

# EDA: Immigration to Canada from 1980 to 2013

In [1]:	# import libraries import pandas as pd import numpy as np import matplotlib.pyplot as plt import seaborn as sns																																																																																																																																																																																																																																																																																																																																																																								
In [2]:	# Load data df = pd.read_excel('https://s3-api.us-geo.objectstorage.softlayer.net/cf-courses-data/CognitiveClass/DV0101EN/labs/Data_Files/Canada_by_Citizenship.xlsx', sheet_name='Canada by Citizenship', skiprows=range(20), skipfooter=2)																																																																																																																																																																																																																																																																																																																																																																								
In [3]:	df_original = df																																																																																																																																																																																																																																																																																																																																																																								
In [4]:	# explore dataset pd.set_option('display.max_rows', 195) df																																																																																																																																																																																																																																																																																																																																																																								
Out[4]:	<table border="1"> <thead> <tr> <th></th><th>Type</th><th>Coverage</th><th>OdName</th><th>AREA</th><th>AreaName</th><th>REG</th><th>RegName</th><th>DEV</th><th>DevName</th><th>1980</th><th>...</th><th>2004</th><th>2005</th><th>2006</th><th>2007</th><th>2008</th><th>2009</th> </tr> </thead> <tbody> <tr> <td>0</td><td>Immigrants</td><td>Foreigners</td><td>Afghanistan</td><td>935</td><td>Asia</td><td>5501</td><td>Southern Asia</td><td>902</td><td>Developing regions</td><td>16</td><td>...</td><td>2978</td><td>3436</td><td>3009</td><td>2652</td><td>2111</td><td>174</td></tr> <tr> <td>1</td><td>Immigrants</td><td>Foreigners</td><td>Albania</td><td>908</td><td>Europe</td><td>925</td><td>Southern Europe</td><td>901</td><td>Developed regions</td><td>1</td><td>...</td><td>1450</td><td>1223</td><td>856</td><td>702</td><td>560</td><td>71</td></tr> <tr> <td>2</td><td>Immigrants</td><td>Foreigners</td><td>Algeria</td><td>903</td><td>Africa</td><td>912</td><td>Northern Africa</td><td>902</td><td>Developing regions</td><td>80</td><td>...</td><td>3616</td><td>3626</td><td>4807</td><td>3623</td><td>4005</td><td>539</td></tr> <tr> <td>3</td><td>Immigrants</td><td>Foreigners</td><td>American Samoa</td><td>909</td><td>Oceania</td><td>957</td><td>Polynesia</td><td>902</td><td>Developing regions</td><td>0</td><td>...</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td></tr> <tr> <td>4</td><td>Immigrants</td><td>Foreigners</td><td>Andorra</td><td>908</td><td>Europe</td><td>925</td><td>Southern Europe</td><td>901</td><td>Developed regions</td><td>0</td><td>...</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr> <td>5</td><td>Immigrants</td><td>Foreigners</td><td>Angola</td><td>903</td><td>Africa</td><td>911</td><td>Middle Africa</td><td>902</td><td>Developing regions</td><td>1</td><td>...</td><td>268</td><td>295</td><td>184</td><td>106</td><td>76</td><td>6</td></tr> <tr> <td>6</td><td>Immigrants</td><td>Foreigners</td><td>Antigua and Barbuda</td><td>904</td><td>Latin America and the Caribbean</td><td>915</td><td>Caribbean</td><td>902</td><td>Developing regions</td><td>0</td><td>...</td><td>14</td><td>24</td><td>32</td><td>15</td><td>32</td><td>3</td></tr> <tr> <td>7</td><td>Immigrants</td><td>Foreigners</td><td>Argentina</td><td>904</td><td>Latin America and the Caribbean</td><td>931</td><td>South America</td><td>902</td><td>Developing regions</td><td>368</td><td>...</td><td>1591</td><td>1153</td><td>847</td><td>620</td><td>540</td><td>46</td></tr> <tr> <td>8</td><td>Immigrants</td><td>Foreigners</td><td>Armenia</td><td>935</td><td>Asia</td><td>922</td><td>Western Asia</td><td>902</td><td>Developing regions</td><td>0</td><td>...</td><td>147</td><td>224</td><td>218</td><td>198</td><td>205</td><td>26</td></tr> <tr> <td>9</td><td>Immigrants</td><td>Foreigners</td><td>Australia</td><td>909</td><td>Oceania</td><td>927</td><td>Australia and New Zealand</td><td>901</td><td>Developed regions</td><td>702</td><td>...</td><td>930</td><td>909</td><td>875</td><td>1033</td><td>1018</td><td>101</td></tr> <tr> <td>10</td><td>Immigrants</td><td>Foreigners</td><td>Austria</td><td>908</td><td>Europe</td><td>926</td><td>Western Europe</td><td>901</td><td>Developed regions</td><td>234</td><td>...</td><td>118</td><td>122</td><td>102</td><td>98</td><td>91</td><td>10</td></tr> <tr> <td>11</td><td>Immigrants</td><td>Foreigners</td><td>Azerbaijan</td><td>935</td><td>Asia</td><td>922</td><td>Western Asia</td><td>902</td><td>Developing regions</td><td>0</td><td>...</td><td>230</td><td>359</td><td>236</td><td>203</td><td>125</td><td>16</td></tr> <tr> <td>12</td><td>Immigrants</td><td>Foreigners</td><td>Bahamas</td><td>904</td><td>Latin America and the Caribbean</td><td>915</td><td>Caribbean</td><td>902</td><td>Developing regions</td><td>26</td><td>...</td><td>13</td><td>14</td><td>18</td><td>23</td><td>30</td><td>2</td></tr> <tr> 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regions</td><td>0</td><td>...</td><td>543</td><td>558</td><td>439</td><td>568</td><td>524</td><td>45</td></tr> <tr> <td>17</td><td>Immigrants</td><td>Foreigners</td><td>Belgium</td><td>908</td><td>Europe</td><td>926</td><td>Western Europe</td><td>901</td><td>Developed regions</td><td>511</td><td>...</td><td>411</td><td>400</td><td>302</td><td>363</td><td>335</td><td>35</td></tr> <tr> <td>18</td><td>Immigrants</td><td>Foreigners</td><td>Belize</td><td>904</td><td>Latin America and the Caribbean</td><td>916</td><td>Central America</td><td>902</td><td>Developing regions</td><td>16</td><td>...</td><td>25</td><td>37</td><td>24</td><td>28</td><td>48</td><td>3</td></tr> </tbody> </table>		Type	Coverage	OdName	AREA	AreaName	REG	RegName	DEV	DevName	1980	...	2004	2005	2006	2007	2008	2009	0	Immigrants	Foreigners	Afghanistan	935	Asia	5501	Southern Asia	902	Developing regions	16	...	2978	3436	3009	2652	2111	174	1	Immigrants	Foreigners	Albania	908	Europe	925	Southern Europe	901	Developed regions	1	...	1450	1223	856	702	560	71	2	Immigrants	Foreigners	Algeria	903	Africa	912	Northern Africa	902	Developing regions	80	...	3616	3626	4807	3623	4005	539	3	Immigrants	Foreigners	American Samoa	909	Oceania	957	Polynesia	902	Developing regions	0	...	0	0	1	0	0	0	4	Immigrants	Foreigners	Andorra	908	Europe	925	Southern Europe	901	Developed regions	0	...	0	0	1	1	0	0	5	Immigrants	Foreigners	Angola	903	Africa	911	Middle Africa	902	Developing regions	1	...	268	295	184	106	76	6	6	Immigrants	Foreigners	Antigua and Barbuda	904	Latin America and the Caribbean	915	Caribbean	902	Developing regions	0	...	14	24	32	15	32	3	7	Immigrants	Foreigners	Argentina	904	Latin America and the Caribbean	931	South America	902	Developing regions	368	...	1591	1153	847	620	540	46	8	Immigrants	Foreigners	Armenia	935	Asia	922	Western Asia	902	Developing regions	0	...	147	224	218	198	205	26	9	Immigrants	Foreigners	Australia	909	Oceania	927	Australia and New Zealand	901	Developed regions	702	...	930	909	875	1033	1018	101	10	Immigrants	Foreigners	Austria	908	Europe	926	Western Europe	901	Developed regions	234	...	118	122	102	98	91	10	11	Immigrants	Foreigners	Azerbaijan	935	Asia	922	Western Asia	902	Developing regions	0	...	230	359	236	203	125	16	12	Immigrants	Foreigners	Bahamas	904	Latin America and the Caribbean	915	Caribbean	902	Developing regions	26	...	13	14	18	23	30	2	13	Immigrants	Foreigners	Bahrain	935	Asia	922	Western Asia	902	Developing regions	0	...	12	12	12	22	9	3	14	Immigrants	Foreigners	Bangladesh	935	Asia	5501	Southern Asia	902	Developing regions	83	...	2660	4171	4014	2897	2939	210	15	Immigrants	Foreigners	Barbados	904	Latin America and the Caribbean	915	Caribbean	902	Developing regions	372	...	90	111	97	130	134	12	16	Immigrants	Foreigners	Belarus	908	Europe	923	Eastern Europe	901	Developed regions	0	...	543	558	439	568	524	45	17	Immigrants	Foreigners	Belgium	908	Europe	926	Western Europe	901	Developed regions	511	...	411	400	302	363	335	35	18	Immigrants	Foreigners	Belize	904	Latin America and the Caribbean	916	Central America	902	Developing regions	16	...	25	37	24	28	48	3
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1	Immigrants	Foreigners	Albania	908	Europe	925	Southern Europe	901	Developed regions	1	...	1450	1223	856	702	560	71																																																																																																																																																																																																																																																																																																																																																								
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3	Immigrants	Foreigners	American Samoa	909	Oceania	957	Polynesia	902	Developing regions	0	...	0	0	1	0	0	0																																																																																																																																																																																																																																																																																																																																																								
4	Immigrants	Foreigners	Andorra	908	Europe	925	Southern Europe	901	Developed regions	0	...	0	0	1	1	0	0																																																																																																																																																																																																																																																																																																																																																								
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9	Immigrants	Foreigners	Australia	909	Oceania	927	Australia and New Zealand	901	Developed regions	702	...	930	909	875	1033	1018	101																																																																																																																																																																																																																																																																																																																																																								
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12	Immigrants	Foreigners	Bahamas	904	Latin America and the Caribbean	915	Caribbean	902	Developing regions	26	...	13	14	18	23	30	2																																																																																																																																																																																																																																																																																																																																																								
13	Immigrants	Foreigners	Bahrain	935	Asia	922	Western Asia	902	Developing regions	0	...	12	12	12	22	9	3																																																																																																																																																																																																																																																																																																																																																								
14	Immigrants	Foreigners	Bangladesh	935	Asia	5501	Southern Asia	902	Developing regions	83	...	2660	4171	4014	2897	2939	210																																																																																																																																																																																																																																																																																																																																																								
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18	Immigrants	Foreigners	Belize	904	Latin America and the Caribbean	916	Central America	902	Developing regions	16	...	25	37	24	28	48	3																																																																																																																																																																																																																																																																																																																																																								

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19	Immigrants	Foreigners	Benin	903	Africa	914	Western Africa	902	Developing regions	2	...	112	95	116	183	205	23
20	Immigrants	Foreigners	Bhutan	935	Asia	5501	Southern Asia	902	Developing regions	0	...	1	5	10	7	36	86
21	Immigrants	Foreigners	Bolivia (Plurinational State of)	904	Latin America and the Caribbean	931	South America	902	Developing regions	44	...	85	134	139	107	143	21
22	Immigrants	Foreigners	Bosnia and Herzegovina	908	Europe	925	Southern Europe	901	Developed regions	0	...	188	211	217	209	182	15
23	Immigrants	Foreigners	Botswana	903	Africa	913	Southern Africa	902	Developing regions	10	...	9	7	11	8	28	1
24	Immigrants	Foreigners	Brazil	904	Latin America and the Caribbean	931	South America	902	Developing regions	211	...	917	969	1181	1746	2138	250
25	Immigrants	Foreigners	Brunei Darussalam	935	Asia	920	South-Eastern Asia	902	Developing regions	79	...	3	4	5	11	10	
26	Immigrants	Foreigners	Bulgaria	908	Europe	923	Eastern Europe	901	Developed regions	24	...	2022	1738	1419	1172	994	78
27	Immigrants	Foreigners	Burkina Faso	903	Africa	914	Western Africa	902	Developing regions	2	...	97	91	147	136	139	16
28	Immigrants	Foreigners	Burundi	903	Africa	910	Eastern Africa	902	Developing regions	0	...	559	626	468	614	448	56
29	Immigrants	Foreigners	Cabo Verde	903	Africa	914	Western Africa	902	Developing regions	1	...	3	5	7	2	5	
30	Immigrants	Foreigners	Cambodia	935	Asia	920	South-Eastern Asia	902	Developing regions	12	...	348	370	529	460	354	20
31	Immigrants	Foreigners	Cameroon	903	Africa	911	Middle Africa	902	Developing regions	9	...	436	604	697	1025	1279	134
32	Immigrants	Citizens	Canada	905	Northern America	905	Northern America	901	Developed regions	0	...	0	0	0	0	0	
33	Immigrants	Foreigners	Central African Republic	903	Africa	911	Middle Africa	902	Developing regions	4	...	13	49	18	30	28	1
34	Immigrants	Foreigners	Chad	903	Africa	911	Middle Africa	902	Developing regions	0	...	92	126	96	131	95	8
35	Immigrants	Foreigners	Chile	904	Latin America and the Caribbean	931	South America	902	Developing regions	1233	...	383	384	427	530	350	37
36	Immigrants	Foreigners	China	935	Asia	906	Eastern Asia	902	Developing regions	5123	...	36619	42584	33518	27642	30037	2962
37	Immigrants	Foreigners	China, Hong Kong Special Administrative Region	935	Asia	906	Eastern Asia	902	Developing regions	0	...	536	729	712	674	897	65
38	Immigrants	Foreigners	China, Macao Special Administrative Region	935	Asia	906	Eastern Asia	902	Developing regions	0	...	21	21	32	16	12	2
39	Immigrants	Foreigners	Colombia	904	Latin America and the Caribbean	931	South America	902	Developing regions	266	...	4566	6424	6535	5357	5452	465
40	Immigrants	Foreigners	Comoros	903	Africa	910	Eastern Africa	902	Developing regions	0	...	6	5	7	11	3	1
41	Immigrants	Foreigners	Congo	903	Africa	911	Middle Africa	902	Developing regions	2	...	142	136	143	87	72	7
42	Immigrants	Foreigners	Costa Rica	904	Latin America and the Caribbean	916	Central America	902	Developing regions	28	...	165	188	279	281	246	21
43	Immigrants	Foreigners	Côte d'Ivoire	903	Africa	914	Western Africa	902	Developing regions	14	...	256	294	431	619	646	66
44	Immigrants	Foreigners	Croatia	908	Europe	925	Southern Europe	901	Developed regions	0	...	151	128	102	102	131	9

