

Prof. Dr. L. Paditz, 14.02.2019

HTW Dresden

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## **Kontrolle der txt-Datei und Aufspaltung deren Inhalte, Verarbeitung einer txt-Datei mit Text- und Dateninhalten**

=====

```
import numpy as np
DATA_FILE = '/home/parallels/DATA_DIR/birth_life_2010.txt'
text = open(DATA_FILE, 'r').readlines()[1:]
print(text)
data = [line[:-1].split('\t') for line in text]
print(data)
births = [float(line[1]) for line in data]
print(births)
lives = [float(line[2]) for line in data]
print(lives)
data=list(zip(births,lives))
print(data)
n_samples = len(data)
print(n_samples)
data = np.asarray(data, dtype=np.float32)
print(data)
```

Die Datei **birth\_life\_2010.txt** darf keinerlei Sonderzeichen enthalten!

### **Download:**

[http://www.informatik.htw-dresden.de/~paditz/birth\\_life\\_2010.txt](http://www.informatik.htw-dresden.de/~paditz/birth_life_2010.txt)

Die Datei **birth\_life\_2010.txt** im Originaltext:

Country	Birth rate	Life expectancy
Vietnam	1.822	74.828243902
Vanuatu	3.869	70.819487805
Tonga	3.911	72.150658537
Timor-Leste	5.578	61.999853659
Thailand	1.579	73.927658537
Solomon Islands	4.229	67.465195122
Singapore	1.15	81.641463415
Samoa	3.86	72.306390244
Philippines	3.142	68.484317073
Papua New Guinea	3.951	62.440609756
New Zealand	2.16	80.702439024
New Caledonia	2.141	76.301682927
Myanmar	2.002	64.662097561
Mongolia	2.504	68.194975610
Micronesia	3.451	68.764829268
Malaysia	2.635	74.024560976
Macao SAR, China	1.092	80.775317073
Lao PDR	2.747	67.064
Korea	1.22	80.761951220
Japan	1.39	82.932682927
Indonesia	2.117	68.889658537
Hong Kong SAR, China	1.108	82.878048780
Guam	2.47	75.994268293
French Polynesia	2.09	75.076878049
Fiji	2.668	69.225829268
Dem. Rep. Korea	2.022	68.532146341
China	1.598	73.273097561
Cambodia	2.581	62.536219512
Brunei	2.042	77.932024390
Australia	1.92	81.695121951
Uzbekistan	2.499	68.001
United Kingdom	1.94	80.402439024
Ukraine	1.445	70.275609756
Turkmenistan	2.399	64.863512195
Turkey	2.088	73.696658537
Tajikistan	3.297	67.259902439
Switzerland	1.5	82.246341463
Sweden	1.98	81.451219512
Spain	1.39	81.626829268
Slovenia	1.57	79.421951220
Slovak Republic	1.4	75.112195122
Serbia	1.4	73.936585366
Russia	1.54	68.804878049
Romania	1.38	73.458536585
Portugal	1.32	79.026829268
Poland	1.38	76.246341463
Norway	1.95	80.997560976
Netherlands	1.79	80.702439024
Montenegro	1.656	74.311097561

Moldova	1.475	68.903707317
Macedonia	1.422	74.618853659
Luxembourg	1.63	80.087804878
Lithuania	1.55	73.268292683
Latvia	1.17	73.482926829
Kyrgyz Republic	2.898	69.368463415
Kosovo	2.2893	69.884390244
Kazakhstan	2.59	68.295365854
Italy	1.4	81.736585366
Ireland	2.07	80.291951220
Iceland	2.2	81.451219512
Hungary	1.25	74.207317073
Greece	1.44	80.387804878
Germany	1.39	79.987804878
Georgia	1.555	73.327341463
France	2	81.368292683
Finland	1.87	79.870731707
Estonia	1.63	75.429268293
Denmark	1.87	79.1
Czech Republic	1.49	77.424390244
Cyprus	1.476	79.380390244
Croatia	1.46	76.475609756
Channel Islands	1.46	79.832
Bulgaria	1.49	73.512195122
Bosnia and Herzegovina	1.148	75.400439024
Belgium	1.84	79.936585366
Belarus	1.44	70.404878049
Azerbaijan	2.3	70.506512195
Austria	1.44	80.382926829
Armenia	1.736	73.783560976
Albania	1.536	76.900951220
Virgin Islands	1.8	79.189439024
Venezuela	2.49	74.127317073
Uruguay	1.9856	76.236829268
Trinidad and Tobago	1.639	69.755
The Bahamas	1.896	75.222121951
Suriname	2.336	70.335317073
St. Vincent and the Grenadines	2.064	72.112536585
St. Lucia	1.98	74.439902439
Puerto Rico	1.797	78.913292683
Peru	2.501	73.764975610
Paraguay	2.954	72.277
Panama	2.484	75.974243902
Nicaragua	2.622	73.729219512
Mexico	2.32	76.683780488
Jamaica	2.329	72.847121951
Honduras	3.139	72.825926829
Haiti	3.34	61.763
Guyana	2.262	69.549146341
Guatemala	3.983	70.825414634

