium	Hf	178.49000
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81	Thallium	Tl	204.38330
82	Lead	Pb	207.20000
83	Bismuth	Bi	208.98037
84	Polonium	Po	209.00000
85	Astatine	At	210.00000
86	Radon	Rn	222.00000
87	Francium	Fr	223.00000
88	Radium	Ra	226.02500
89	Actinium	Ac	227.02800
91	Protactinium	Pa	231.03590
90	Thorium	Th	232.03810
93	Neptunium	Np	237.04800
92	Uranium	U	238.02890
95	Americium	Am	243.00000
94	Plutonium	Pu	244.00000
96	Curium	Cm	247.00000
97	Berkelium	Bk	247.00000
98	Californium	Cf	251.00000
99	Einsteinium	Es	252.00000
100	Fermium	Fm	257.00000
101	Mendelevium	Md	258.00000
102	Nobelium	No	259.00000
104	Rutherfordium	Rf	261.00000
103	Lawrencium	Lr	262.00000
105	Dubnium	Db	262.00000
107	Bohrium	Bh	262.00000
106	Seaborgium	Sg	263.00000
108	Hassium	Hs	265.00000
109	Meitnerium	Mt	266.00000
111	Roentgenium	Rg	272.00000
110	Darmstadtium	Ds	281.00000
113	Ununtrium	Uut	284.00000
112	Copernicium	Cn	285.00000
115	Ununpentium	Uup	288.00000
114	Flerovium	Fl	289.00000
116	Livermorium	Lv	292.00000
117	Ununseptium	Uus	294.00000
118	Ununoctium	Uuo	294.00000

-
- 1: Bubble Sort by name
 - 2: Selection Sort by number
 - 3: Insertion Sort by atomic mass
 - 4: Merge Sort by symbol

5: Exit

Please Enter 1 through 5, indicating your choice from the menu above: (1 - 5) -> 4

```
+-----+
| List of Elements |
+-----+
| #   Element           Symbol  Atomic Mass |
|-----|
| 89  Actinium          Ac      227.02800 |
| 47  Silver            Ag      107.86820 |
| 13  Aluminum          Al      26.98154 |
| 95  Americium         Am      243.00000 |
| 18  Argon             Ar      39.94800 |
|-----|
| 33  Arsenic           As      74.92159 |
| 85  Astatine          At      210.00000 |
| 79  Gold              Au      196.96654 |
| 5   Boron             B       10.81100 |
| 56  Barium            Ba      137.32700 |
|-----|
| 4   Beryllium         Be      9.01218 |
| 107 Bohrium           Bh      262.00000 |
| 83  Bismuth           Bi      208.98037 |
| 97  Berkelium         Bk      247.00000 |
| 35  Bromine           Br      79.90400 |
|-----|
| 6   Carbon            C       12.01100 |
| 20  Calcium           Ca      40.07800 |
| 48  Cadmium           Cd      112.41100 |
| 58  Cerium            Ce      140.11500 |
| 98  Californium      Cf      251.00000 |
|-----|
| 17  Chlorine          Cl      35.45270 |
| 96  Curium            Cm      247.00000 |
| 112 Copernicium      Cn      285.00000 |
| 27  Cobalt            Co      58.93320 |
| 24  Chromium          Cr      51.99610 |
|-----|
| 55  Cesium            Cs      132.90543 |
| 29  Copper            Cu      63.54600 |
| 105 Dubnium           Db      262.00000 |
| 110 Darmstadtium     Ds      281.00000 |
| 66  Dysprosium        Dy      162.50000 |
|-----|
| 68  Erbium            Er      167.26000 |
| 99  Einsteinium       Es      252.00000 |
| 63  Europium          Eu      151.96500 |
| 9   Fluorine          F       18.99840 |
| 26  Iron              Fe      55.84700 |
|-----|
| 114 Flerovium         Fl      289.00000 |
| 100 Fermium           Fm      257.00000 |
| 87  Francium          Fr      223.00000 |
| 31  Gallium           Ga      69.72300 |
| 64  Gadolinium        Gd      157.25000 |
|-----|
| 32  Germanium         Ge      72.61000 |
| 1   Hydrogen          H       1.00794 |
| 2   Helium            He      4.00260 |
| 72  Hafnium           Hf      178.49000 |
| 80  Mercury           Hg      200.59000 |
|-----|
| 67  Holmium           Ho      164.93032 |
```

108	Hassium	Hs	265.00000
53	Iodine	I	126.90447
49	Indium	In	114.82000
77	Iridium	Ir	192.22000
19	Potassium	K	39.09830
36	Krypton	Kr	83.80000
57	Lanthanum	La	138.90550
3	Lithium	Li	6.94100
103	Lawrencium	Lr	262.00000
71	Lutetium	Lu	174.96700
116	Livermorium	Lv	292.00000
101	Mendelevium	Md	258.00000
12	Magnesium	Mg	24.30500
25	Manganese	Mn	54.93805
42	Molybdenum	Mo	95.94000
109	Meitnerium	Mt	266.00000
7	Nitrogen	N	14.00674
11	Sodium	Na	22.98977
41	Niobium	Nb	92.90638
60	Neodymium	Nd	144.24000
10	Neon	Ne	20.17970
28	Nickel	Ni	58.69340
102	Nobelium	No	259.00000
93	Neptunium	Np	237.04800
8	Oxygen	O	15.99940
76	Osmium	Os	190.20000
15	Phosphorus	P	30.97376
91	Protactinium	Pa	231.03590
82	Lead	Pb	207.20000
46	Palladium	Pd	106.42000
61	Promethium	Pm	145.00000
84	Polonium	Po	209.00000
59	Praseodymium	Pr	140.90765
78	Platinum	Pt	195.08000
94	Plutonium	Pu	244.00000
88	Radium	Ra	226.02500
37	Rubidium	Rb	85.46780
75	Rhenium	Re	186.20700
104	Rutherfordium	Rf	261.00000
111	Roentgenium	Rg	272.00000
45	Rhodium	Rh	102.90550
86	Radon	Rn	222.00000
44	Ruthenium	Ru	101.07000
16	Sulfur	S	32.06600
51	Antimony	Sb	121.75700
21	Scandium	Sc	44.95591
34	Selenium	Se	78.96000
106	Seaborgium	Sg	263.00000
14	Silicon	Si	28.08550
62	Samarium	Sm	150.36000
50	Tin	Sn	118.71000
38	Strontium	Sr	87.62000
73	Tantalum	Ta	180.94790
65	Terbium	Tb	158.92534

43	Technetium	Tc	98.00000	
52	Tellurium	Te	127.60000	
90	Thorium	Th	232.03810	
22	Titanium	Ti	47.88000	
81	Thallium	Tl	204.38330	
69	Thulium	Tm	168.93421	
92	Uranium	U	238.02890	
118	Ununoctium	Uuo	294.00000	
115	Ununpentium	Uup	288.00000	
117	Ununseptium	Uus	294.00000	
113	Ununtrium	Uut	284.00000	
23	Vanadium	V	50.94150	
74	Tungsten	W	183.85000	
54	Xenon	Xe	131.29000	
39	Yttrium	Y	88.90585	
70	Ytterbium	Yb	173.04000	
30	Zinc	Zn	65.39000	
40	Zirconium	Zr	91.22400	

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- 1: Bubble Sort by name
- 2: Selection Sort by number
- 3: Insertion Sort by atomic mass
- 4: Merge Sort by symbol
- 5: Exit

Please Enter 1 through 5, indicating your choice from the menu above: (1 - 5) -> **5**

Thank you for using ElementSorter on the Periodic Table of elements.

Goodbye.