	Type	Coverage	OdName	AREA	AreaName	REG	RegName	DEV	DevName	1980	...	2004	2005	2006	2007	2008	2009
45	Immigrants	Foreigners	Cuba	904	Latin America and the Caribbean	915	Caribbean	902	Developing regions	306	...	866	999	1064	1350	1300	143
46	Immigrants	Foreigners	Cyprus	935	Asia	922	Western Asia	902	Developing regions	132	...	11	7	9	4	7	
47	Immigrants	Foreigners	Czech Republic	908	Europe	923	Eastern Europe	901	Developed regions	0	...	191	193	146	137	104	15
48	Immigrants	Foreigners	Democratic People's Republic of Korea	935	Asia	906	Eastern Asia	902	Developing regions	1	...	15	14	10	7	19	1
49	Immigrants	Foreigners	Democratic Republic of the Congo	903	Africa	911	Middle Africa	902	Developing regions	15	...	1465	1521	1623	1466	1397	158
50	Immigrants	Foreigners	Denmark	908	Europe	924	Northern Europe	901	Developed regions	272	...	89	62	101	97	108	8
51	Immigrants	Foreigners	Djibouti	903	Africa	910	Eastern Africa	902	Developing regions	0	...	67	93	68	50	47	7
52	Immigrants	Foreigners	Dominica	904	Latin America and the Caribbean	915	Caribbean	902	Developing regions	104	...	50	59	72	79	60	5
53	Immigrants	Foreigners	Dominican Republic	904	Latin America and the Caribbean	915	Caribbean	902	Developing regions	40	...	270	303	295	311	438	39
54	Immigrants	Foreigners	Ecuador	904	Latin America and the Caribbean	931	South America	902	Developing regions	238	...	417	491	525	419	437	37
55	Immigrants	Foreigners	Egypt	903	Africa	912	Northern Africa	902	Developing regions	612	...	2393	2496	2190	2356	3347	349
56	Immigrants	Foreigners	El Salvador	904	Latin America and the Caribbean	916	Central America	902	Developing regions	110	...	442	436	430	929	1115	84
57	Immigrants	Foreigners	Equatorial Guinea	903	Africa	911	Middle Africa	902	Developing regions	0	...	2	3	4	5	1	
58	Immigrants	Foreigners	Eritrea	903	Africa	910	Eastern Africa	902	Developing regions	0	...	414	528	700	699	799	90
59	Immigrants	Foreigners	Estonia	908	Europe	924	Northern Europe	901	Developed regions	0	...	27	26	18	34	34	2
60	Immigrants	Foreigners	Ethiopia	903	Africa	910	Eastern Africa	902	Developing regions	98	...	1535	1506	1801	1512	1613	128
61	Immigrants	Foreigners	Fiji	909	Oceania	928	Melanesia	902	Developing regions	632	...	495	298	277	304	321	31
62	Immigrants	Foreigners	Finland	908	Europe	924	Northern Europe	901	Developed regions	208	...	54	67	51	62	89	6
63	Immigrants	Foreigners	France	908	Europe	926	Western Europe	901	Developed regions	1729	...	4391	4429	4002	4290	4532	505
64	Immigrants	Foreigners	Gabon	903	Africa	911	Middle Africa	902	Developing regions	2	...	33	67	68	101	86	8
65	Immigrants	Foreigners	Gambia	903	Africa	914	Western Africa	902	Developing regions	0	...	10	29	38	32	25	1
66	Immigrants	Foreigners	Georgia	935	Asia	922	Western Asia	902	Developing regions	0	...	106	114	125	132	112	12
67	Immigrants	Foreigners	Germany	908	Europe	926	Western Europe	901	Developed regions	1626	...	2020	2226	2767	2449	3833	388
68	Immigrants	Foreigners	Ghana	903	Africa	914	Western Africa	902	Developing regions	172	...	738	851	710	688	629	65
69	Immigrants	Foreigners	Greece	908	Europe	925	Southern Europe	901	Developed regions	1065	...	120	100	74	110	107	11
70	Immigrants	Foreigners	Grenada	904	Latin America and the Caribbean	915	Caribbean	902	Developing regions	154	...	296	283	363	360	284	32
71	Immigrants	Foreigners	Guatemala	904	Latin America and the Caribbean	916	Central America	902	Developing regions	114	...	217	190	230	258	263	26

	Type	Coverage	OdName	AREA	AreaName	REG	RegName	DEV	DevName	1980	...	2004	2005	2006	2007	2008	2009
72	Immigrants	Foreigners	Guinea	903	Africa	914	Western Africa	902	Developing regions	0	...	281	256	342	415	327	34
73	Immigrants	Foreigners	Guinea-Bissau	903	Africa	914	Western Africa	902	Developing regions	0	...	4	7	12	7	2	
74	Immigrants	Foreigners	Guyana	904	Latin America and the Caribbean	931	South America	902	Developing regions	2334	...	1341	1215	1286	1277	1137	118
75	Immigrants	Foreigners	Haiti	904	Latin America and the Caribbean	915	Caribbean	902	Developing regions	1666	...	1652	1682	1619	1598	2491	208
76	Immigrants	Foreigners	Honduras	904	Latin America and the Caribbean	916	Central America	902	Developing regions	26	...	133	166	164	165	187	16
77	Immigrants	Foreigners	Hungary	908	Europe	923	Eastern Europe	901	Developed regions	205	...	671	516	520	425	383	31
78	Immigrants	Foreigners	Iceland	908	Europe	924	Northern Europe	901	Developed regions	17	...	23	10	2	15	13	1
79	Immigrants	Foreigners	India	935	Asia	5501	Southern Asia	902	Developing regions	8880	...	28235	36210	33848	28742	28261	2945
80	Immigrants	Foreigners	Indonesia	935	Asia	920	South-Eastern Asia	902	Developing regions	186	...	552	632	613	657	661	50
81	Immigrants	Foreigners	Iran (Islamic Republic of)	935	Asia	5501	Southern Asia	902	Developing regions	1172	...	6348	5837	7480	6974	6475	658
82	Immigrants	Foreigners	Iraq	935	Asia	922	Western Asia	902	Developing regions	262	...	1796	2226	1788	2406	3543	545
83	Immigrants	Foreigners	Ireland	908	Europe	924	Northern Europe	901	Developed regions	781	...	244	224	283	300	412	39
84	Immigrants	Foreigners	Israel	935	Asia	922	Western Asia	902	Developing regions	1403	...	2788	2446	2625	2401	2562	231
85	Immigrants	Foreigners	Italy	908	Europe	925	Southern Europe	901	Developed regions	1820	...	334	344	325	320	370	42
86	Immigrants	Foreigners	Jamaica	904	Latin America and the Caribbean	915	Caribbean	902	Developing regions	3198	...	2237	1945	1722	2141	2334	245
87	Immigrants	Foreigners	Japan	935	Asia	906	Eastern Asia	901	Developed regions	701	...	973	1067	1212	1250	1284	119
88	Immigrants	Foreigners	Jordan	935	Asia	922	Western Asia	902	Developing regions	177	...	1733	1940	1827	1421	1581	123
89	Immigrants	Foreigners	Kazakhstan	935	Asia	5500	Central Asia	902	Developing regions	0	...	545	506	408	436	394	43
90	Immigrants	Foreigners	Kenya	903	Africa	910	Eastern Africa	902	Developing regions	291	...	685	693	622	449	453	48
91	Immigrants	Foreigners	Kiribati	909	Oceania	954	Micronesia	902	Developing regions	0	...	0	1	0	0	1	
92	Immigrants	Foreigners	Kuwait	935	Asia	922	Western Asia	902	Developing regions	1	...	74	66	35	62	53	6
93	Immigrants	Foreigners	Kyrgyzstan	935	Asia	5500	Central Asia	902	Developing regions	0	...	245	173	161	135	168	17
94	Immigrants	Foreigners	Lao People's Democratic Republic	935	Asia	920	South-Eastern Asia	902	Developing regions	11	...	38	42	74	53	32	3
95	Immigrants	Foreigners	Latvia	908	Europe	924	Northern Europe	901	Developed regions	0	...	94	77	69	88	67	8
96	Immigrants	Foreigners	Lebanon	935	Asia	922	Western Asia	902	Developing regions	1409	...	3293	3709	3802	3467	3566	307
97	Immigrants	Foreigners	Lesotho	903	Africa	913	Southern Africa	902	Developing regions	1	...	2	4	0	4	1	
98	Immigrants	Foreigners	Liberia	903	Africa	914	Western Africa	902	Developing regions	1	...	409	581	356	153	74	9
99	Immigrants	Foreigners	Libya	903	Africa	912	Northern Africa	902	Developing regions	5	...	196	196	281	198	306	28
100	Immigrants	Foreigners	Liechtenstein	908	Europe	926	Western Europe	901	Developed regions	1	...	0	1	0	0	1	

	Type	Coverage	OdName	AREA	AreaName	REG	RegName	DEV	DevName	1980	...	2004	2005	2006	2007	2008	2009
101	Immigrants	Foreigners	Lithuania	908	Europe	924	Northern Europe	901	Developed regions	1	...	220	167	113	108	109	6
102	Immigrants	Foreigners	Luxembourg	908	Europe	926	Western Europe	901	Developed regions	14	...	9	10	9	9	3	
103	Immigrants	Foreigners	Madagascar	903	Africa	910	Eastern Africa	902	Developing regions	22	...	79	88	96	115	118	16
104	Immigrants	Foreigners	Malawi	903	Africa	910	Eastern Africa	902	Developing regions	5	...	17	23	15	13	5	1
105	Immigrants	Foreigners	Malaysia	935	Asia	920	South-Eastern Asia	902	Developing regions	786	...	401	593	580	600	658	64
106	Immigrants	Foreigners	Maldives	935	Asia	5501	Southern Asia	902	Developing regions	0	...	1	0	0	2	1	
107	Immigrants	Foreigners	Mali	903	Africa	914	Western Africa	902	Developing regions	4	...	87	87	114	143	154	16
108	Immigrants	Foreigners	Malta	908	Europe	925	Southern Europe	901	Developed regions	191	...	28	28	24	7	21	1
109	Immigrants	Foreigners	Marshall Islands	909	Oceania	954	Micronesia	902	Developing regions	0	...	0	0	0	2	0	
110	Immigrants	Foreigners	Mauritania	903	Africa	914	Western Africa	902	Developing regions	5	...	60	86	124	96	112	8
111	Immigrants	Foreigners	Mauritius	903	Africa	910	Eastern Africa	902	Developing regions	306	...	702	696	512	507	714	87
112	Immigrants	Foreigners	Mexico	904	Latin America and the Caribbean	916	Central America	902	Developing regions	409	...	2259	2837	2844	3239	2856	309
113	Immigrants	Foreigners	Monaco	908	Europe	926	Western Europe	901	Developed regions	0	...	1	1	1	1	0	
114	Immigrants	Foreigners	Mongolia	935	Asia	906	Eastern Asia	902	Developing regions	0	...	34	59	64	82	59	11
115	Immigrants	Foreigners	Montenegro	908	Europe	925	Southern Europe	901	Developed regions	0	...	0	0	0	7	19	1
116	Immigrants	Foreigners	Morocco	903	Africa	912	Northern Africa	902	Developing regions	325	...	3686	2939	3322	4021	4226	553
117	Immigrants	Foreigners	Mozambique	903	Africa	910	Eastern Africa	902	Developing regions	0	...	8	5	9	5	5	1
118	Immigrants	Foreigners	Myanmar	935	Asia	920	South-Eastern Asia	902	Developing regions	80	...	191	210	953	1887	975	115
119	Immigrants	Foreigners	Namibia	903	Africa	913	Southern Africa	902	Developing regions	0	...	9	6	19	13	26	1
120	Immigrants	Foreigners	Nauru	909	Oceania	954	Micronesia	902	Developing regions	1	...	1	1	1	0	0	
121	Immigrants	Foreigners	Nepal	935	Asia	5501	Southern Asia	902	Developing regions	1	...	404	607	540	511	581	56
122	Immigrants	Foreigners	Netherlands	908	Europe	926	Western Europe	901	Developed regions	1889	...	749	813	837	615	818	78
123	Immigrants	Foreigners	New Caledonia	909	Oceania	928	Melanesia	902	Developing regions	0	...	0	0	0	0	1	
124	Immigrants	Foreigners	New Zealand	909	Oceania	927	Australia and New Zealand	901	Developed regions	602	...	350	370	318	350	480	52
125	Immigrants	Foreigners	Nicaragua	904	Latin America and the Caribbean	916	Central America	902	Developing regions	18	...	67	79	96	76	124	11
126	Immigrants	Foreigners	Niger	903	Africa	914	Western Africa	902	Developing regions	0	...	38	59	57	75	75	8
127	Immigrants	Foreigners	Nigeria	903	Africa	914	Western Africa	902	Developing regions	81	...	1518	2236	2594	2375	2109	315
128	Immigrants	Foreigners	Norway	908	Europe	924	Northern Europe	901	Developed regions	116	...	73	57	53	73	66	7
129	Immigrants	Foreigners	Oman	935	Asia	922	Western Asia	902	Developing regions	0	...	12	14	18	16	10	
130	Immigrants	Foreigners	Pakistan	935	Asia	5501	Southern Asia	902	Developing regions	978	...	13399	14314	13127	10124	8994	721

	Type	Coverage	OdName	AREA	AreaName	REG	RegName	DEV	DevName	1980	...	2004	2005	2006	2007	2008	200
131	Immigrants	Foreigners	Palau	909	Oceania	954	Micronesia	902	Developing regions	0	...	0	0	0	1	0	0
132	Immigrants	Foreigners	Panama	904	Latin America and the Caribbean	916	Central America	902	Developing regions	13	...	38	57	73	63	52	7
133	Immigrants	Foreigners	Papua New Guinea	909	Oceania	928	Melanesia	902	Developing regions	0	...	1	1	0	0	9	
134	Immigrants	Foreigners	Paraguay	904	Latin America and the Caribbean	931	South America	902	Developing regions	45	...	74	75	88	98	95	8
135	Immigrants	Foreigners	Peru	904	Latin America and the Caribbean	931	South America	902	Developing regions	317	...	1460	1653	1473	1490	1094	188
136	Immigrants	Foreigners	Philippines	935	Asia	920	South-Eastern Asia	902	Developing regions	6051	...	14004	18139	18400	19837	24887	2857
137	Immigrants	Foreigners	Poland	908	Europe	923	Eastern Europe	901	Developed regions	863	...	1533	1405	1263	1235	1267	101
138	Immigrants	Foreigners	Portugal	908	Europe	925	Southern Europe	901	Developed regions	4473	...	336	338	424	405	665	62
139	Immigrants	Foreigners	Qatar	935	Asia	922	Western Asia	902	Developing regions	0	...	5	11	2	5	9	
140	Immigrants	Foreigners	Republic of Korea	935	Asia	906	Eastern Asia	902	Developing regions	1011	...	5352	5832	6215	5920	7294	587
141	Immigrants	Foreigners	Republic of Moldova	908	Europe	923	Eastern Europe	901	Developed regions	0	...	628	655	803	1099	1127	153
142	Immigrants	Foreigners	Romania	908	Europe	923	Eastern Europe	901	Developed regions	375	...	5755	5048	4468	3834	2837	207
143	Immigrants	Foreigners	Russian Federation	908	Europe	923	Eastern Europe	901	Developed regions	0	...	3989	3972	3117	2983	2690	293
144	Immigrants	Foreigners	Rwanda	903	Africa	910	Eastern Africa	902	Developing regions	6	...	299	378	360	420	358	41
145	Immigrants	Foreigners	Saint Kitts and Nevis	904	Latin America and the Caribbean	915	Caribbean	902	Developing regions	5	...	8	11	3	10	25	1
146	Immigrants	Foreigners	Saint Lucia	904	Latin America and the Caribbean	915	Caribbean	902	Developing regions	69	...	110	185	190	255	298	25
147	Immigrants	Foreigners	Saint Vincent and the Grenadines	904	Latin America and the Caribbean	915	Caribbean	902	Developing regions	147	...	294	343	383	579	434	51
148	Immigrants	Foreigners	Samoa	909	Oceania	957	Polynesia	902	Developing regions	3	...	3	2	0	1	4	
149	Immigrants	Foreigners	San Marino	908	Europe	925	Southern Europe	901	Developed regions	1	...	0	0	0	0	0	
150	Immigrants	Foreigners	Sao Tome and Principe	903	Africa	911	Middle Africa	902	Developing regions	0	...	1	1	1	0	0	
151	Immigrants	Foreigners	Saudi Arabia	935	Asia	922	Western Asia	902	Developing regions	0	...	128	198	252	188	249	24
152	Immigrants	Foreigners	Senegal	903	Africa	914	Western Africa	902	Developing regions	13	...	210	278	416	433	555	66
153	Immigrants	Foreigners	Serbia	908	Europe	925	Southern Europe	901	Developed regions	0	...	0	0	3	50	259	36
154	Immigrants	Foreigners	Seychelles	903	Africa	910	Eastern Africa	902	Developing regions	5	...	15	25	8	9	18	
155	Immigrants	Foreigners	Sierra Leone	903	Africa	914	Western Africa	902	Developing regions	6	...	347	191	138	92	103	7
156	Immigrants	Foreigners	Singapore	935	Asia	920	South-Eastern Asia	902	Developing regions	241	...	311	392	298	690	734	36
157	Immigrants	Foreigners	Slovakia	908	Europe	923	Eastern Europe	901	Developed regions	0	...	597	369	241	215	125	12
158	Immigrants	Foreigners	Slovenia	908	Europe	925	Southern Europe	901	Developed regions	0	...	17	23	11	29	18	2