Grenada	2.235	75.660439024
El Salvador	2.25	71.732365854
Ecuador	2.479	75.462292683
Dominican Republic	2.58	73.200024390
Cuba	1.467	78.964146341
Costa Rica	1.848	79.192609756
Colombia	2.1	73.429682927
Chile	1.862	78.885731707
Brazil	1.83	73.099536585
Bolivia	3.348	66.268560976
Belize	2.79	75.839951220
Barbados	1.551	76.572829268
Aruba	1.699	74.975170732
Argentina	2.211	75.632146341
Yemen	5.2	65.030463415
West Bank and Gaza	4.453	72.643682927
United Arab Emirates	1.749	76.573609756
Tunisia	2.04	74.6
Syrian Arab Republic	2.934	75.702560976
Saudi Arabia	2.811	73.850414634
Qatar	2.271	78.097585366
Oman	2.309	73.124609756
Morocco	2.279	71.864634146
Malta	1.38	80.948780488
Libya	2.564	74.753121951
Lebanon	1.8	72.408756098
Kuwait	2.295	74.604731707
Jordan	3.8	73.289658537
Israel	3.03	81.504878049
Iraq	4.702	68.486048780
Iran	1.67	72.751853659
Egypt	2.733	72.975268293
Djibouti	3.75	57.527390244
Bahrain	2.54	75.023829268
Algeria	2.264	72.852536585
United States	2.1	78.241463415
Canada	1.677	80.797804878
Bermuda	1.764	79.288536585
Sri Lanka	2.313	74.722609756
Pakistan	3.423	65.198853659
Nepal	2.727	68.394829268
Maldives	1.752	76.551414634
India	2.625	65.131341463
Bhutan	2.399	66.908853659
Bangladesh	2.245	68.634804878
Afghanistan	6.288	48.282195122
Zimbabwe	3.29	49.860878049
Zambia	6.258	48.455487805
Uganda	6.149	53.614634146
Togo	4.072	56.588707317

The Gambia	4.896	58.160024390
Tanzania	5.544	57.387487805
Swaziland	3.364	48.342804878
Sudan 4.4	61.108243902	
South Africa	2.458	52.081487805
Somalia	6.339	50.895536585
Sierra Leone	4.982	47.402195122
Seychelles	2.5	73.034146341
Senegal	4.819	58.954073171
Rwanda	5.371	55.057121951
Nigeria	5.525	51.410024390
Niger 7.063	54.265634146	
Namibia	3.217	62.070097561
Mozambique	4.912	49.696926829
Mauritius	1.47	72.967317073
Mauritania	4.533	58.216951220
Mali 6.294	50.954829268	
Malawi	5.99	53.462634146
Madagascar	4.651	66.467073171
Liberia	5.238	56.147585366
Lesotho	3.199	47.365073171
Kenya 4.718	56.497073171	
Guinea-Bissau	5.063	47.700658537
Guinea	5.246	53.638585366
Ghana 4.17	63.837268293	
Gabon 3.25	62.286682927	
Ethiopia	4.193	58.715097561
Eritrea	4.453	60.994195122
Equatorial Guinea	5.185	50.840804878
Dem. Rep. Congo	5.775	48.069585366
Congo 4.544	56.960195122	
Comoros	4.919	60.626268293
Chad 5.981	49.194829268	
Central African Republic	4.631	47.618463415
Cape Verde	2.405	73.774048780
Cameroon	4.487	51.062756098
Burundi	4.338	49.877219512
Burkina Faso	5.85	54.924195122
Botswana	2.75	53.109512195
Benin 5.287	55.585585366	
Angola	5.443	50.653658537