	Type	Coverage	OdName	AREA	AreaName	REG	RegName	DEV	DevName	1980	...	2004	2005	2006	2007	2008	2009
159	Immigrants	Foreigners	Somalia	903	Africa	910	Eastern Africa	902	Developing regions	7	...	1364	1198	1061	1166	1015	121
160	Immigrants	Foreigners	South Africa	903	Africa	913	Southern Africa	902	Developing regions	1026	...	1175	988	1111	1200	1123	118
161	Immigrants	Foreigners	Spain	908	Europe	925	Southern Europe	901	Developed regions	211	...	133	126	124	137	169	19
162	Immigrants	Foreigners	Sri Lanka	935	Asia	5501	Southern Asia	902	Developing regions	185	...	4495	4930	4714	4123	4756	454
163	Immigrants	Foreigners	State of Palestine	935	Asia	922	Western Asia	902	Developing regions	0	...	376	453	627	441	481	40
164	Immigrants	Foreigners	Sudan	903	Africa	912	Northern Africa	902	Developing regions	20	...	1823	1310	1039	683	622	42
165	Immigrants	Foreigners	Suriname	904	Latin America and the Caribbean	931	South America	902	Developing regions	15	...	17	15	16	20	9	1
166	Immigrants	Foreigners	Swaziland	903	Africa	913	Southern Africa	902	Developing regions	4	...	8	7	7	5	6	1
167	Immigrants	Foreigners	Sweden	908	Europe	924	Northern Europe	901	Developed regions	281	...	129	205	139	193	165	16
168	Immigrants	Foreigners	Switzerland	908	Europe	926	Western Europe	901	Developed regions	806	...	337	270	258	308	357	32
169	Immigrants	Foreigners	Syrian Arab Republic	935	Asia	922	Western Asia	902	Developing regions	315	...	1116	1458	1145	1056	919	91
170	Immigrants	Foreigners	Tajikistan	935	Asia	5500	Central Asia	902	Developing regions	0	...	14	85	46	44	15	5
171	Immigrants	Foreigners	Thailand	935	Asia	920	South-Eastern Asia	902	Developing regions	56	...	392	575	500	487	519	51
172	Immigrants	Foreigners	The former Yugoslav Republic of Macedonia	908	Europe	925	Southern Europe	901	Developed regions	0	...	443	285	256	211	191	19
173	Immigrants	Foreigners	Togo	903	Africa	914	Western Africa	902	Developing regions	5	...	163	157	149	235	351	40
174	Immigrants	Foreigners	Tonga	909	Oceania	957	Polynesia	902	Developing regions	2	...	5	2	0	1	0	
175	Immigrants	Foreigners	Trinidad and Tobago	904	Latin America and the Caribbean	915	Caribbean	902	Developing regions	958	...	730	857	794	975	1002	113
176	Immigrants	Foreigners	Tunisia	903	Africa	912	Northern Africa	902	Developing regions	58	...	764	756	1065	869	950	119
177	Immigrants	Foreigners	Turkey	935	Asia	922	Western Asia	902	Developing regions	481	...	1736	2065	1638	1463	1122	123
178	Immigrants	Foreigners	Turkmenistan	935	Asia	5500	Central Asia	902	Developing regions	0	...	16	40	26	37	13	2
179	Immigrants	Foreigners	Tuvalu	909	Oceania	957	Polynesia	902	Developing regions	0	...	2	0	0	1	0	
180	Immigrants	Foreigners	Uganda	903	Africa	910	Eastern Africa	902	Developing regions	13	...	160	239	201	170	204	18
181	Immigrants	Foreigners	Ukraine	908	Europe	923	Eastern Europe	901	Developed regions	0	...	2431	2270	1973	2218	1937	236
182	Immigrants	Foreigners	United Arab Emirates	935	Asia	922	Western Asia	902	Developing regions	0	...	41	31	42	37	33	3
183	Immigrants	Foreigners	United Kingdom of Great Britain and Northern I...	908	Europe	924	Northern Europe	901	Developed regions	22045	...	7533	7258	7140	8216	8979	887
184	Immigrants	Foreigners	United Republic of Tanzania	903	Africa	910	Eastern Africa	902	Developing regions	635	...	310	274	291	195	230	13
185	Immigrants	Foreigners	United States of America	905	Northern America	905	Northern America	901	Developed regions	9378	...	6990	8394	9613	9463	10190	899
186	Immigrants	Foreigners	Uruguay	904	Latin America and the Caribbean	931	South America	902	Developing regions	128	...	130	217	175	147	160	9

	Type	Coverage	OdName	AREA	AreaName	REG	RegName	DEV	DevName	1980	...	2004	2005	2006	2007	2008	200
187	Immigrants	Foreigners	Uzbekistan	935	Asia	5500	Central Asia	902	Developing regions	0	...	175	330	262	284	215	28
188	Immigrants	Foreigners	Vanuatu	909	Oceania	928	Melanesia	902	Developing regions	0	...	1	1	1	0	0	
189	Immigrants	Foreigners	Venezuela (Bolivarian Republic of)	904	Latin America and the Caribbean	931	South America	902	Developing regions	103	...	1224	1211	1192	1335	1239	135
190	Immigrants	Foreigners	Viet Nam	935	Asia	920	South-Eastern Asia	902	Developing regions	1191	...	1816	1852	3153	2574	1784	217
191	Immigrants	Foreigners	Western Sahara	903	Africa	912	Northern Africa	902	Developing regions	0	...	0	0	1	0	0	
192	Immigrants	Foreigners	Yemen	935	Asia	922	Western Asia	902	Developing regions	1	...	124	161	140	122	133	12
193	Immigrants	Foreigners	Zambia	903	Africa	910	Eastern Africa	902	Developing regions	11	...	56	91	77	71	64	6
194	Immigrants	Foreigners	Zimbabwe	903	Africa	910	Eastern Africa	902	Developing regions	72	...	1450	615	454	663	611	50

195 rows × 43 columns



In [5]:

df.shape

Out[5]:

(195, 43)

In [6]:

df.info()

```

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 195 entries, 0 to 194
Data columns (total 43 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   Type        195 non-null    object 
 1   Coverage    195 non-null    object 
 2   OdName      195 non-null    object 
 3   AREA         195 non-null    int64  
 4   AreaName    195 non-null    object 
 5   REG          195 non-null    int64  
 6   RegName     195 non-null    object 
 7   DEV          195 non-null    int64  
 8   DevName     195 non-null    object 
 9   1980         195 non-null    int64  
 10  1981         195 non-null    int64  
 11  1982         195 non-null    int64  
 12  1983         195 non-null    int64  
 13  1984         195 non-null    int64  
 14  1985         195 non-null    int64  
 15  1986         195 non-null    int64  
 16  1987         195 non-null    int64  
 17  1988         195 non-null    int64  
 18  1989         195 non-null    int64  
 19  1990         195 non-null    int64  
 20  1991         195 non-null    int64  
 21  1992         195 non-null    int64  
 22  1993         195 non-null    int64  
 23  1994         195 non-null    int64  
 24  1995         195 non-null    int64  
 25  1996         195 non-null    int64  
 26  1997         195 non-null    int64  
 27  1998         195 non-null    int64  
 28  1999         195 non-null    int64  
 29  2000         195 non-null    int64  
 30  2001         195 non-null    int64  
 31  2002         195 non-null    int64  
 32  2003         195 non-null    int64  
 33  2004         195 non-null    int64  
 34  2005         195 non-null    int64  
 35  2006         195 non-null    int64  
 36  2007         195 non-null    int64  
 37  2008         195 non-null    int64  
 38  2009         195 non-null    int64  
 39  2010         195 non-null    int64  
 40  2011         195 non-null    int64  
 41  2012         195 non-null    int64  
 42  2013         195 non-null    int64  
dtypes: int64(37), object(6)
memory usage: 65.6+ KB

```

In [7]:

localhost:8888/nbconvert/html/projects/project\_3\_final.ipynb?download=false

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df.columns

```
Out[7]: Index(['Type', 'Coverage', 'OdName', 'AREA', 'AreaName', 'REG',
       'RegName', 'DEV', 'DevName', 1980, 1981, 1982,
       1983, 1984, 1985, 1986, 1987, 1988,
       1989, 1990, 1991, 1992, 1993, 1994,
       1995, 1996, 1997, 1998, 1999, 2000,
       2001, 2002, 2003, 2004, 2005, 2006,
       2007, 2008, 2009, 2010, 2011, 2012,
       2013],
      dtype='object')
```

```
In [8]: # delete unwanted columns
canada = df.drop(columns=['Type', 'Coverage', 'AREA', 'AreaName', 'REG', 'RegName', 'DEV', 'DevName'])
```

```
In [9]: # change the column name and set country as a index
canada.rename(columns={'OdName':'Country'}, inplace=True)
canada.set_index(canada.Country, inplace=True)
```

```
In [10]: canada.index.name=None
```

```
In [11]: del canada['Country']
```

```
In [12]: canada = canada.transpose()
canada.head()
```

Out[12]:

	Afghanistan	Albania	Algeria	American Samoa	Andorra	Angola	Antigua and Barbuda	Argentina	Armenia	Australia	...	United States of America	Uruguay	Uzbekistan	Vanuatu
<b>1980</b>	16	1	80	0	0	1	0	368	0	702	...	9378	128	0	
<b>1981</b>	39	0	67	1	0	3	0	426	0	639	...	10030	132	0	
<b>1982</b>	39	0	71	0	0	6	0	626	0	484	...	9074	146	0	
<b>1983</b>	47	0	69	0	0	6	0	241	0	317	...	7100	105	0	
<b>1984</b>	71	0	63	0	0	4	42	237	0	317	...	6661	90	0	

5 rows × 195 columns

1) Let's view the number of immigrants from Japan (row 87) for the following scenarios

1. The full row data (all columns)
2. For year 2013
3. For years 1980 to 1985

```
In [13]: canada['Japan']
```

```
Out[13]: 1980    701
1981    756
1982    598
1983    309
1984    246
1985    198
1986    248
1987    422
1988    324
1989    494
1990    379
1991    506
1992    605
1993    907
1994    956
1995    826
1996    994
1997    924
1998    897
1999    1883
2000    1010
2001    1092
2002    806
2003    817
2004    973
2005    1867
2006    1212
2007    1250
2008    1284
2009    1194
2010    1168
```

```
2011    1265
2012    1214
2013     982
Name: Japan, dtype: int64
```

B) For year 2013

```
In [14]: canada.iloc[-1:,87]
```

```
Out[14]: 2013    982
Name: Japan, dtype: int64
```

C) For years 1980 to 1985

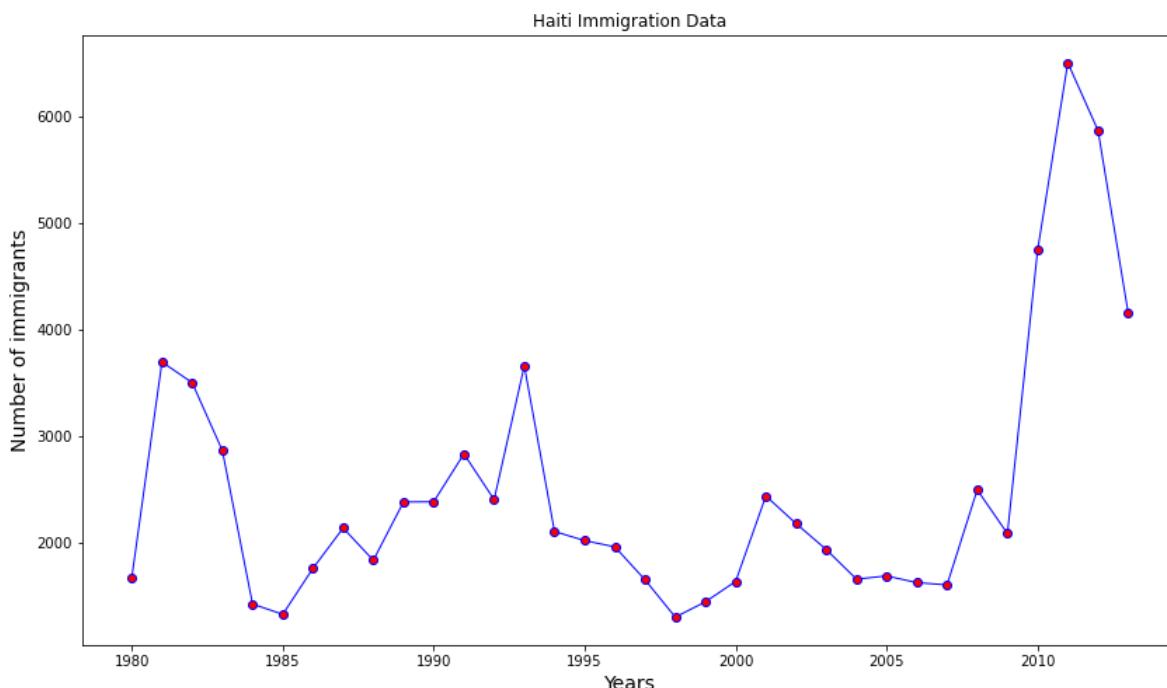
```
In [15]: canada.iloc[0:6,87]
```

```
Out[15]: 1980    701
1981    756
1982    598
1983    309
1984    246
1985    198
Name: Japan, dtype: int64
```

2) In 2010, Haiti suffered a catastrophic magnitude 7.0 earthquake. The quake caused widespread devastation and loss of life and about three million people were affected by this natural disaster. As part of Canada's humanitarian effort, the Government of Canada stepped up its effort in accepting refugees from Haiti. We can quickly visualize this effort using a Line plot.

```
In [16]: plt.figure(figsize=(14,8))
plt.plot(canada['Haiti'], marker='o', linewidth='1', color='b', markerfacecolor='r')
plt.xlabel('Years', size=14)
plt.ylabel('Number of immigrants', size=14)
plt.title('Haiti Immigration Data')
```

```
Out[16]: Text(0.5, 1.0, 'Haiti Immigration Data')
```

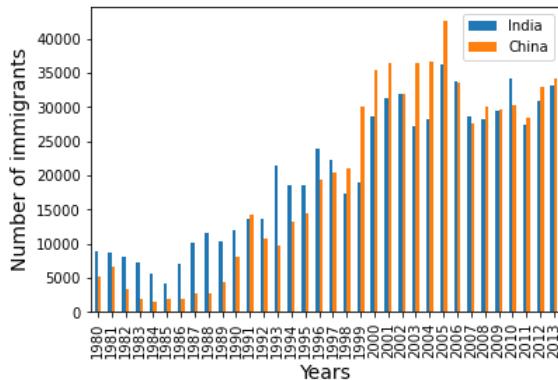


from the line plot it is clear that the immigration count in 2010 is much higher as compared to previous year.

3) Let's compare the number of immigrants from India and China from 1980 to 2013

```
In [17]: plt.figure(figsize=(20,10))
ind_china= pd.DataFrame({'India':canada['India'], 'China':canada['China']})
ind_china.plot(kind='bar')
plt.xlabel('Years', size=14)
plt.ylabel('Number of immigrants', size=14)
```

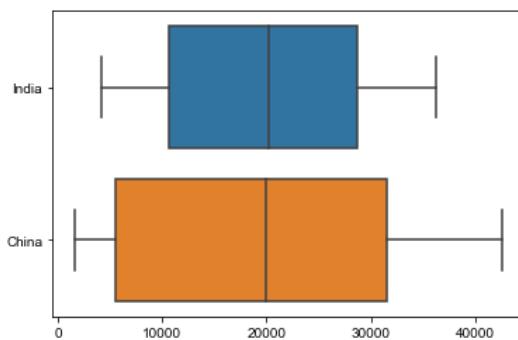
```
Out[17]: Text(0, 0.5, 'Number of immigrants')
<Figure size 1440x720 with 0 Axes>
```



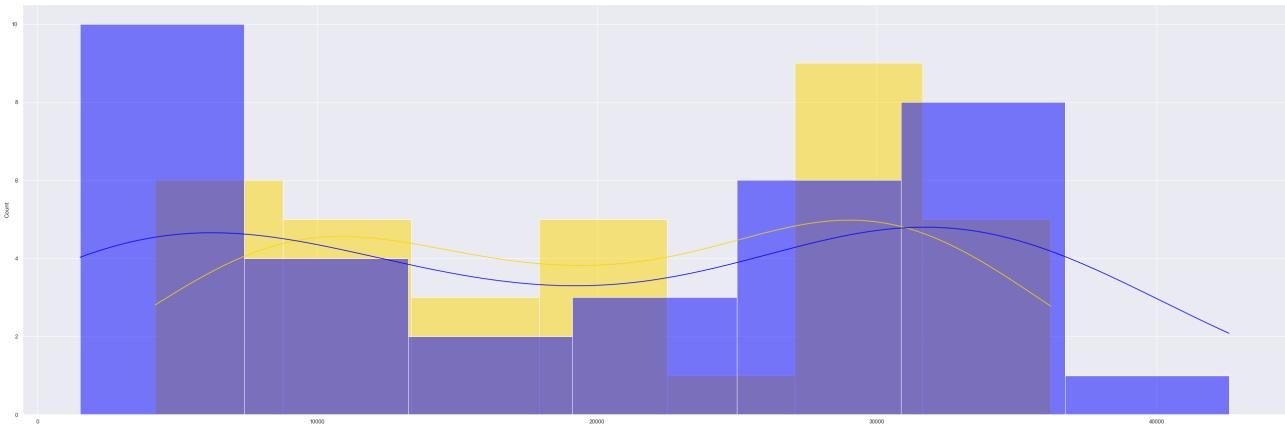
from the bar chart it is clear immigration fro India China goes increasing in 2000s decade

4) Let's compare the distribution of data from India and China from 1980 to 2013

```
In [18]:  
canada_i = pd.DataFrame(canada['India'])  
canada_c = pd.DataFrame(canada['China'])  
ind_china = canada_i.join(canada_c)  
sns.boxplot(data=ind_china, orient='h')  
sns.set(rc={'figure.figsize':(45,15)})
```



```
In [19]:  
sns.histplot(data=canada, x='India', kde=True, color= 'gold')  
sns.histplot(data=canada, x='China', kde=True, color= 'blue')  
sns.set(rc={'figure.figsize':(30,15)})
```



5) Compare the trend of top 5 countries that contributed the most to immigration to Canada.

```
In [20]:  
# creating new row which has total count of each country  
canada.loc['canada_top'] = canada.sum()
```

```
In [21]:  
canada
```

```
Out[21]:
```

	Afghanistan	Albania	Algeria	American Samoa	Andorra	Angola	Antigua and Barbuda	Argentina	Armenia	Australia	...	United States of America	Uruguay	Uzbekistan
1980	16	1	80	0	0	1	0	368	0	702	...	9378	128	0
1981	39	0	67	1	0	3	0	426	0	639	...	10030	132	0
1982	39	0	71	0	0	6	0	626	0	484	...	9074	146	0
1983	47	0	69	0	0	6	0	241	0	317	...	7100	105	0

	Afghanistan	Albania	Algeria	American Samoa	Andorra	Angola	Antigua and Barbuda	Argentina	Armenia	Australia	...	United States of America	Uruguay	Uzbekistan
1984	71	0	63	0	0	4	42	237	0	317	...	6661	90	0
1985	340	0	44	0	0	3	52	196	0	319	...	6543	92	0
1986	496	1	69	0	2	5	51	213	0	356	...	7074	137	0
1987	741	2	132	1	0	5	61	519	0	467	...	7705	269	0
1988	828	2	242	0	0	11	34	374	0	410	...	6469	99	0
1989	1076	3	434	1	0	6	51	538	0	553	...	6790	144	0
1990	1028	3	491	2	3	8	31	678	0	620	...	5892	111	0
1991	1378	21	872	0	0	23	59	763	0	640	...	6054	229	0
1992	1170	56	795	0	1	26	61	1023	22	734	...	6842	299	12
1993	713	96	717	0	0	22	44	1022	21	886	...	7435	437	44
1994	858	71	595	0	0	8	18	366	66	702	...	5901	125	33
1995	1537	63	1106	0	0	26	23	380	75	668	...	4890	164	34
1996	2212	113	2054	0	0	38	21	396	102	699	...	5515	171	58
1997	2555	307	1842	0	0	27	27	391	115	623	...	4753	117	75
1998	1999	574	2292	0	2	58	19	349	89	479	...	4437	87	97
1999	2395	1264	2389	0	0	49	12	318	112	523	...	5196	93	106
2000	3326	1816	2867	0	0	70	13	427	124	599	...	5433	75	101
2001	4067	1602	3418	0	1	169	25	635	87	799	...	5604	64	102
2002	3697	1021	3406	0	0	168	17	865	132	747	...	4948	91	144
2003	3479	853	3072	0	2	165	25	1745	153	876	...	5543	103	155
2004	2978	1450	3616	0	0	268	14	1591	147	930	...	6990	130	175
2005	3436	1223	3626	0	0	295	24	1153	224	909	...	8394	217	330
2006	3009	856	4807	1	1	184	32	847	218	875	...	9613	175	262
2007	2652	702	3623	0	1	106	15	620	198	1033	...	9463	147	284
2008	2111	560	4005	0	0	76	32	540	205	1018	...	10190	160	215
2009	1746	716	5393	0	0	62	38	467	267	1018	...	8995	99	288
2010	1758	561	4752	0	0	61	27	459	252	933	...	8142	93	289
2011	2203	539	4325	0	0	39	37	278	236	851	...	7676	81	162
2012	2635	620	3774	0	1	70	51	263	258	982	...	7891	47	235
2013	2004	603	4331	0	1	45	25	282	207	1121	...	8501	58	167
canada_top	58639	15699	69439	6	15	2113	981	19596	3310	23829	...	241122	4715	3368

35 rows × 195 columns



In [22]:

```
# sorting canada_top row to get top 15 countries
canada15=canada.sort_values(by='canada_top', axis=1, ascending=False)
```

In [23]:

```
# storing top 15 countries which has highest immigrants to canada
canada_15 = canada15.iloc[:, 0:15]
canada_15
```

Out[23]:

	India	China	United Kingdom of Great Britain and Northern Ireland	Philippines	Pakistan	United States of America	Iran (Islamic Republic of)	Sri Lanka	Republic of Korea	Poland	Lebanon	France	Jamaica	Viet Nam	Romania
1980	8880	5123	22045	6051	978	9378	1172	185	1011	863	1409	1729	3198	1191	3
1981	8670	6682	24796	5921	972	10030	1429	371	1456	2930	1119	2027	2634	1829	4
1982	8147	3308	20620	5249	1201	9074	1822	290	1572	5881	1159	2219	2661	2162	5
1983	7338	1863	10015	4562	900	7100	1592	197	1081	4546	789	1490	2455	3404	5
1984	5704	1527	10170	3801	668	6661	1977	1086	847	3588	1253	1169	2508	7583	5
1985	4211	1816	9564	3150	514	6543	1648	845	962	2819	1683	1177	2938	5907	6

	India	China	United Kingdom of Great Britain and Northern Ireland	Philippines	Pakistan	United States of America	Iran (Islamic Republic of)	Sri Lanka	Republic of Korea	Poland	Lebanon	France	Jamaica	Viet Nam	Romania
1986	7150	1960	9470	4166	691	7074	1794	1838	1208	4808	2576	1298	4649	2741	6
1987	10189	2643	21337	7360	1072	7705	2989	4447	2338	6931	3803	1658	5415	1406	12
1988	11522	2758	27359	8639	1334	6469	3273	2779	2805	9211	3970	2038	3924	1411	11
1989	10343	4323	23795	11865	2261	6790	3781	2758	2979	16025	7157	2332	3946	3004	15
1990	12041	8076	31668	12509	2470	5892	3655	3525	2087	17040	13568	2177	4945	3801	22
1991	13734	14255	23380	12718	3079	6054	6250	7266	2598	16028	12567	2911	5056	5870	23
1992	13673	10846	34123	13670	4071	6842	6814	13102	3790	12145	6915	3487	5991	5416	31
1993	21496	9817	33720	20479	4777	7435	3959	9563	3819	6960	4902	3709	6065	6547	36
1994	18620	13128	39231	19532	4666	5901	2785	7150	3005	3550	2751	2759	3913	5105	34
1995	18489	14398	30145	15864	4994	4890	3956	9368	3501	2405	2228	3332	3619	3723	42
1996	23859	19415	29322	13692	9125	5515	6205	6484	3250	2136	1919	2623	3282	2462	39
1997	22268	20475	22965	11549	13073	4753	7982	5415	4093	1758	1472	2473	2847	1752	39
1998	17241	21049	10367	8735	9068	4437	7057	3566	4938	1488	1329	3214	2253	1631	30
1999	18974	30069	7045	9734	9979	5196	6208	4982	7108	1354	1594	3343	2358	1419	35
2000	28572	35529	8840	10763	15400	5433	5884	6081	7618	1471	1903	3765	2482	1803	45
2001	31223	36434	11728	13836	16708	5604	6169	5861	9619	1601	2578	3806	2838	2117	56
2002	31889	31961	8046	11707	15110	4948	8129	5279	7342	1447	2332	3463	2524	2291	57
2003	27155	36439	6797	12758	13205	5543	5918	4892	7117	1394	3179	3568	2054	1713	55
2004	28235	36619	7533	14004	13399	6990	6348	4495	5352	1533	3293	4391	2237	1816	57
2005	36210	42584	7258	18139	14314	8394	5837	4930	5832	1405	3709	4429	1945	1852	50
2006	33848	33518	7140	18400	13127	9613	7480	4714	6215	1263	3802	4002	1722	3153	44
2007	28742	27642	8216	19837	10124	9463	6974	4123	5920	1235	3467	4290	2141	2574	38
2008	28261	30037	8979	24887	8994	10190	6475	4756	7294	1267	3566	4532	2334	1784	28
2009	29456	29622	8876	28573	7217	8995	6580	4547	5874	1013	3077	5051	2456	2171	20
2010	34235	30391	8724	38617	6811	8142	7477	4422	5537	795	3432	4646	2321	1942	19
2011	27509	28502	6204	36765	7468	7676	7479	3309	4588	720	3072	4080	2059	1723	17
2012	30933	33024	6195	34315	11227	7891	7534	3338	5316	779	1614	6280	2182	1731	15
2013	33087	34129	5827	29544	12603	8501	11291	2394	4509	852	2172	5623	2479	2112	15
canada_top	691904	659962	551500	511391	241600	241122	175923	148358	142581	139241	115359	109091	106431	97146	935

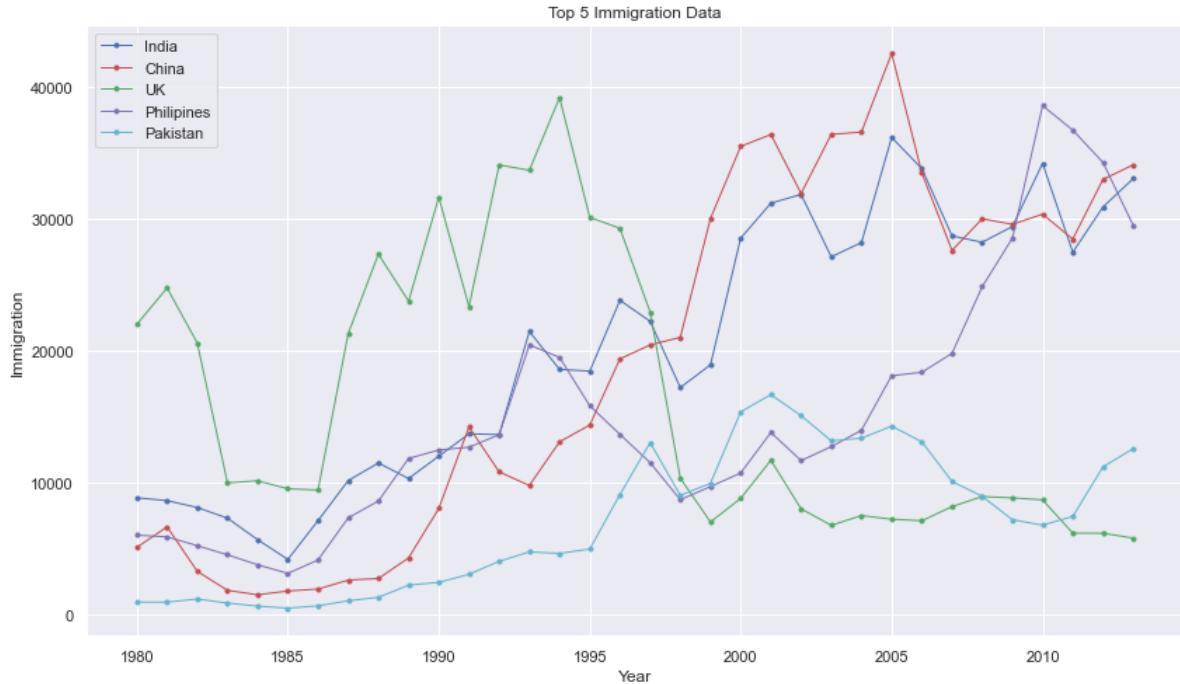
In [24]:

```
# dropping canada_top row
canada80_2013 = canada.drop('canada_top')
```

In [25]:

```
# creating line chart to compare trend of immigration of top 5 countries having highest immigratns.
plt.figure(figsize=(14,8))
plt.plot(canada80_2013['India'],marker='.', linewidth=1, color='b', label='India')
plt.plot(canada80_2013['China'], marker='.', linewidth=1, color='r', label='China')
plt.plot(canada80_2013['United Kingdom of Great Britain and Northern Ireland'], marker='.', linewidth=1, color='g', label='UK')
plt.plot(canada80_2013['Philippines'], marker='.', linewidth=1, color='m', label='Philippines')
plt.plot(canada80_2013['Pakistan'], marker='.', linewidth=1, color='c', label='Pakistan')
plt.xlabel('Year')
plt.ylabel('Immigration')
plt.title('Top 5 Immigration Data')
plt.legend(loc='upper left')
```

Out[25]: <matplotlib.legend.Legend at 0x14c666ef610>



6) Using a pie chart, explore the proportion (percentage) of new immigrants grouped by continents in the year 2013

In [26]:

```
# creating new data set df_continents
df_continents = df.drop(columns=['Type', 'Coverage', 'AREA', 'OdName', 'REG', 'RegName', 'DEV', 'DevName'])
```

Out[26]:

	AreaName	1980	1981	1982	1983	1984	1985	1986	1987	1988	...	2004	2005	2006	2007	2008	2009	2010	2011	2012
0	Asia	16	39	39	47	71	340	496	741	828	...	2978	3436	3009	2652	2111	1746	1758	2203	2635
1	Europe	1	0	0	0	0	0	1	2	2	...	1450	1223	856	702	560	716	561	539	620
2	Africa	80	67	71	69	63	44	69	132	242	...	3616	3626	4807	3623	4005	5393	4752	4325	3774
3	Oceania	0	1	0	0	0	0	0	1	0	...	0	0	1	0	0	0	0	0	0
4	Europe	0	0	0	0	0	0	2	0	0	...	0	0	1	1	0	0	0	0	1
5	Africa	1	3	6	6	4	3	5	5	11	...	268	295	184	106	76	62	61	39	70
6	Latin America and the Caribbean	0	0	0	0	42	52	51	61	34	...	14	24	32	15	32	38	27	37	51
7	Latin America and the Caribbean	368	426	626	241	237	196	213	519	374	...	1591	1153	847	620	540	467	459	278	263
8	Asia	0	0	0	0	0	0	0	0	0	...	147	224	218	198	205	267	252	236	258
9	Oceania	702	639	484	317	317	319	356	467	410	...	930	909	875	1033	1018	1018	933	851	982
10	Europe	234	238	201	117	127	165	196	265	198	...	118	122	102	98	91	109	124	84	102
11	Asia	0	0	0	0	0	0	0	0	0	...	230	359	236	203	125	165	209	138	161
12	Latin America and the Caribbean	26	23	38	12	21	28	23	18	22	...	13	14	18	23	30	27	25	40	60
13	Asia	0	2	1	1	1	3	0	2	10	...	12	12	12	22	9	35	28	21	38
14	Asia	83	84	86	81	98	92	486	503	476	...	2660	4171	4014	2897	2939	2104	4721	2694	2640
15	Latin America and the Caribbean	372	376	299	244	265	285	251	303	265	...	90	111	97	130	134	125	121	97	132
16	Europe	0	0	0	0	0	0	0	0	0	...	543	558	439	568	524	454	438	357	277
17	Europe	511	540	519	297	183	181	197	283	333	...	411	400	302	363	335	358	363	332	402
18	Latin America and the Caribbean	16	27	13	21	37	26	25	23	53	...	25	37	24	28	48	38	39	36	34
19	Africa	2	5	4	3	4	3	6	4	20	...	112	95	116	183	205	238	290	284	391
20	Asia	0	0	0	0	1	0	0	0	0	...	1	5	10	7	36	865	1464	1879	1075