**Mit tensorflow kann diese Datei mit 191 Zeilen zerlegt werden:**

```
parallels@parallels-Parallels-Virtual-Platform:~$ python3
```

```
Python 3.6.7 (default, Oct 22 2018, 11:32:17)
```

```
[GCC 8.2.0] on linux
```

```
Type "help", "copyright", "credits" or "license" for more information.
```

```
>>> import numpy as np
```

```
>>> DATA_FILE = '/home/parallels/DATA_DIR/birth_life_2010.txt'
```

```
>>> text = open(DATA_FILE, 'r').readlines()[1:]
```

```
>>> print(text)
```

```
['Vietnam\t1.822\t74.828243902\n', 'Vanuatu\t3.869\t70.819487805\n',  
'Tonga\t3.911\t72.150658537\n', 'Timor-Leste\t5.578\t61.999853659\n',  
'Thailand\t1.579\t73.927658537\n', 'Solomon Islands\t4.229\t67.465195122\n',  
'Singapore\t1.15\t81.641463415\n', 'Samoa\t3.86\t72.306390244\n',  
'Philippines\t3.142\t68.484317073\n', 'Papua New Guinea\t3.951\t62.440609756\n',  
'New Zealand\t2.16\t80.702439024\n', 'New Caledonia\t2.141\t76.301682927\n',  
'Myanmar\t2.002\t64.662097561\n', 'Mongolia\t2.504\t68.194975610\n',  
'Micronesia\t3.451\t68.764829268\n', 'Malaysia\t2.635\t74.024560976\n', 'Macao  
SAR, China\t1.092\t80.775317073\n', 'Lao PDR\t2.747\t67.064\n',  
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Polynesia\t2.09\t75.076878049\n', 'Fiji\t2.668\t69.225829268\n', 'Dem. Rep.  
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'Cambodia\t2.581\t62.536219512\n', 'Brunei\t2.042\t77.932024390\n',  
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Kingdom\t1.94\t80.402439024\n', 'Ukraine\t1.445\t70.275609756\n',  
'Turkmenistan\t2.399\t64.863512195\n', 'Turkey\t2.088\t73.696658537\n',  
'Tajikistan\t3.297\t67.259902439\n', 'Switzerland\t1.5\t82.246341463\n',  
'Sweden\t1.98\t81.451219512\n', 'Spain\t1.39\t81.626829268\n',  
'Slovenia\t1.57\t79.421951220\n', 'Slovak Republic\t1.4\t75.112195122\n',  
'Serbia\t1.4\t73.936585366\n', 'Russia\t1.54\t68.804878049\n',  
'Romania\t1.38\t73.458536585\n', 'Portugal\t1.32\t79.026829268\n',  
'Poland\t1.38\t76.246341463\n', 'Norway\t1.95\t80.997560976\n',  
'Netherlands\t1.79\t80.702439024\n', 'Montenegro\t1.656\t74.311097561\n',  
'Moldova\t1.475\t68.903707317\n', 'Macedonia\t1.422\t74.618853659\n',  
'Luxembourg\t1.63\t80.087804878\n', 'Lithuania\t1.55\t73.268292683\n',  
'Latvia\t1.17\t73.482926829\n', 'Kyrgyz Republic\t2.898\t69.368463415\n',  
'Kosovo\t2.2893\t69.884390244\n', 'Kazakhstan\t2.59\t68.295365854\n',  
'Italy\t1.4\t81.736585366\n', 'Ireland\t2.07\t80.291951220\n',  
'Iceland\t2.2\t81.451219512\n', 'Hungary\t1.25\t74.207317073\n',  
'Greece\t1.44\t80.387804878\n', 'Germany\t1.39\t79.987804878\n',  
'Georgia\t1.555\t73.327341463\n', 'France\t2\t81.368292683\n',  
'Finland\t1.87\t79.870731707\n', 'Estonia\t1.63\t75.429268293\n',  
'Denmark\t1.87\t79.1\n', 'Czech Republic\t1.49\t77.424390244\n',  
'Cyprus\t1.476\t79.380390244\n', 'Croatia\t1.46\t76.475609756\n', 'Channel  
Islands\t1.46\t79.832\n', 'Bulgaria\t1.49\t73.512195122\n', 'Bosnia and  
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'Belarus\t1.44\t70.404878049\n', 'Azerbaijan\t2.3\t70.506512195\n',  
'Austria\t1.44\t80.382926829\n', 'Armenia\t1.736\t73.783560976\n',  
'Albania\t1.536\t76.900951220\n', 'Virgin Islands\t1.8\t79.189439024\n',  
'Venezuela\t2.49\t74.127317073\n', 'Uruguay\t1.9856\t76.236829268\n', 'Trinidad  
and Tobago\t1.639\t69.755\n', 'The Bahamas\t1.896\t75.222121951\n',
```