	AreaName	1980	1981	1982	1983	1984	1985	1986	1987	1988	...	2004	2005	2006	2007	2008	2009	2010	2011	2012
21	Latin America and the Caribbean	44	52	42	49	38	44	79	165	63	...	85	134	139	107	143	214	180	86	83
22	Europe	0	0	0	0	0	0	0	0	0	...	188	211	217	209	182	156	168	140	121
23	Africa	10	1	3	3	7	4	2	3	8	...	9	7	11	8	28	15	42	53	64
24	Latin America and the Caribbean	211	220	192	139	145	130	205	244	394	...	917	969	1181	1746	2138	2509	2598	1508	1642
25	Asia	79	6	8	2	2	4	12	16	103	...	3	4	5	11	10	5	12	6	3
26	Europe	24	20	12	33	11	24	33	52	43	...	2022	1738	1419	1172	994	784	556	365	451
27	Africa	2	1	3	2	3	2	7	18	6	...	97	91	147	136	139	162	186	144	269
28	Africa	0	0	0	0	1	2	1	5	1	...	559	626	468	614	448	566	529	604	684
29	Africa	1	1	2	0	11	1	9	3	1	...	3	5	7	2	5	1	3	3	6
30	Asia	12	19	26	33	10	7	8	14	15	...	348	370	529	460	354	203	200	196	233
31	Africa	9	2	16	7	8	13	11	18	20	...	436	604	697	1025	1279	1344	1800	1638	2507
32	Northern America	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	1	1
33	Africa	4	3	1	0	0	0	0	2	3	...	13	49	18	30	28	19	26	18	45
34	Africa	0	0	1	0	0	1	2	3	7	...	92	126	96	131	95	87	98	79	97
35	Latin America and the Caribbean	1233	1069	1078	781	681	533	633	1454	990	...	383	384	427	530	350	375	340	174	291
36	Asia	5123	6682	3308	1863	1527	1816	1960	2643	2758	...	36619	42584	33518	27642	30037	29622	30391	28502	33024
37	Asia	0	0	0	0	0	0	0	0	0	...	536	729	712	674	897	657	623	591	728
38	Asia	0	0	0	0	0	0	0	0	0	...	21	21	32	16	12	21	21	13	33
39	Latin America and the Caribbean	266	326	360	244	235	214	257	376	352	...	4566	6424	6535	5357	5452	4652	5218	4366	3741
40	Africa	0	2	2	0	0	2	1	0	2	...	6	5	7	11	3	19	22	14	18
41	Africa	2	0	1	0	1	2	4	1	1	...	142	136	143	87	72	70	75	81	91
42	Latin America and the Caribbean	28	35	42	51	75	113	79	116	104	...	165	188	279	281	246	217	190	149	183
43	Africa	14	8	10	6	21	23	23	20	17	...	256	294	431	619	646	668	1066	636	1024
44	Europe	0	0	0	0	0	0	0	0	0	...	151	128	102	102	131	92	91	135	112
45	Latin America and the Caribbean	306	41	94	104	101	115	102	139	90	...	866	999	1064	1350	1300	1433	961	962	1304
46	Asia	132	128	84	46	46	43	48	48	56	...	11	7	9	4	7	6	18	6	12
47	Europe	0	0	0	0	0	0	0	0	0	...	191	193	146	137	104	159	168	128	173
48	Asia	1	1	3	1	4	3	0	0	0	...	15	14	10	7	19	11	45	97	66
49	Africa	15	16	17	17	28	11	38	66	46	...	1465	1521	1623	1466	1397	1581	1239	1224	1714
50	Europe	272	293	299	106	93	73	93	109	129	...	89	62	101	97	108	81	92	93	94
51	Africa	0	1	1	5	1	0	4	2	4	...	67	93	68	50	47	70	123	127	164
52	Latin America and the Caribbean	104	81	94	65	81	79	50	89	75	...	50	59	72	79	60	59	43	36	43
53	Latin America and the Caribbean	40	53	104	88	97	84	307	446	358	...	270	303	295	311	438	391	479	739	604
54	Latin America and the Caribbean	238	207	184	155	179	208	240	344	265	...	417	491	525	419	437	373	353	348	282
55	Africa	612	660	755	455	447	348	514	1017	1085	...	2393	2496	2190	2356	3347	3496	5982	4663	5555

	AreaName	1980	1981	1982	1983	1984	1985	1986	1987	1988	...	2004	2005	2006	2007	2008	2009	2010	2011	2012
56	Latin America and the Caribbean	110	295	882	2587	2666	2769	3106	3558	2720	...	442	436	430	929	1115	845	787	691	641
57	Africa	0	0	0	0	0	0	1	0	0	...	2	3	4	5	1	5	4	4	
58	Africa	0	0	0	0	0	0	0	0	0	...	414	528	700	699	799	904	931	1182	1335
59	Europe	0	0	0	0	0	0	0	0	0	...	27	26	18	34	34	26	28	15	26
60	Africa	98	59	54	98	154	157	302	555	690	...	1535	1506	1801	1512	1613	1289	1865	2163	1864
61	Oceania	632	705	814	554	389	446	361	523	561	...	495	298	277	304	321	311	398	316	270
62	Europe	208	205	170	70	83	69	68	92	89	...	54	67	51	62	89	63	63	72	62
63	Europe	1729	2027	2219	1490	1169	1177	1298	1658	2038	...	4391	4429	4002	4290	4532	5051	4646	4080	6280
64	Africa	2	3	2	2	1	0	0	5	3	...	33	67	68	101	86	86	64	63	74
65	Africa	0	0	1	0	0	2	4	22	3	...	10	29	38	32	25	10	37	24	18
66	Asia	0	0	0	0	0	0	0	0	0	...	106	114	125	132	112	128	126	139	147
67	Europe	1626	1977	3062	2376	1610	1441	1233	1704	1482	...	2020	2226	2767	2449	3833	3887	2956	2053	1702
68	Africa	172	196	98	122	116	172	215	970	408	...	738	851	710	688	629	659	802	528	531
69	Europe	1065	953	897	633	580	584	547	765	564	...	120	100	74	110	107	119	101	102	146
70	Latin America and the Caribbean	154	181	231	165	167	168	235	302	165	...	296	283	363	360	284	325	208	173	142
71	Latin America and the Caribbean	114	108	113	366	598	975	1265	1060	702	...	217	190	230	258	263	264	266	288	358
72	Africa	0	3	3	6	4	3	5	14	12	...	281	256	342	415	327	347	395	352	407
73	Africa	0	0	0	0	1	0	0	0	3	...	4	7	12	7	2	0	2	4	
74	Latin America and the Caribbean	2334	2943	3575	2650	1932	2299	3942	6174	2977	...	1341	1215	1286	1277	1137	1180	953	804	676
75	Latin America and the Caribbean	1666	3692	3498	2860	1418	1321	1753	2132	1829	...	1652	1682	1619	1598	2491	2080	4744	6503	5868
76	Latin America and the Caribbean	26	33	30	68	65	69	81	135	111	...	133	166	164	165	187	169	386	538	436
77	Europe	205	310	397	337	310	522	647	676	1139	...	671	516	520	425	383	312	354	287	300
78	Europe	17	33	10	9	13	6	11	11	7	...	23	10	2	15	13	15	30	38	42
79	Asia	8880	8670	8147	7338	5704	4211	7150	10189	11522	...	28235	36210	33848	28742	28261	29456	34235	27509	30933
80	Asia	186	178	252	115	123	100	127	213	270	...	552	632	613	657	661	504	712	390	395
81	Asia	1172	1429	1822	1592	1977	1648	1794	2989	3273	...	6348	5837	7480	6974	6475	6580	7477	7479	7534
82	Asia	262	245	260	380	428	231	265	384	619	...	1796	2226	1788	2406	3543	5450	5941	6196	4041
83	Europe	781	895	707	298	327	287	481	1078	1415	...	244	224	283	300	412	395	547	525	725
84	Asia	1403	1711	1334	541	446	680	1212	1497	1389	...	2788	2446	2625	2401	2562	2316	2755	1970	2134
85	Europe	1820	2057	1480	820	858	667	731	1101	885	...	334	344	325	320	370	429	434	374	440
86	Latin America and the Caribbean	3198	2634	2661	2455	2508	2938	4649	5415	3924	...	2237	1945	1722	2141	2334	2456	2321	2059	2182
87	Asia	701	756	598	309	246	198	248	422	324	...	973	1067	1212	1250	1284	1194	1168	1265	1214
88	Asia	177	160	155	113	102	179	181	392	489	...	1733	1940	1827	1421	1581	1235	1831	1635	1206
89	Asia	0	0	0	0	0	0	0	0	0	...	545	506	408	436	394	431	377	381	462
90	Africa	291	296	221	201	218	245	244	628	984	...	685	693	622	449	453	489	507	585	725
91	Oceania	0	0	0	1	0	0	0	0	0	...	0	1	0	0	1	1	0	0	2
92	Asia	1	0	8	2	1	4	4	9	19	...	74	66	35	62	53	68	67	58	73
93	Asia	0	0	0	0	0	0	0	0	0	...	245	173	161	135	168	173	157	159	278
94	Asia	11	6	16	16	7	17	21	20	22	...	38	42	74	53	32	39	54	22	25
95	Europe	0	0	0	0	0	0	1	0	0	...	94	77	69	88	67	85	70	103	202

	AreaName	1980	1981	1982	1983	1984	1985	1986	1987	1988	...	2004	2005	2006	2007	2008	2009	2010	2011	2012
96	Asia	1409	1119	1159	789	1253	1683	2576	3803	3970	...	3293	3709	3802	3467	3566	3077	3432	3072	1614
97	Africa	1	1	1	2	7	5	3	1	6	...	2	4	0	4	1	8	7	1	
98	Africa	1	2	2	1	4	4	3	4	3	...	409	581	356	153	74	94	162	106	58
99	Africa	5	7	9	24	10	31	23	81	43	...	196	196	281	198	306	282	384	352	298
100	Europe	1	4	2	0	0	3	0	1	1	...	0	1	0	0	1	1	0	2	
101	Europe	1	1	0	0	0	1	0	0	1	...	220	167	113	108	109	63	57	52	77
102	Europe	14	4	2	5	1	3	6	2	4	...	9	10	9	9	3	5	8	11	
103	Africa	22	10	13	32	30	18	10	42	36	...	79	88	96	115	118	169	178	148	
104	Africa	5	4	6	3	2	0	4	7	1	...	17	23	15	13	5	10	28	16	
105	Asia	786	816	813	448	384	374	425	817	2072	...	401	593	580	600	658	640	802	409	
106	Asia	0	0	0	1	0	0	0	0	0	...	1	0	0	2	1	7	4	1	
107	Africa	4	4	7	3	3	4	3	5	4	...	87	87	114	143	154	164	170	155	
108	Europe	191	242	153	64	60	68	76	78	111	...	28	28	24	7	21	18	17	8	
109	Oceania	0	0	0	0	0	0	0	0	0	...	0	0	0	2	0	0	0	0	
110	Africa	5	0	3	3	1	1	1	4	3	...	60	86	124	96	112	83	74	54	
111	Africa	306	259	353	170	207	164	325	578	531	...	702	696	512	507	714	872	1455	1146	
112	Latin America and the Caribbean	409	394	491	490	509	425	667	813	916	...	2259	2837	2844	3239	2856	3092	3865	3947	4227
113	Europe	0	0	0	0	0	1	0	1	0	...	1	1	1	1	0	0	4	1	
114	Asia	0	0	0	0	0	0	0	0	0	...	34	59	64	82	59	118	169	103	
115	Europe	0	0	0	0	0	0	0	0	0	...	0	0	0	7	19	10	14	19	
116	Africa	325	471	447	335	248	328	388	505	685	...	3686	2939	3322	4021	4226	5532	6242	4399	3878
117	Africa	0	0	7	2	3	1	3	1	5	...	8	5	9	5	5	12	7	3	
118	Asia	80	62	46	31	41	23	18	33	55	...	191	210	953	1887	975	1153	556	368	
119	Africa	0	5	5	3	2	1	1	4	3	...	9	6	19	13	26	14	16	23	
120	Oceania	1	0	0	0	0	0	0	0	1	...	1	1	1	0	0	1	0	0	
121	Asia	1	1	6	1	2	4	13	6	13	...	404	607	540	511	581	561	1392	1129	
122	Europe	1889	1858	1852	716	560	510	539	647	832	...	749	813	837	615	818	786	759	586	
123	Oceania	0	0	0	0	0	0	0	0	0	...	0	0	0	0	1	0	0	0	
124	Oceania	602	480	364	140	164	148	176	208	200	...	350	370	318	350	480	520	490	375	
125	Latin America and the Caribbean	18	21	27	55	126	468	670	1073	969	...	67	79	96	76	124	116	94	123	
126	Africa	0	0	1	1	0	0	0	4	0	...	38	59	57	75	75	82	80	95	
127	Africa	81	60	58	58	78	78	114	149	122	...	1518	2236	2594	2375	2109	3156	3906	3103	
128	Europe	116	77	106	51	31	54	56	80	73	...	73	57	53	73	66	75	46	49	
129	Asia	0	0	0	8	0	0	0	3	0	...	12	14	18	16	10	7	14	13	
130	Asia	978	972	1201	900	668	514	691	1072	1334	...	13399	14314	13127	10124	8994	7217	6811	7468	11227
131	Oceania	0	0	0	0	0	0	0	0	0	...	0	0	0	1	0	0	0	0	
132	Latin America and the Caribbean	13	8	14	10	11	17	16	26	21	...	38	57	73	63	52	73	65	49	
133	Oceania	0	2	2	4	2	2	1	1	3	...	1	1	0	0	9	1	3	0	
134	Latin America and the Caribbean	45	26	32	40	48	36	34	72	53	...	74	75	88	98	95	88	89	83	
135	Latin America and the Caribbean	317	456	401	241	306	328	628	843	1237	...	1460	1653	1473	1490	1094	1884	1283	886	
136	Asia	6051	5921	5249	4562	3801	3150	4166	7360	8639	...	14004	18139	18400	19837	24887	28573	38617	36765	
137	Europe	863	2930	5881	4546	3588	2819	4808	6931	9211	...	1533	1405	1263	1235	1267	1013	795	720	
138	Europe	4473	3486	2432	1433	1398	1451	2617	7684	6888	...	336	338	424	405	665	623	629	528	