'Suriname\t2.336\t70.335317073\n', 'St. Vincent and the Grenadines\t2.064\t72.112536585\n', 'St. Lucia\t1.98\t74.439902439\n', 'Puerto Rico\t1.797\t78.913292683\n', 'Peru\t2.501\t73.764975610\n', 'Paraguay\t2.954\t72.277\n', 'Panama\t2.484\t75.974243902\n', 'Nicaragua\t2.622\t73.729219512\n', 'Mexico\t2.32\t76.683780488\n', 'Jamaica\t2.329\t72.847121951\n', 'Honduras\t3.139\t72.825926829\n', 'Haiti\t3.34\t61.763\n', 'Guyana\t2.262\t69.549146341\n', 'Guatemala\t3.983\t70.825414634\n', 'Grenada\t2.235\t75.660439024\n', 'El Salvador\t2.25\t71.732365854\n', 'Ecuador\t2.479\t75.462292683\n', 'Dominican Republic\t2.58\t73.200024390\n', 'Cuba\t1.467\t78.964146341\n', 'Costa Rica\t1.848\t79.192609756\n', 'Colombia\t2.1\t73.429682927\n', 'Chile\t1.862\t78.885731707\n', 'Brazil\t1.83\t73.099536585\n', 'Bolivia\t3.348\t66.268560976\n', 'Belize\t2.79\t75.839951220\n', 'Barbados\t1.551\t76.572829268\n', 'Aruba\t1.699\t74.975170732\n', 'Argentina\t2.211\t75.632146341\n', 'Yemen\t5.2\t65.030463415\n', 'West Bank and Gaza\t4.453\t72.643682927\n', 'United Arab Emirates\t1.749\t76.573609756\n', 'Tunisia\t2.04\t74.6\n', 'Syrian Arab Republic\t2.934\t75.702560976\n', 'Saudi Arabia\t2.811\t73.850414634\n', 'Qatar\t2.271\t78.097585366\n', 'Oman\t2.309\t73.124609756\n', 'Morocco\t2.279\t71.864634146\n', 'Malta\t1.38\t80.948780488\n', 'Libya\t2.564\t74.753121951\n', 'Lebanon\t1.8\t72.408756098\n', 'Kuwait\t2.295\t74.604731707\n', 'Jordan\t3.8\t73.289658537\n', 'Israel\t3.03\t81.504878049\n', 'Iraq\t4.702\t68.486048780\n', 'Iran\t1.67\t72.751853659\n', 'Egypt\t2.733\t72.975268293\n', 'Djibouti\t3.75\t57.527390244\n', 'Bahrain\t2.54\t75.023829268\n', 'Algeria\t2.264\t72.852536585\n', 'United States\t2.1\t78.241463415\n', 'Canada\t1.677\t80.797804878\n', 'Bermuda\t1.764\t79.288536585\n', 'Sri Lanka\t2.313\t74.722609756\n', 'Pakistan\t3.423\t65.198853659\n', 'Nepal\t2.727\t68.394829268\n', 'Maldives\t1.752\t76.551414634\n', 'India\t2.625\t65.131341463\n', 'Bhutan\t2.399\t66.908853659\n', 'Bangladesh\t2.245\t68.634804878\n', 'Afghanistan\t6.288\t48.282195122\n', 'Zimbabwe\t3.29\t49.860878049\n', 'Zambia\t6.258\t48.455487805\n', 'Uganda\t6.149\t53.614634146\n', 'Togo\t4.072\t56.588707317\n', 'The Gambia\t4.896\t58.160024390\n', 'Tanzania\t5.544\t57.387487805\n', 'Swaziland\t3.364\t48.342804878\n', 'Sudan\t4.4\t61.108243902\n', 'South Africa\t2.458\t52.081487805\n', 'Somalia\t6.339\t50.895536585\n', 'Sierra Leone\t4.982\t47.402195122\n', 'Seychelles\t2.5\t73.034146341\n', 'Senegal\t4.819\t58.954073171\n', 'Rwanda\t5.371\t55.057121951\n', 'Nigeria\t5.525\t51.410024390\n', 'Niger\t7.063\t54.265634146\n', 'Namibia\t3.217\t62.070097561\n', 'Mozambique\t4.912\t49.696926829\n', 'Mauritius\t1.47\t72.967317073\n', 'Mauritania\t4.533\t58.216951220\n', 'Mali\t6.294\t50.954829268\n', 'Malawi\t5.99\t53.462634146\n', 'Madagascar\t4.651\t66.467073171\n', 'Liberia\t5.238\t56.147585366\n', 'Lesotho\t3.199\t47.365073171\n', 'Kenya\t4.718\t56.497073171\n', 'Guinea-Bissau\t5.063\t47.700658537\n', 'Guinea\t5.246\t53.638585366\n', 'Ghana\t4.17\t63.837268293\n', 'Gabon\t3.25\t62.286682927\n', 'Ethiopia\t4.193\t58.715097561\n', 'Eritrea\t4.453\t60.994195122\n', 'Equatorial Guinea\t5.185\t50.840804878\n', 'Dem. Rep. Congo\t5.775\t48.069585366\n', 'Congo\t4.544\t56.960195122\n', 'Comoros\t4.919\t60.626268293\n', 'Chad\t5.981\t49.194829268\n', 'Central African Republic\t4.631\t47.618463415\n', 'Cape Verde\t2.405\t73.774048780\n',

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'Cameroon\t4.487\t51.062756098\n', 'Burundi\t4.338\t49.877219512\n', 'Burkina Faso\t5.85\t54.924195122\n', 'Botswana\t2.75\t53.109512195\n', 'Benin\t5.287\t55.585585366\n', 'Angola\t5.443\t50.653658537\n']
```

```
>>> data = [line[:-1].split('\t') for line in text]
```

```
>>> print(data)
```

```
[['Vietnam', '1.822', '74.828243902'], ['Vanuatu', '3.869', '70.819487805'], ['Tonga', '3.911', '72.150658537'], ['Timor-Leste', '5.578', '61.999853659'], ['Thailand', '1.579', '73.927658537'], ['Solomon Islands', '4.229', '67.465195122'], ['Singapore', '1.15', '81.641463415'], ['Samoa', '3.86', '72.306390244'], ['Philippines', '3.142', '68.484317073'], ['Papua New Guinea', '3.951', '62.440609756'], ['New Zealand', '2.16', '80.702439024'], ['New Caledonia', '2.141', '76.301682927'], ['Myanmar', '2.002', '64.662097561'], ['Mongolia', '2.504', '68.194975610'], ['Micronesia', '3.451', '68.764829268'], ['Malaysia', '2.635', '74.024560976'], ['Macao SAR, China', '1.092', '80.775317073'], ['Lao PDR', '2.747', '67.064'], ['Korea', '1.22', '80.761951220'], ['Japan', '1.39', '82.932682927'], ['Indonesia', '2.117', '68.889658537'], ['Hong Kong SAR, China', '1.108', '82.878048780'], ['Guam', '2.47', '75.994268293'], ['French Polynesia', '2.09', '75.076878049'], ['Fiji', '2.668', '69.225829268'], ['Dem. Rep. Korea', '2.022', '68.532146341'], ['China', '1.598', '73.273097561'], ['Cambodia', '2.581', '62.536219512'], ['Brunei', '2.042', '77.932024390'], ['Australia', '1.92', '81.695121951'], ['Uzbekistan', '2.499', '68.001'], ['United Kingdom', '1.94', '80.402439024'], ['Ukraine', '1.445', '70.275609756'], ['Turkmenistan', '2.399', '64.863512195'], ['Turkey', '2.088', '73.696658537'], ['Tajikistan', '3.297', '67.259902439'], ['Switzerland', '1.5', '82.246341463'], ['Sweden', '1.98', '81.451219512'], ['Spain', '1.39', '81.626829268'], ['Slovenia', '1.57', '79.421951220'], ['Slovak Republic', '1.4', '75.112195122'], ['Serbia', '1.4', '73.936585366'], ['Russia', '1.54', '68.804878049'], ['Romania', '1.38', '73.458536585'], ['Portugal', '1.32', '79.026829268'], ['Poland', '1.38', '76.246341463'], ['Norway', '1.95', '80.997560976'], ['Netherlands', '1.79', '80.702439024'], ['Montenegro', '1.656', '74.311097561'], ['Moldova', '1.475', '68.903707317'], ['Macedonia', '1.422', '74.618853659'], ['Luxembourg', '1.63', '80.087804878'], ['Lithuania', '1.55', '73.268292683'], ['Latvia', '1.17', '73.482926829'], ['Kyrgyz Republic', '2.898', '69.368463415'], ['Kosovo', '2.2893', '69.884390244'], ['Kazakhstan', '2.59', '68.295365854'], ['Italy', '1.4', '81.736585366'], ['Ireland', '2.07', '80.291951220'], ['Iceland', '2.2', '81.451219512'], ['Hungary', '1.25', '74.207317073'], ['Greece', '1.44', '80.387804878'], ['Germany', '1.39', '79.987804878'], ['Georgia', '1.555', '73.327341463'], ['France', '2', '81.368292683'], ['Finland', '1.87', '79.870731707'], ['Estonia', '1.63', '75.429268293'], ['Denmark', '1.87', '79.1'], ['Czech Republic', '1.49', '77.424390244'], ['Cyprus', '1.476', '79.380390244'], ['Croatia', '1.46', '76.475609756'], ['Channel Islands', '1.46', '79.832'], ['Bulgaria', '1.49', '73.512195122'], ['Bosnia and Herzegovina', '1.148', '75.400439024'], ['Belgium', '1.84', '79.936585366'], ['Belarus', '1.44', '70.404878049'], ['Azerbaijan', '2.3', '70.506512195'], ['Austria', '1.44', '80.382926829'], ['Armenia', '1.736', '73.783560976'], ['Albania', '1.536', '76.900951220'], ['Virgin Islands', '1.8', '79.189439024'], ['Venezuela', '2.49', '74.127317073'], ['Uruguay', '1.9856', '76.236829268'], ['Trinidad and Tobago', '1.639', '69.755'], ['The Bahamas', '1.896', '75.222121951'], ['Suriname', '2.336', '70.335317073'], ['St. Vincent and the Grenadines', '2.064', '72.112536585'], ['St. Lucia', '1.98', '74.439902439'], ['Puerto Rico', '1.797', '78.913292683'], ['Peru', '2.501', '73.764975610'], ['Paraguay', '2.954', '72.277'], ['Panama', '2.484', '75.974243902'], ['Nicaragua', '2.622', '73.729219512'], ['Mexico', '2.32', '76.683780488'], ['Jamaica',