	AreaName	1980	1981	1982	1983	1984	1985	1986	1987	1988	...	2004	2005	2006	2007	2008	2009	2010	2011	2012
139	Asia	0	0	0	0	0	0	1	0	1	...	5	11	2	5	9	6	18	3	14
140	Asia	1011	1456	1572	1081	847	962	1208	2338	2805	...	5352	5832	6215	5920	7294	5874	5537	4588	5316
141	Europe	0	0	0	0	0	0	0	0	0	...	628	655	803	1099	1127	1535	1988	1367	1416
142	Europe	375	438	583	543	524	604	656	1202	1106	...	5755	5048	4468	3834	2837	2076	1922	1776	1588
143	Europe	0	0	0	0	0	0	0	0	0	...	3989	3972	3117	2983	2690	2931	2288	1963	2079
144	Africa	6	6	8	4	3	0	9	3	12	...	299	378	360	420	358	415	396	492	562
145	Latin America and the Caribbean	5	3	0	16	21	17	36	43	39	...	8	11	3	10	25	11	22	12	21
	Latin America and the Caribbean	69	89	133	69	68	80	95	92	77	...	110	185	190	255	298	257	249	261	382
147	Latin America and the Caribbean	147	190	202	154	158	182	209	216	133	...	294	343	383	579	434	511	434	451	523
148	Oceania	3	7	4	1	3	0	3	0	1	...	3	2	0	1	4	2	5	3	2
149	Europe	1	0	0	0	0	0	1	0	0	...	0	0	0	0	0	0	1	0	C
150	Africa	0	0	0	0	0	0	0	0	0	...	1	1	1	0	0	1	2	0	C
151	Asia	0	0	1	4	1	2	5	7	29	...	128	198	252	188	249	246	330	278	286
152	Africa	13	10	9	11	7	11	16	19	17	...	210	278	416	433	555	668	765	740	945
153	Europe	0	0	0	0	0	0	0	0	0	...	0	0	3	50	259	365	271	299	395
154	Africa	5	15	3	4	1	8	13	24	19	...	15	25	8	9	18	4	10	10	E
155	Africa	6	6	7	3	12	10	13	57	26	...	347	191	138	92	103	70	63	96	72
156	Asia	241	301	337	169	128	139	205	372	808	...	311	392	298	690	734	366	805	219	146
157	Europe	0	0	0	0	0	0	0	0	0	...	597	369	241	215	125	128	135	134	136
158	Europe	0	0	0	0	0	0	0	0	0	...	17	23	11	29	18	27	12	13	36
159	Africa	7	10	7	12	14	10	37	190	217	...	1364	1198	1061	1166	1015	1214	1528	1535	1582
160	Africa	1026	1118	781	379	271	310	718	1470	1305	...	1175	988	1111	1200	1123	1188	1238	959	1243
161	Europe	211	299	260	133	137	98	121	176	137	...	133	126	124	137	169	195	174	179	262
162	Asia	185	371	290	197	1086	845	1838	4447	2779	...	4495	4930	4714	4123	4756	4547	4422	3309	3338
163	Asia	0	0	0	0	0	0	0	0	0	...	376	453	627	441	481	400	654	555	533
164	Africa	20	12	11	7	23	32	57	43	54	...	1823	1310	1039	683	622	422	612	531	444
165	Latin America and the Caribbean	15	10	21	12	5	16	7	46	16	...	17	15	16	20	9	12	13	11	16
	Africa	4	1	1	0	10	7	1	2	7	...	8	7	7	5	6	10	3	13	17
167	Europe	281	308	222	176	128	158	187	198	171	...	129	205	139	193	165	167	159	134	140
168	Europe	806	811	634	370	326	314	294	565	508	...	337	270	258	308	357	328	285	266	243
169	Asia	315	419	409	269	264	385	493	927	864	...	1116	1458	1145	1056	919	917	1039	1005	650
170	Asia	0	0	0	0	0	0	0	0	0	...	14	85	46	44	15	50	52	47	34
171	Asia	56	53	113	65	82	66	78	117	147	...	392	575	500	487	519	512	499	396	296
172	Europe	0	0	0	0	0	0	0	0	0	...	443	285	256	211	191	198	188	130	126
173	Africa	5	5	2	3	6	5	8	23	11	...	163	157	149	235	351	400	354	261	295
174	Oceania	2	4	7	1	2	5	7	0	4	...	5	2	0	1	0	5	5	2	3
175	Latin America and the Caribbean	958	947	972	766	606	699	955	1676	2218	...	730	857	794	975	1002	1134	915	588	586
	Africa	58	51	55	46	51	57	64	86	130	...	764	756	1065	869	950	1195	1299	1442	1503
177	Asia	481	874	706	280	338	202	257	397	346	...	1736	2065	1638	1463	1122	1238	1492	1257	1068
178	Asia	0	0	0	0	0	0	0	0	0	...	16	40	26	37	13	20	30	20	20
179	Oceania	0	1	0	0	1	0	0	0	1	...	2	0	0	1	0	0	0	1	C
180	Africa	13	16	17	38	32	29	40	70	60	...	160	239	201	170	204	185	216	213	222
181	Europe	0	0	0	0	0	0	0	0	0	...	2431	2270	1973	2218	1937	2367	3159	2515	2265

	AreaName	1980	1981	1982	1983	1984	1985	1986	1987	1988	...	2004	2005	2006	2007	2008	2009	2010	2011	2012
182	Asia	0	2	2	1	2	0	5	4	1	...	41	31	42	37	33	37	86	60	54
183	Europe	22045	24796	20620	10015	10170	9564	9470	21337	27359	...	7533	7258	7140	8216	8979	8876	8724	6204	6195
184	Africa	635	832	621	474	473	460	403	538	532	...	310	274	291	195	230	136	200	215	224
185	Northern America	9378	10030	9074	7100	6661	6543	7074	7705	6469	...	6990	8394	9613	9463	10190	8995	8142	7676	7891
186	Latin America and the Caribbean	128	132	146	105	90	92	137	269	99	...	130	217	175	147	160	99	93	81	47
187	Asia	0	0	0	0	0	0	0	0	0	...	175	330	262	284	215	288	289	162	235
188	Oceania	0	0	0	0	0	0	0	0	0	...	1	1	1	0	0	1	0	0	0
189	Latin America and the Caribbean	103	117	174	124	142	165	179	229	279	...	1224	1211	1192	1335	1239	1353	998	1452	1373
190	Asia	1191	1829	2162	3404	7583	5907	2741	1406	1411	...	1816	1852	3153	2574	1784	2171	1942	1723	1731
191	Africa	0	0	0	0	0	0	0	0	0	...	0	0	1	0	0	0	0	0	0
192	Asia	1	2	1	6	0	18	7	12	7	...	124	161	140	122	133	128	211	160	174
193	Africa	11	17	11	7	16	9	15	23	44	...	56	91	77	71	64	60	102	69	46
194	Africa	72	114	102	44	32	29	43	68	99	...	1450	615	454	663	611	508	494	434	437

195 rows × 35 columns

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In [27]:  

```
# creating new column which contain sum of all data from 1980-2013 of each row
df_continents['total']=df_continents.iloc[:, 1: ].sum(axis=1)
```

In [28]:  

```
df_continents
```

	AreaName	1980	1981	1982	1983	1984	1985	1986	1987	1988	...	2005	2006	2007	2008	2009	2010	2011	2012	2013
0	Asia	16	39	39	47	71	340	496	741	828	...	3436	3009	2652	2111	1746	1758	2203	2635	2004
1	Europe	1	0	0	0	0	0	1	2	2	...	1223	856	702	560	716	561	539	620	603
2	Africa	80	67	71	69	63	44	69	132	242	...	3626	4807	3623	4005	5393	4752	4325	3774	4331
3	Oceania	0	1	0	0	0	0	0	1	0	...	0	1	0	0	0	0	0	0	0
4	Europe	0	0	0	0	0	0	2	0	0	...	0	1	1	0	0	0	0	1	1
5	Africa	1	3	6	6	4	3	5	5	11	...	295	184	106	76	62	61	39	70	45
6	Latin America and the Caribbean	0	0	0	0	42	52	51	61	34	...	24	32	15	32	38	27	37	51	25
7	Latin America and the Caribbean	368	426	626	241	237	196	213	519	374	...	1153	847	620	540	467	459	278	263	282
8	Asia	0	0	0	0	0	0	0	0	0	...	224	218	198	205	267	252	236	258	207
9	Oceania	702	639	484	317	317	319	356	467	410	...	909	875	1033	1018	1018	933	851	982	1121
10	Europe	234	238	201	117	127	165	196	265	198	...	122	102	98	91	109	124	84	102	90
11	Asia	0	0	0	0	0	0	0	0	0	...	359	236	203	125	165	209	138	161	57
12	Latin America and the Caribbean	26	23	38	12	21	28	23	18	22	...	14	18	23	30	27	25	40	60	55
13	Asia	0	2	1	1	1	3	0	2	10	...	12	12	22	9	35	28	21	39	32
14	Asia	83	84	86	81	98	92	486	503	476	...	4171	4014	2897	2939	2104	4721	2694	2640	3788
15	Latin America and the Caribbean	372	376	299	244	265	285	251	303	265	...	111	97	130	134	125	121	97	132	97
16	Europe	0	0	0	0	0	0	0	0	0	...	558	439	568	524	454	438	357	277	247
17	Europe	511	540	519	297	183	181	197	283	333	...	400	302	363	335	358	363	332	402	378

	AreaName	1980	1981	1982	1983	1984	1985	1986	1987	1988	...	2005	2006	2007	2008	2009	2010	2011	2012	2013
18	Latin America and the Caribbean	16	27	13	21	37	26	25	23	53	...	37	24	28	48	38	39	36	34	53
19	Africa	2	5	4	3	4	3	6	4	20	...	95	116	183	205	238	290	284	391	397
20	Asia	0	0	0	0	1	0	0	0	0	...	5	10	7	36	865	1464	1879	1075	487
21	Latin America and the Caribbean	44	52	42	49	38	44	79	165	63	...	134	139	107	143	214	180	86	83	107
22	Europe	0	0	0	0	0	0	0	0	0	...	211	217	209	182	156	168	140	121	115
23	Africa	10	1	3	3	7	4	2	3	8	...	7	11	8	28	15	42	53	64	76
24	Latin America and the Caribbean	211	220	192	139	145	130	205	244	394	...	969	1181	1746	2138	2509	2598	1508	1642	1714
25	Asia	79	6	8	2	2	4	12	16	103	...	4	5	11	10	5	12	6	3	6
26	Europe	24	20	12	33	11	24	33	52	43	...	1738	1419	1172	994	784	556	365	451	512
27	Africa	2	1	3	2	3	2	7	18	6	...	91	147	136	139	162	186	144	269	322
28	Africa	0	0	0	0	1	2	1	5	1	...	626	468	614	448	566	529	604	684	480
29	Africa	1	1	2	0	11	1	9	3	1	...	5	7	2	5	1	3	3	6	2
30	Asia	12	19	26	33	10	7	8	14	15	...	370	529	460	354	203	200	196	233	288
31	Africa	9	2	16	7	8	13	11	18	20	...	604	697	1025	1279	1344	1800	1638	2507	2439
32	Northern America	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	1	1	2	
33	Africa	4	3	1	0	0	0	0	2	3	...	49	18	30	28	19	26	18	45	165
34	Africa	0	0	1	0	0	1	2	3	7	...	126	96	131	95	87	98	79	97	86
35	Latin America and the Caribbean	1233	1069	1078	781	681	533	633	1454	990	...	384	427	530	350	375	340	174	291	273
36	Asia	5123	6682	3308	1863	1527	1816	1960	2643	2758	...	42584	33518	27642	30037	29622	30391	28502	33024	34129
37	Asia	0	0	0	0	0	0	0	0	0	...	729	712	674	897	657	623	591	728	774
38	Asia	0	0	0	0	0	0	0	0	0	...	21	32	16	12	21	21	13	33	29
39	Latin America and the Caribbean	266	326	360	244	235	214	257	376	352	...	6424	6535	5357	5452	4652	5218	4366	3741	3631
40	Africa	0	2	2	0	0	2	1	0	2	...	5	7	11	3	19	22	14	18	22
41	Africa	2	0	1	0	1	2	4	1	1	...	136	143	87	72	70	75	81	91	114
42	Latin America and the Caribbean	28	35	42	51	75	113	79	116	104	...	188	279	281	246	217	190	149	183	122
43	Africa	14	8	10	6	21	23	23	20	17	...	294	431	619	646	668	1066	636	1024	1170
44	Europe	0	0	0	0	0	0	0	0	0	...	128	102	102	131	92	91	135	112	125
45	Latin America and the Caribbean	306	41	94	104	101	115	102	139	90	...	999	1064	1350	1300	1433	961	962	1304	1402
46	Asia	132	128	84	46	46	43	48	48	56	...	7	9	4	7	6	18	6	12	16
47	Europe	0	0	0	0	0	0	0	0	0	...	193	146	137	104	159	168	128	173	174
48	Asia	1	1	3	1	4	3	0	0	0	...	14	10	7	19	11	45	97	66	17
49	Africa	15	16	17	17	28	11	38	66	46	...	1521	1623	1466	1397	1581	1239	1224	1714	2050
50	Europe	272	293	299	106	93	73	93	109	129	...	62	101	97	108	81	92	93	94	81
51	Africa	0	1	1	5	1	0	4	2	4	...	93	68	50	47	70	123	127	164	201
52	Latin America and the Caribbean	104	81	94	65	81	79	50	89	75	...	59	72	79	60	59	43	36	43	48
53	Latin America and the Caribbean	40	53	104	88	97	84	307	446	358	...	303	295	311	438	391	479	739	604	590

	AreaName	1980	1981	1982	1983	1984	1985	1986	1987	1988	...	2005	2006	2007	2008	2009	2010	2011	2012	2013
54	Latin America and the Caribbean	238	207	184	155	179	208	240	344	265	...	491	525	419	437	373	353	348	282	418
55	Africa	612	660	755	455	447	348	514	1017	1085	...	2496	2190	2356	3347	3496	5982	4663	5555	4165
56	Latin America and the Caribbean	110	295	882	2587	2666	2769	3106	3558	2720	...	436	430	929	1115	845	787	691	641	635
57	Africa	0	0	0	0	0	0	1	0	0	...	3	4	5	1	5	4	4	11	
58	Africa	0	0	0	0	0	0	0	0	0	...	528	700	699	799	904	931	1182	1335	1715
59	Europe	0	0	0	0	0	0	0	0	0	...	26	18	34	34	26	28	15	26	45
60	Africa	98	59	54	98	154	157	302	555	690	...	1506	1801	1512	1613	1289	1865	2163	1864	1606
61	Oceania	632	705	814	554	389	446	361	523	561	...	298	277	304	321	311	398	316	270	228
62	Europe	208	205	170	70	83	69	68	92	89	...	67	51	62	89	63	63	72	62	76
63	Europe	1729	2027	2219	1490	1169	1177	1298	1658	2038	...	4429	4002	4290	4532	5051	4646	4080	6280	5623
64	Africa	2	3	2	2	1	0	0	5	3	...	67	68	101	86	86	64	63	74	90
65	Africa	0	0	1	0	0	2	4	22	3	...	29	38	32	25	10	37	24	18	33
66	Asia	0	0	0	0	0	0	0	0	0	...	114	125	132	112	128	126	139	147	125
67	Europe	1626	1977	3062	2376	1610	1441	1233	1704	1482	...	2226	2767	2449	3833	3887	2956	2053	1702	1217
68	Africa	172	196	98	122	116	172	215	970	408	...	851	710	688	629	659	802	528	531	517
69	Europe	1065	953	897	633	580	584	547	765	564	...	100	74	110	107	119	101	102	146	298
70	Latin America and the Caribbean	154	181	231	165	167	168	235	302	165	...	283	363	360	284	325	208	173	142	170
71	Latin America and the Caribbean	114	108	113	366	598	975	1265	1060	702	...	190	230	258	263	264	266	288	358	345
72	Africa	0	3	3	6	4	3	5	14	12	...	256	342	415	327	347	395	352	407	463
73	Africa	0	0	0	0	1	0	0	0	3	...	7	12	7	2	0	2	2	4	0
74	Latin America and the Caribbean	2334	2943	3575	2650	1932	2299	3942	6174	2977	...	1215	1286	1277	1137	1180	953	804	676	656
75	Latin America and the Caribbean	1666	3692	3498	2860	1418	1321	1753	2132	1829	...	1682	1619	1598	2491	2080	4744	6503	5868	4152
76	Latin America and the Caribbean	26	33	30	68	65	69	81	135	111	...	166	164	165	187	169	386	538	436	350
77	Europe	205	310	397	337	310	522	647	676	1139	...	516	520	425	383	312	354	287	300	425
78	Europe	17	33	10	9	13	6	11	11	7	...	10	2	15	13	15	30	38	42	72
79	Asia	8880	8670	8147	7338	5704	4211	7150	10189	11522	...	36210	33848	28742	28261	29456	34235	27509	30933	33087
80	Asia	186	178	252	115	123	100	127	213	270	...	632	613	657	661	504	712	390	395	387
81	Asia	1172	1429	1822	1592	1977	1648	1794	2989	3273	...	5837	7480	6974	6475	6580	7477	7479	7534	11291
82	Asia	262	245	260	380	428	231	265	384	619	...	2226	1788	2406	3543	5450	5941	6196	4041	4918
83	Europe	781	895	707	298	327	287	481	1078	1415	...	224	283	300	412	395	547	525	725	1015
84	Asia	1403	1711	1334	541	446	680	1212	1497	1389	...	2446	2625	2401	2562	2316	2755	1970	2134	1945
85	Europe	1820	2057	1480	820	858	667	731	1101	885	...	344	325	320	370	429	434	374	440	545
86	Latin America and the Caribbean	3198	2634	2661	2455	2508	2938	4649	5415	3924	...	1945	1722	2141	2334	2456	2321	2059	2182	2479
87	Asia	701	756	598	309	246	198	248	422	324	...	1067	1212	1250	1284	1194	1168	1265	1214	982
88	Asia	177	160	155	113	102	179	181	392	489	...	1940	1827	1421	1581	1235	1831	1635	1206	1255
89	Asia	0	0	0	0	0	0	0	0	0	...	506	408	436	394	431	377	381	462	348
90	Africa	291	296	221	201	218	245	244	628	984	...	693	622	449	453	489	507	585	725	664
91	Oceania	0	0	0	1	0	0	0	0	0	...	1	0	0	1	1	0	0	2	0