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```
'2.329', '72.847121951'], ['Honduras', '3.139', '72.825926829'], ['Haiti', '3.34', '61.763'],
['Guyana', '2.262', '69.549146341'], ['Guatemala', '3.983', '70.825414634'], ['Grenada',
'2.235', '75.660439024'], ['El Salvador', '2.25', '71.732365854'], ['Ecuador', '2.479',
'75.462292683'], ['Dominican Republic', '2.58', '73.200024390'], ['Cuba', '1.467',
'78.964146341'], ['Costa Rica', '1.848', '79.192609756'], ['Colombia', '2.1',
'73.429682927'], ['Chile', '1.862', '78.885731707'], ['Brazil', '1.83', '73.099536585'],
['Bolivia', '3.348', '66.268560976'], ['Belize', '2.79', '75.839951220'], ['Barbados', '1.551',
'76.572829268'], ['Aruba', '1.699', '74.975170732'], ['Argentina', '2.211',
'75.632146341'], ['Yemen', '5.2', '65.030463415'], ['West Bank and Gaza', '4.453',
'72.643682927'], ['United Arab Emirates', '1.749', '76.573609756'], ['Tunisia', '2.04',
'74.6'], ['Syrian Arab Republic', '2.934', '75.702560976'], ['Saudi Arabia', '2.811',
'73.850414634'], ['Qatar', '2.271', '78.097585366'], ['Oman', '2.309', '73.124609756'],
['Morocco', '2.279', '71.864634146'], ['Malta', '1.38', '80.948780488'], ['Libya', '2.564',
'74.753121951'], ['Lebanon', '1.8', '72.408756098'], ['Kuwait', '2.295', '74.604731707'],
['Jordan', '3.8', '73.289658537'], ['Israel', '3.03', '81.504878049'], ['Iraq', '4.702',
'68.486048780'], ['Iran', '1.67', '72.751853659'], ['Egypt', '2.733', '72.975268293'],
['Djibouti', '3.75', '57.527390244'], ['Bahrain', '2.54', '75.023829268'], ['Algeria', '2.264',
'72.852536585'], ['United States', '2.1', '78.241463415'], ['Canada', '1.677',
'80.797804878'], ['Bermuda', '1.764', '79.288536585'], ['Sri Lanka', '2.313',
'74.722609756'], ['Pakistan', '3.423', '65.198853659'], ['Nepal', '2.727', '68.394829268'],
['Maldives', '1.752', '76.551414634'], ['India', '2.625', '65.131341463'], ['Bhutan', '2.399',
'66.908853659'], ['Bangladesh', '2.245', '68.634804878'], ['Afghanistan', '6.288',
'48.282195122'], ['Zimbabwe', '3.29', '49.860878049'], ['Zambia', '6.258',
'48.455487805'], ['Uganda', '6.149', '53.614634146'], ['Togo', '4.072', '56.588707317'],
['The Gambia', '4.896', '58.160024390'], ['Tanzania', '5.544', '57.387487805'],
['Swaziland', '3.364', '48.342804878'], ['Sudan', '4.4', '61.108243902'], ['South Africa',
'2.458', '52.081487805'], ['Somalia', '6.339', '50.895536585'], ['Sierra Leone', '4.982',
'47.402195122'], ['Seychelles', '2.5', '73.034146341'], ['Senegal', '4.819',
'58.954073171'], ['Rwanda', '5.371', '55.057121951'], ['Nigeria', '5.525',
'51.410024390'], ['Niger', '7.063', '54.265634146'], ['Namibia', '3.217', '62.070097561'],
['Mozambique', '4.912', '49.696926829'], ['Mauritius', '1.47', '72.967317073'],
['Mauritania', '4.533', '58.216951220'], ['Mali', '6.294', '50.954829268'], ['Malawi', '5.99',
'53.462634146'], ['Madagascar', '4.651', '66.467073171'], ['Liberia', '5.238',
'56.147585366'], ['Lesotho', '3.199', '47.365073171'], ['Kenya', '4.718', '56.497073171'],
['Guinea-Bissau', '5.063', '47.700658537'], ['Guinea', '5.246', '53.638585366'], ['Ghana',
'4.17', '63.837268293'], ['Gabon', '3.25', '62.286682927'], ['Ethiopia', '4.193',
'58.715097561'], ['Eritrea', '4.453', '60.994195122'], ['Equatorial Guinea', '5.185',
'50.840804878'], ['Dem. Rep. Congo', '5.775', '48.069585366'], ['Congo', '4.544',
'56.960195122'], ['Comoros', '4.919', '60.626268293'], ['Chad', '5.981', '49.194829268'],
['Central African Republic', '4.631', '47.618463415'], ['Cape Verde', '2.405',
'73.774048780'], ['Cameroon', '4.487', '51.062756098'], ['Burundi', '4.338',
'49.877219512'], ['Burkina Faso', '5.85', '54.924195122'], ['Botswana', '2.75',
'53.109512195'], ['Benin', '5.287', '55.585585366'], ['Angola', '5.443', '50.653658537']]
```