	AreaName	1980	1981	1982	1983	1984	1985	1986	1987	1988	...	2005	2006	2007	2008	2009	2010	2011	2012	2013
92	Asia	1	0	8	2	1	4	4	9	19	...	66	35	62	53	68	67	58	73	48
93	Asia	0	0	0	0	0	0	0	0	0	...	173	161	135	168	173	157	159	278	123
94	Asia	11	6	16	16	7	17	21	20	22	...	42	74	53	32	39	54	22	25	15
95	Europe	0	0	0	0	0	0	1	0	0	...	77	69	88	67	85	70	103	202	213
96	Asia	1409	1119	1159	789	1253	1683	2576	3803	3970	...	3709	3802	3467	3566	3077	3432	3072	1614	2172
97	Africa	1	1	1	2	7	5	3	1	6	...	4	0	4	1	8	7	1	0	6
98	Africa	1	2	2	1	4	4	3	4	3	...	581	356	153	74	94	162	106	58	35
99	Africa	5	7	9	24	10	31	23	81	43	...	196	281	198	306	282	384	352	299	255
100	Europe	1	4	2	0	0	3	0	1	1	...	1	0	0	1	1	0	2	1	0
101	Europe	1	1	0	0	0	1	0	0	1	...	167	113	108	109	63	57	52	77	145
102	Europe	14	4	2	5	1	3	6	2	4	...	10	9	9	3	5	8	11	6	7
103	Africa	22	10	13	32	30	18	10	42	36	...	88	96	115	118	169	178	148	165	225
104	Africa	5	4	6	3	2	0	4	7	1	...	23	15	13	5	10	28	16	9	10
105	Asia	786	816	813	448	384	374	425	817	2072	...	593	580	600	658	640	802	409	358	204
106	Asia	0	0	0	1	0	0	0	0	0	...	0	0	2	1	7	4	3	1	1
107	Africa	4	4	7	3	3	4	3	5	4	...	87	114	143	154	164	170	155	191	190
108	Europe	191	242	153	64	60	68	76	78	111	...	28	24	7	21	18	17	8	9	4
109	Oceania	0	0	0	0	0	0	0	0	0	...	0	0	2	0	0	0	0	0	0
110	Africa	5	0	3	3	1	1	1	4	3	...	86	124	96	112	83	74	54	77	57
111	Africa	306	259	353	170	207	164	325	578	531	...	696	512	507	714	872	1455	1146	799	1203
112	Latin America and the Caribbean	409	394	491	490	509	425	667	813	916	...	2837	2844	3239	2856	3092	3865	3947	4227	3996
113	Europe	0	0	0	0	0	1	0	1	0	...	1	1	1	0	0	4	1	3	1
114	Asia	0	0	0	0	0	0	0	0	0	...	59	64	82	59	118	169	103	68	95
115	Europe	0	0	0	0	0	0	0	0	0	...	0	0	7	19	10	14	19	26	9
116	Africa	325	471	447	335	248	328	388	505	685	...	2939	3322	4021	4226	5532	6242	4399	3878	3261
117	Africa	0	0	7	2	3	1	3	1	5	...	5	9	5	5	12	7	3	4	12
118	Asia	80	62	46	31	41	23	18	33	55	...	210	953	1887	975	1153	556	368	193	262
119	Africa	0	5	5	3	2	1	1	4	3	...	6	19	13	26	14	16	23	24	83
120	Oceania	1	0	0	0	0	0	0	0	1	...	1	1	0	0	1	0	0	0	1
121	Asia	1	1	6	1	2	4	13	6	13	...	607	540	511	581	561	1392	1129	1185	1308
122	Europe	1889	1858	1852	716	560	510	539	647	832	...	813	837	615	818	786	759	586	504	395
123	Oceania	0	0	0	0	0	0	0	0	0	...	0	0	0	1	0	0	0	0	2
124	Oceania	602	480	364	140	164	148	176	208	200	...	370	318	350	480	520	490	375	417	415
125	Latin America and the Caribbean	18	21	27	55	126	468	670	1073	969	...	79	96	76	124	116	94	123	106	96
126	Africa	0	0	1	1	0	0	0	4	0	...	59	57	75	75	82	80	90	95	105
127	Africa	81	60	58	58	78	78	114	149	122	...	2236	2594	2375	2109	3156	3906	3103	3443	4172
128	Europe	116	77	106	51	31	54	56	80	73	...	57	53	73	66	75	46	49	53	55
129	Asia	0	0	0	8	0	0	0	3	0	...	14	18	16	10	7	14	10	13	11
130	Asia	978	972	1201	900	668	514	691	1072	1334	...	14314	13127	10124	8994	7217	6811	7468	11227	12603
131	Oceania	0	0	0	0	0	0	0	0	0	...	0	0	1	0	0	0	0	0	0
132	Latin America and the Caribbean	13	8	14	10	11	17	16	26	21	...	57	73	63	52	73	65	49	34	43
133	Oceania	0	2	2	4	2	2	1	1	3	...	1	0	0	9	1	3	0	3	3
134	Latin America and the Caribbean	45	26	32	40	48	36	34	72	53	...	75	88	98	95	88	89	83	55	66

	AreaName	1980	1981	1982	1983	1984	1985	1986	1987	1988	...	2005	2006	2007	2008	2009	2010	2011	2012	2013
135	Latin America and the Caribbean	317	456	401	241	306	328	628	843	1237	...	1653	1473	1490	1094	1884	1283	886	787	682
136	Asia	6051	5921	5249	4562	3801	3150	4166	7360	8639	...	18139	18400	19837	24887	28573	38617	36765	34315	29544
137	Europe	863	2930	5881	4546	3588	2819	4808	6931	9211	...	1405	1263	1235	1267	1013	795	720	779	852
138	Europe	4473	3486	2432	1433	1398	1451	2617	7684	6888	...	338	424	405	665	623	629	528	560	630
139	Asia	0	0	0	0	0	0	1	0	1	...	11	2	5	9	6	18	3	14	6
140	Asia	1011	1456	1572	1081	847	962	1208	2338	2805	...	5832	6215	5920	7294	5874	5537	4588	5316	4505
141	Europe	0	0	0	0	0	0	0	0	0	...	655	803	1099	1127	1535	1988	1367	1416	1231
142	Europe	375	438	583	543	524	604	656	1202	1106	...	5048	4468	3834	2837	2076	1922	1776	1588	1512
143	Europe	0	0	0	0	0	0	0	0	0	...	3972	3117	2983	2690	2931	2288	1963	2079	2466
144	Africa	6	6	8	4	3	0	9	3	12	...	378	360	420	358	415	396	492	562	415
145	Latin America and the Caribbean	5	3	0	16	21	17	36	43	39	...	11	3	10	25	11	22	12	21	18
146	Latin America and the Caribbean	69	89	133	69	68	80	95	92	77	...	185	190	255	298	257	249	261	382	392
147	Latin America and the Caribbean	147	190	202	154	158	182	209	216	133	...	343	383	579	434	511	434	451	523	538
148	Oceania	3	7	4	1	3	0	3	0	1	...	2	0	1	4	2	5	3	2	0
149	Europe	1	0	0	0	0	0	1	0	0	...	0	0	0	0	0	1	0	0	0
150	Africa	0	0	0	0	0	0	0	0	0	...	1	1	0	0	1	2	0	0	1
151	Asia	0	0	1	4	1	2	5	7	29	...	198	252	188	249	246	330	278	286	267
152	Africa	13	10	9	11	7	11	16	19	17	...	278	416	433	555	668	765	740	949	818
153	Europe	0	0	0	0	0	0	0	0	0	...	0	3	50	259	365	271	299	395	297
154	Africa	5	15	3	4	1	8	13	24	19	...	25	8	9	18	4	10	10	6	5
155	Africa	6	6	7	3	12	10	13	57	26	...	191	138	92	103	70	63	96	72	63
156	Asia	241	301	337	169	128	139	205	372	808	...	392	298	690	734	366	805	219	146	141
157	Europe	0	0	0	0	0	0	0	0	0	...	369	241	215	125	128	135	134	136	105
158	Europe	0	0	0	0	0	0	0	0	0	...	23	11	29	18	27	12	13	36	20
159	Africa	7	10	7	12	14	10	37	190	217	...	1198	1061	1166	1015	1214	1528	1535	1582	2028
160	Africa	1026	1118	781	379	271	310	718	1470	1305	...	988	1111	1200	1123	1188	1238	959	1243	1240
161	Europe	211	299	260	133	137	98	121	176	137	...	126	124	137	169	195	174	179	262	331
162	Asia	185	371	290	197	1086	845	1838	4447	2779	...	4930	4714	4123	4756	4547	4422	3309	3338	2394
163	Asia	0	0	0	0	0	0	0	0	0	...	453	627	441	481	400	654	555	533	462
164	Africa	20	12	11	7	23	32	57	43	54	...	1310	1039	683	622	422	612	531	444	343
165	Latin America and the Caribbean	15	10	21	12	5	16	7	46	16	...	15	16	20	9	12	13	11	16	4
166	Africa	4	1	1	0	10	7	1	2	7	...	7	7	5	6	10	3	13	17	38
167	Europe	281	308	222	176	128	158	187	198	171	...	205	139	193	165	167	159	134	140	140
168	Europe	806	811	634	370	326	314	294	565	508	...	270	258	308	357	328	285	266	243	201
169	Asia	315	419	409	269	264	385	493	927	864	...	1458	1145	1056	919	917	1039	1005	650	1005
170	Asia	0	0	0	0	0	0	0	0	0	...	85	46	44	15	50	52	47	34	38
171	Asia	56	53	113	65	82	66	78	117	147	...	575	500	487	519	512	499	396	296	400
172	Europe	0	0	0	0	0	0	0	0	0	...	285	256	211	191	198	188	130	126	112
173	Africa	5	5	2	3	6	5	8	23	11	...	157	149	235	351	400	354	261	299	316
174	Oceania	2	4	7	1	2	5	7	0	4	...	2	0	1	0	5	5	2	3	5
175	Latin America and the Caribbean	958	947	972	766	606	699	955	1676	2218	...	857	794	975	1002	1134	915	588	586	427
176	Africa	58	51	55	46	51	57	64	86	130	...	756	1065	869	950	1195	1299	1442	1503	1627

	AreaName	1980	1981	1982	1983	1984	1985	1986	1987	1988	...	2005	2006	2007	2008	2009	2010	2011	2012	2013
177	Asia	481	874	706	280	338	202	257	397	346	...	2065	1638	1463	1122	1238	1492	1257	1068	729
178	Asia	0	0	0	0	0	0	0	0	0	...	40	26	37	13	20	30	20	20	14
179	Oceania	0	1	0	0	1	0	0	0	1	...	0	0	1	0	0	0	1	0	0
180	Africa	13	16	17	38	32	29	40	70	60	...	239	201	170	204	185	216	213	222	206
181	Europe	0	0	0	0	0	0	0	0	0	...	2270	1973	2218	1937	2367	3159	2515	2265	2487
182	Asia	0	2	2	1	2	0	5	4	1	...	31	42	37	33	37	86	60	54	46
183	Europe	22045	24796	20620	10015	10170	9564	9470	21337	27359	...	7258	7140	8216	8979	8876	8724	6204	6195	5827
184	Africa	635	832	621	474	473	460	403	538	532	...	274	291	195	230	136	200	215	224	182
185	Northern America	9378	10030	9074	7100	6661	6543	7074	7705	6469	...	8394	9613	9463	10190	8995	8142	7676	7891	8501
186	Latin America and the Caribbean	128	132	146	105	90	92	137	269	99	...	217	175	147	160	99	93	81	47	58
187	Asia	0	0	0	0	0	0	0	0	0	...	330	262	284	215	288	289	162	235	167
188	Oceania	0	0	0	0	0	0	0	0	0	...	1	1	0	0	1	0	0	0	0
189	Latin America and the Caribbean	103	117	174	124	142	165	179	229	279	...	1211	1192	1335	1239	1353	998	1452	1373	1022
190	Asia	1191	1829	2162	3404	7583	5907	2741	1406	1411	...	1852	3153	2574	1784	2171	1942	1723	1731	2112
191	Africa	0	0	0	0	0	0	0	0	0	...	0	1	0	0	0	0	0	0	
192	Asia	1	2	1	6	0	18	7	12	7	...	161	140	122	133	128	211	160	174	217
193	Africa	11	17	11	7	16	9	15	23	44	...	91	77	71	64	60	102	69	46	55
194	Africa	72	114	102	44	32	29	43	68	99	...	615	454	663	611	508	494	434	437	407

195 rows × 36 columns

In [29]: # using groupby method 1st group the continents and then applying sum to total column to get total immigrant of each continent  
df\_continents = df\_continents.groupby(['AreaName'])['total'].sum()

In [30]: df\_continents

Out[30]:

AreaName	
Africa	618948
Asia	3317794
Europe	1410947
Latin America and the Caribbean	765148
Northern America	241142
Oceania	55174

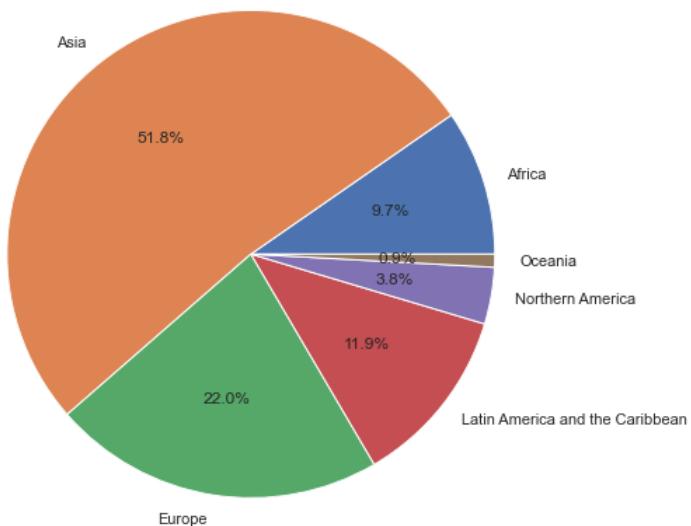
Name: total, dtype: int64

In [31]: # using pie chart we can visualize the % wise contribution of immigrant from each continent

```
plt.figure(figsize=(14,8))
X = df.columns[9:42].tolist()
labels = ['Africa', 'Asia', 'Europe', 'Latin America and the Caribbean', 'Northern America', 'Oceania']
immigrant_2013 = df_continents.tolist()
plt.axis("equal")
plt.pie(immigrant_2013, labels=labels, autopct='%1.1f%%')
plt.title('2013 Immigration Data')
```

Out[31]: Text(0.5, 1.0, '2013 Immigration Data')