```
>>> births = [float(line[1]) for line in data]
```

```
>>> print(births)
```

```
[1.822, 3.869, 3.911, 5.578, 1.579, 4.229, 1.15, 3.86, 3.142, 3.951, 2.16, 2.141, 2.002,
2.504, 3.451, 2.635, 1.092, 2.747, 1.22, 1.39, 2.117, 1.108, 2.47, 2.09, 2.668, 2.022, 1.598,
2.581, 2.042, 1.92, 2.499, 1.94, 1.445, 2.399, 2.088, 3.297, 1.5, 1.98, 1.39, 1.57, 1.4, 1.4,
```

1.54, 1.38, 1.32, 1.38, 1.95, 1.79, 1.656, 1.475, 1.422, 1.63, 1.55, 1.17, 2.898, 2.2893, 2.59, 1.4, 2.07, 2.2, 1.25, 1.44, 1.39, 1.555, 2.0, 1.87, 1.63, 1.87, 1.49, 1.476, 1.46, 1.46, 1.49, 1.148, 1.84, 1.44, 2.3, 1.44, 1.736, 1.536, 1.8, 2.49, 1.9856, 1.639, 1.896, 2.336, 2.064, 1.98, 1.797, 2.501, 2.954, 2.484, 2.622, 2.32, 2.329, 3.139, 3.34, 2.262, 3.983, 2.235, 2.25, 2.479, 2.58, 1.467, 1.848, 2.1, 1.862, 1.83, 3.348, 2.79, 1.551, 1.699, 2.211, 5.2, 4.453, 1.749, 2.04, 2.934, 2.811, 2.271, 2.309, 2.279, 1.38, 2.564, 1.8, 2.295, 3.8, 3.03, 4.702, 1.67, 2.733, 3.75, 2.54, 2.264, 2.1, 1.677, 1.764, 2.313, 3.423, 2.727, 1.752, 2.625, 2.399, 2.245, 6.288, 3.29, 6.258, 6.149, 4.072, 4.896, 5.544, 3.364, 4.4, 2.458, 6.339, 4.982, 2.5, 4.819, 5.371, 5.525, 7.063, 3.217, 4.912, 1.47, 4.533, 6.294, 5.99, 4.651, 5.238, 3.199, 4.718, 5.063, 5.246, 4.17, 3.25, 4.193, 4.453, 5.185, 5.775, 4.544, 4.919, 5.981, 4.631, 2.405, 4.487, 4.338, 5.85, 2.75, 5.287, 5.443]

```
>>> lifes = [float(line[2]) for line in data]
```

```
>>> print(lifes)
```

```
[74.828243902, 70.819487805, 72.150658537, 61.999853659, 73.927658537, 67.465195122, 81.641463415, 72.306390244, 68.484317073, 62.440609756, 80.702439024, 76.301682927, 64.662097561, 68.19497561, 68.764829268, 74.024560976, 80.775317073, 67.064, 80.76195122, 82.932682927, 68.889658537, 82.87804878, 75.994268293, 75.076878049, 69.225829268, 68.532146341, 73.273097561, 62.536219512, 77.93202439, 81.695121951, 68.001, 80.402439024, 70.275609756, 64.863512195, 73.696658537, 67.259902439, 82.246341463, 81.451219512, 81.626829268, 79.42195122, 75.112195122, 73.936585366, 68.804878049, 73.458536585, 79.026829268, 76.246341463, 80.997560976, 80.702439024, 74.311097561, 68.903707317, 74.618853659, 80.087804878, 73.268292683, 73.482926829, 69.368463415, 69.884390244, 68.295365854, 81.736585366, 80.29195122, 81.451219512, 74.207317073, 80.387804878, 79.987804878, 73.327341463, 81.368292683, 79.870731707, 75.429268293, 79.1, 77.424390244, 79.380390244, 76.475609756, 79.832, 73.512195122, 75.400439024, 79.936585366, 70.404878049, 70.506512195, 80.382926829, 73.783560976, 76.90095122, 79.189439024, 74.127317073, 76.236829268, 69.755, 75.222121951, 70.335317073, 72.112536585, 74.439902439, 78.913292683, 73.76497561, 72.277, 75.974243902, 73.729219512, 76.683780488, 72.847121951, 72.825926829, 61.763, 69.549146341, 70.825414634, 75.660439024, 71.732365854, 75.462292683, 73.20002439, 78.964146341, 79.192609756, 73.429682927, 78.885731707, 73.099536585, 66.268560976, 75.83995122, 76.572829268, 74.975170732, 75.632146341, 65.030463415, 72.643682927, 76.573609756, 74.6, 75.702560976, 73.850414634, 78.097585366, 73.124609756, 71.864634146, 80.948780488, 74.753121951, 72.408756098, 74.604731707, 73.289658537, 81.504878049, 68.48604878, 72.751853659, 72.975268293, 57.527390244, 75.023829268, 72.852536585, 78.241463415, 80.797804878, 79.288536585, 74.722609756, 65.198853659, 68.394829268, 76.551414634, 65.131341463, 66.908853659, 68.634804878, 48.282195122, 49.860878049, 48.455487805, 53.614634146, 56.588707317, 58.16002439, 57.387487805, 48.342804878, 61.108243902, 52.081487805, 50.895536585, 47.402195122, 73.034146341, 58.954073171, 55.057121951, 51.41002439, 54.265634146, 62.070097561, 49.696926829, 72.967317073, 58.21695122, 50.954829268, 53.462634146, 66.467073171, 56.147585366, 47.365073171, 56.497073171, 47.700658537, 53.638585366, 63.837268293, 62.286682927, 58.715097561, 60.994195122, 50.840804878, 48.069585366, 56.960195122, 60.626268293, 49.194829268, 47.618463415,
```