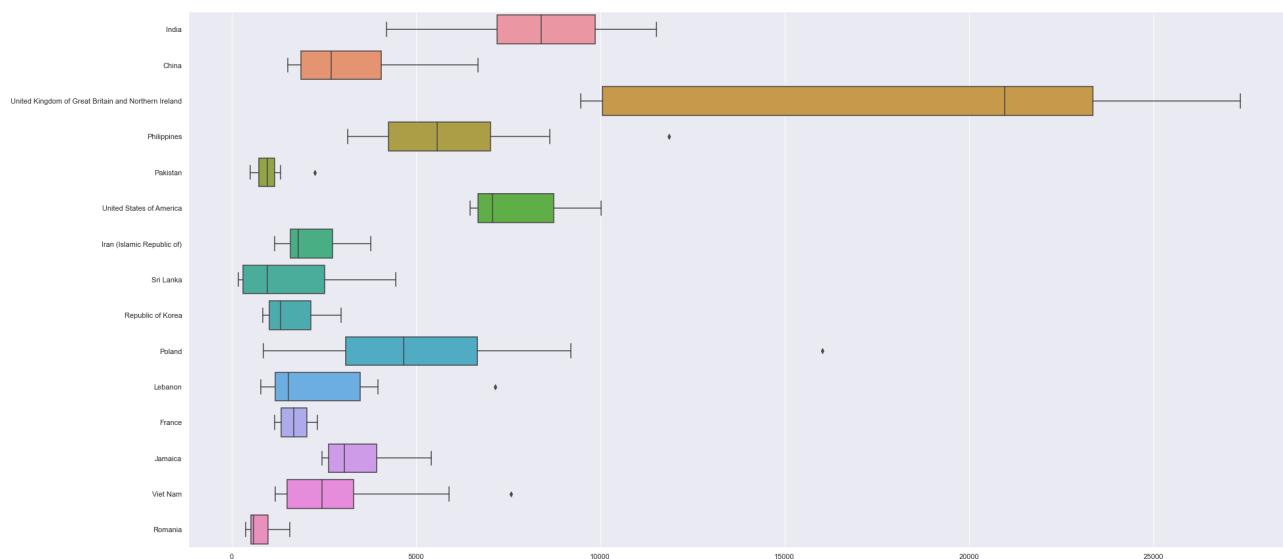
2013 Immigration Data



8) Create a box plot to visualize the distribution of the top 15 countries (based on total immigration) grouped by the decades 1980s, 1990s, and 2000s

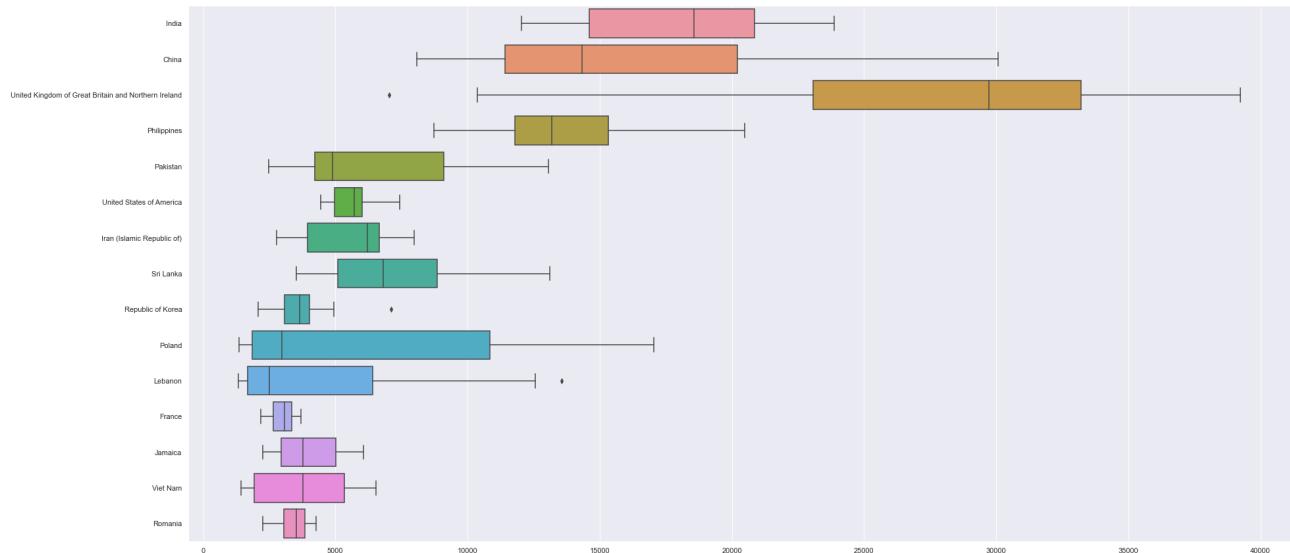
```
In [32]: #creating dataset which has 1980-1989 data
sns.set(rc={'figure.figsize':(30,15)})
canada_80s = canada_15.iloc[0:10, :]
sns.boxplot(data=canada_80s, orient='h')
```

Out[32]: <AxesSubplot:>



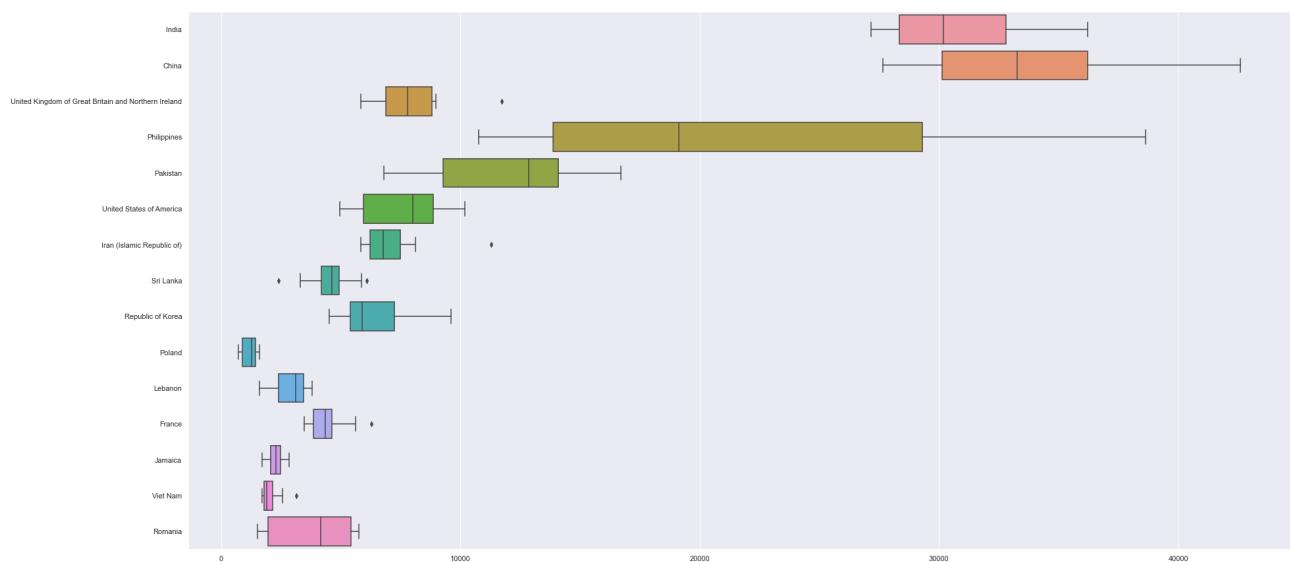
```
In [33]: #creating dataset which has 1990-1999 data
sns.set(rc={'figure.figsize':(30,15)})
canada_90s = canada_15.iloc[10:20, :]
sns.boxplot(data=canada_90s, orient='h')
```

Out[33]: <AxesSubplot:>



```
In [34]: #creating dataset which has 2000-2013 data
sns.set(rc={'figure.figsize':(30,15)})
canada_2000s =canada_15.iloc[20:34, :]
sns.boxplot(data=canada_2000s, orient='h')
```

Out[34]: &lt;AxesSubplot:&gt;

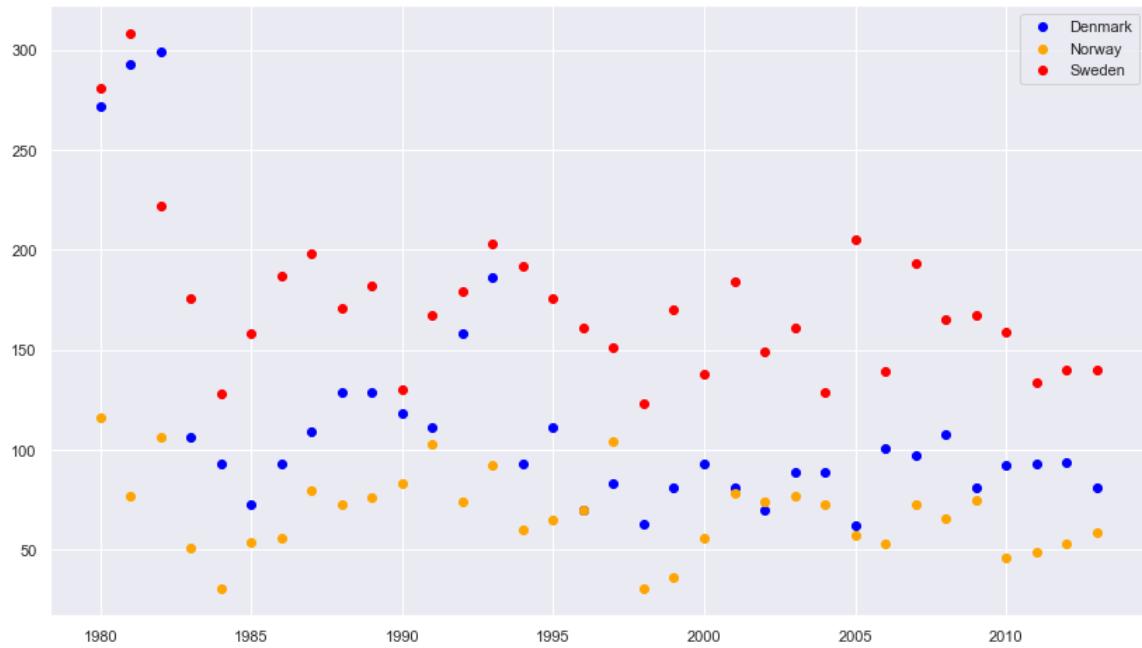


9) Create a scatter plot of the total immigration from Denmark, Norway, and Sweden to Canada from 1980 to 2013

```
In [35]: # creating list of year
year = [[1980, '1981', '1982', '1983', '1984', '1985', '1986', '1987', '1988', '1989', '1990',
'1991', '1992', '1993', '1994', '1995', '1996', '1997', '1998', '1999', '2000',
'2001', '2002', '2003', '2004', '2005', '2006', '2007', '2008', '2009', '2010',
'2011', '2012', '2013']]
```

```
In [36]: #scatter plot
plt.figure(figsize=(14,8))
plt.scatter(x=year, y=canada80_2013['Denmark'], color='blue', label='Denmark')
plt.scatter(x=year, y=canada80_2013['Norway'], color='orange', label='Norway')
plt.scatter(x=year, y=canada80_2013['Sweden'], color='red', label='Sweden')
plt.legend(loc= 'upper right')
```

Out[36]: &lt;matplotlib.legend.Legend at 0x14c6916f580&gt;



10) Let's start by analyzing the effect of Argentina's great depression.

Argentina suffered a great depression from 1998 - 2002, which caused widespread unemployment, riots, the fall of the government, and a default on the country's foreign debt. In terms of income, over 50% of Argentines were poor, and seven out of ten Argentine children were poor at the depth of the crisis in 2002.

Let's analyze the effect of this crisis, and compare Argentina's immigration to that of its neighbour Brazil. Let's do that using a bubble plot of immigration from Brazil and Argentina for the years 1980 - 2013. We will set the weights for the bubble as the normalized value of the population for each year

In [37]: canada80\_2013

Out[37]:

	Afghanistan	Albania	Algeria	American Samoa	Andorra	Angola	Antigua and Barbuda	Argentina	Armenia	Australia	...	United States of America	Uruguay	Uzbekistan	Vanuatu
1980	16	1	80	0	0	1	0	368	0	702	...	9378	128	0	
1981	39	0	67	1	0	3	0	426	0	639	...	10030	132	0	
1982	39	0	71	0	0	6	0	626	0	484	...	9074	146	0	
1983	47	0	69	0	0	6	0	241	0	317	...	7100	105	0	
1984	71	0	63	0	0	4	42	237	0	317	...	6661	90	0	
1985	340	0	44	0	0	3	52	196	0	319	...	6543	92	0	
1986	496	1	69	0	2	5	51	213	0	356	...	7074	137	0	
1987	741	2	132	1	0	5	61	519	0	467	...	7705	269	0	
1988	828	2	242	0	0	11	34	374	0	410	...	6469	99	0	
1989	1076	3	434	1	0	6	51	538	0	553	...	6790	144	0	
1990	1028	3	491	2	3	8	31	678	0	620	...	5892	111	0	
1991	1378	21	872	0	0	23	59	763	0	640	...	6054	229	0	
1992	1170	56	795	0	1	26	61	1023	22	734	...	6842	299	12	
1993	713	96	717	0	0	22	44	1022	21	886	...	7435	437	44	
1994	858	71	595	0	0	8	18	366	66	702	...	5901	125	33	
1995	1537	63	1106	0	0	26	23	380	75	668	...	4890	164	34	
1996	2212	113	2054	0	0	38	21	396	102	699	...	5515	171	58	
1997	2555	307	1842	0	0	27	27	391	115	623	...	4753	117	75	
1998	1999	574	2292	0	2	58	19	349	89	479	...	4437	87	97	
1999	2395	1264	2389	0	0	49	12	318	112	523	...	5196	93	106	
2000	3326	1816	2867	0	0	70	13	427	124	599	...	5433	75	101	
2001	4067	1602	3418	0	1	169	25	635	87	799	...	5604	64	102	
2002	3697	1021	3406	0	0	168	17	865	132	747	...	4948	91	144	
2003	3479	853	3072	0	2	165	25	1745	153	876	...	5543	103	155	

	Afghanistan	Albania	Algeria	American Samoa	Andorra	Angola	Antigua and Barbuda	Argentina	Armenia	Australia	...	United States of America	Uruguay	Uzbekistan	Vanuatu
2004	2978	1450	3616	0	0	268	14	1591	147	930	...	6990	130	175	
2005	3436	1223	3626	0	0	295	24	1153	224	909	...	8394	217	330	
2006	3009	856	4807	1	1	184	32	847	218	875	...	9613	175	262	
2007	2652	702	3623	0	1	106	15	620	198	1033	...	9463	147	284	
2008	2111	560	4005	0	0	76	32	540	205	1018	...	10190	160	215	
2009	1746	716	5393	0	0	62	38	467	267	1018	...	8995	99	288	
2010	1758	561	4752	0	0	61	27	459	252	933	...	8142	93	289	
2011	2203	539	4325	0	0	39	37	278	236	851	...	7676	81	162	
2012	2635	620	3774	0	1	70	51	263	258	982	...	7891	47	235	
2013	2004	603	4331	0	1	45	25	282	207	1121	...	8501	58	167	

34 rows × 195 columns



```
In [38]: Argentina = canada80_2013['Argentina']
Brazil = canada80_2013['Brazil']
```

```
In [39]: # normalizing the values
a_norm = Argentina / Argentina.max()
b_norm = Brazil / Brazil.max()
```

```
In [40]: # bubble plot
plt.figure(figsize=(14,8))
plt.scatter(year, Argentina, color='pink', alpha= 0.5, s= a_norm * 2000)
plt.scatter(year, Brazil, color='green', alpha= 0.5, s= b_norm * 2000)
plt.xlabel('Years', size=14)
plt.ylabel('Number of immigrants',size=14)
```

Out[40]: Text(0, 0.5, 'Number of immigrants')



Brazil suffered the Samba Effect where the Brazilian real (currency) dropped nearly 35% in 1999. There was a fear of a South American financial crisis as many South American countries were heavily dependent on industrial exports from Brazil. The Brazilian government subsequently adopted an austerity program, and the economy slowly recovered over the years, culminating in a surge in 2010.

Check if the immigration data reflect these events?

11) Previously in this lab, we created box plots to compare immigration from China and India to Canada. Create bubble plots of immigration from China and India to visualize any differences with time from 1980 to 2013

```
In [41]: India = canada80_2013['India']
China = canada80_2013['China']
```

```
In [42]: #normalizing values  
i_norm =India / India.max()  
c_norm =China/ China.max()
```

```
In [43]: #bubble plot  
plt.figure(figsize=(14,8))  
plt.scatter(year, India, color='skyblue', alpha= 0.5, s= a_norm * 2000)  
plt.scatter(year, China, color='purple', alpha= 0.5, s= b_norm * 2000)  
plt.xlabel('Years', size=14)  
plt.ylabel('Number of immigrants',size=14)
```

```
Out[43]: Text(0, 0.5, 'Number of immigrants')
```



the immigration from India and China increases notably from 21st century.