```
73.77404878, 51.062756098, 49.877219512, 54.924195122, 53.109512195,  
55.585585366, 50.653658537]
```

```
>>> data=list(zip(births,lifes))
```

```
>>> print(data)
```

```
[(1.822, 74.828243902), (3.869, 70.819487805), (3.911, 72.150658537), (5.578,  
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(3.86, 72.306390244), (3.142, 68.484317073), (3.951, 62.440609756), (2.16,  
80.702439024), (2.141, 76.301682927), (2.002, 64.662097561), (2.504, 68.19497561),  
(3.451, 68.764829268), (2.635, 74.024560976), (1.092, 80.775317073), (2.747,  
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(2.022, 68.532146341), (1.598, 73.273097561), (2.581, 62.536219512), (2.042,  
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67.259902439), (1.5, 82.246341463), (1.98, 81.451219512), (1.39, 81.626829268),  
(1.57, 79.42195122), (1.4, 75.112195122), (1.4, 73.936585366), (1.54, 68.804878049),  
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(2.954, 72.277), (2.484, 75.974243902), (2.622, 73.729219512), (2.32, 76.683780488),  
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75.462292683), (2.58, 73.20002439), (1.467, 78.964146341), (1.848, 79.192609756),  
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(2.211, 75.632146341), (5.2, 65.030463415), (4.453, 72.643682927), (1.749,  
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(2.733, 72.975268293), (3.75, 57.527390244), (2.54, 75.023829268), (2.264,  
72.852536585), (2.1, 78.241463415), (1.677, 80.797804878), (1.764, 79.288536585),  
(2.313, 74.722609756), (3.423, 65.198853659), (2.727, 68.394829268), (1.752,  
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(6.149, 53.614634146), (4.072, 56.588707317), (4.896, 58.16002439), (5.544,  
57.387487805), (3.364, 48.342804878), (4.4, 61.108243902), (2.458, 52.081487805),  
(6.339, 50.895536585), (4.982, 47.402195122), (2.5, 73.034146341), (4.819,
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58.954073171), (5.371, 55.057121951), (5.525, 51.41002439), (7.063, 54.265634146), (3.217, 62.070097561), (4.912, 49.696926829), (1.47, 72.967317073), (4.533, 58.21695122), (6.294, 50.954829268), (5.99, 53.462634146), (4.651, 66.467073171), (5.238, 56.147585366), (3.199, 47.365073171), (4.718, 56.497073171), (5.063, 47.700658537), (5.246, 53.638585366), (4.17, 63.837268293), (3.25, 62.286682927), (4.193, 58.715097561), (4.453, 60.994195122), (5.185, 50.840804878), (5.775, 48.069585366), (4.544, 56.960195122), (4.919, 60.626268293), (5.981, 49.194829268), (4.631, 47.618463415), (2.405, 73.77404878), (4.487, 51.062756098), (4.338, 49.877219512), (5.85, 54.924195122), (2.75, 53.109512195), (5.287, 55.585585366), **(5.443, 50.653658537)]**

```
>>> n_samples = len(data)
```

```
>>> print(n_samples)
```

**190**

```
>>> data = np.asarray(data, dtype=np.float32)
```

```
>>> print(data)
```

**[[ 1.822 74.82825 ]**

[ 3.869 70.81949 ]

[ 3.911 72.15066 ]

[ 5.578 61.999855]

[ 1.579 73.92766 ]

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