INDEXING IN PANDAS

In [1]:
```
import pandas as pd
```

In [3]:
```
df = pd.read_csv(r"C:\Users\PAVILION\Downloads\world_population_excel_workbook.csv")
df
```

Out[3]:

	Rank	CCA3	Country	Capital	Continent	2022 Population	2020 Population	2015 Population	2010 Population	2000 Population	1990 Population	1980 Population	Popul
0	36	AFG	Afghanistan	Kabul	Asia	41128771	38972230	33753499	28189672	19542982	10694796	12486631	1075
1	138	ALB	Albania	Tirana	Europe	2842321	2866849	2882481	2913399	3182021	3295066	2941651	232
2	34	DZA	Algeria	Algiers	Africa	44903225	43451666	39543154	35856344	30774621	25518074	18739378	1379
3	213	ASM	American Samoa	Pago Pago	Oceania	44273	46189	51368	54849	58230	47818	32886	2
4	203	AND	Andorra	Andorra la Vella	Europe	79824	77700	71746	71519	66097	53569	35611	1
...	...	...	...	...	...	...	...	...	...	...	...	...	...
229	226	WLF	Wallis and Futuna	Mata-Utu	Oceania	11572	11655	12182	13142	14723	13454	11315	
230	172	ESH	Western Sahara	El Aaiún	Africa	575986	556048	491824	413296	270375	178529	116775	7
231	46	YEM	Yemen	Sanaa	Asia	33696614	32284046	28516545	24743946	18628700	13375121	9204938	684
232	63	ZMB	Zambia	Lusaka	Africa	20017675	18927715	16248230	13792086	9891136	7686401	5720438	428
233	74	ZWE	Zimbabwe	Harare	Africa	16320537	15669666	14154937	12839771	11834676	10113893	7049926	520

234 rows × 17 columns

In [4]:
```
df = pd.read_csv(r"C:\Users\PAVILION\Downloads\world_population_excel_workbook.csv", index_col = "Country")
df
```

Out[4]:

Country	Rank	CCA3	Capital	Continent	2022 Population	2020 Population	2015 Population	2010 Population	2000 Population	1990 Population	1980 Population	1970 Population
Afghanistan	36	AFG	Kabul	Asia	41128771	38972230	33753499	28189672	19542982	10694796	12486631	10752971
Albania	138	ALB	Tirana	Europe	2842321	2866849	2882481	2913399	3182021	3295066	2941651	2324731
Algeria	34	DZA	Algiers	Africa	44903225	43451666	39543154	35856344	30774621	25518074	18739378	13795915
American Samoa	213	ASM	Pago Pago	Oceania	44273	46189	51368	54849	58230	47818	32886	27075
Andorra	203	AND	Andorra la Vella	Europe	79824	77700	71746	71519	66097	53569	35611	19860
...	...	...	...	...	...	...	...	...	...	...	...	...
Wallis and Futuna	226	WLF	Mata-Utu	Oceania	11572	11655	12182	13142	14723	13454	11315	9377
Western Sahara	172	ESH	El Aaiún	Africa	575986	556048	491824	413296	270375	178529	116775	76371
Yemen	46	YEM	Sanaa	Asia	33696614	32284046	28516545	24743946	18628700	13375121	9204938	6843607
Zambia	63	ZMB	Lusaka	Africa	20017675	18927715	16248230	13792086	9891136	7686401	5720438	4281671
Zimbabwe	74	ZWE	Harare	Africa	16320537	15669666	14154937	12839771	11834676	10113893	7049926	5202918

234 rows × 16 columns

In [5]:
```
df.reset_index(inplace=True)
df
```

Out[5]:

	Country	Rank	CCA3	Capital	Continent	2022 Population	2020 Population	2015 Population	2010 Population	2000 Population	1990 Population	1980 Population	Popul
0	Afghanistan	36	AFG	Kabul	Asia	41128771	38972230	33753499	28189672	19542982	10694796	12486631	1075
1	Albania	138	ALB	Tirana	Europe	2842321	2866849	2882481	2913399	3182021	3295066	2941651	232
2	Algeria	34	DZA	Algiers	Africa	44903225	43451666	39543154	35856344	30774621	25518074	18739378	1379
3	American Samoa	213	ASM	Pago Pago	Oceania	44273	46189	51368	54849	58230	47818	32886	2
4	Andorra	203	AND	Andorra la Vella	Europe	79824	77700	71746	71519	66097	53569	35611	1
...	...	...	...	...	...	...	...	...	...	...	...	...	...	
229	Wallis and Futuna	226	WLF	Mata-Utu	Oceania	11572	11655	12182	13142	14723	13454	11315	
230	Western Sahara	172	ESH	El Aaiún	Africa	575986	556048	491824	413296	270375	178529	116775	7
231	Yemen	46	YEM	Sanaa	Asia	33696614	32284046	28516545	24743946	18628700	13375121	9204938	684
232	Zambia	63	ZMB	Lusaka	Africa	20017675	18927715	16248230	13792086	9891136	7686401	5720438	428
233	Zimbabwe	74	ZWE	Harare	Africa	16320537	15669666	14154937	12839771	11834676	10113893	7049926	520

234 rows × 17 columns

In [12]:
```
df.iloc[1]
```

Out[12]:
```
Country                        Albania
Rank                               138
CCA3                               ALB
Capital                         Tirana
Continent                       Europe
2022 Population                2842321
2020 Population                2866849
2015 Population                2882481
2010 Population                2913399
2000 Population                3182021
1990 Population                3295066
1980 Population                2941651
1970 Population                2324731
Area (km²)                       28748
Density (per km²)                98.87
Growth Rate                     0.9957
World Population Percentage       0.04
Name: 1, dtype: object
```

In [18]:
```
df.set_index('Country')
```

Out[18]:

	Rank	CCA3	Capital	Continent	2022 Population	2020 Population	2015 Population	2010 Population	2000 Population	1990 Population	1980 Population	1970 Population
Country												
Afghanistan	36	AFG	Kabul	Asia	41128771	38972230	33753499	28189672	19542982	10694796	12486631	10752971
Albania	138	ALB	Tirana	Europe	2842321	2866849	2882481	2913399	3182021	3295066	2941651	2324731
Algeria	34	DZA	Algiers	Africa	44903225	43451666	39543154	35856344	30774621	25518074	18739378	13795915
American Samoa	213	ASM	Pago Pago	Oceania	44273	46189	51368	54849	58230	47818	32886	27075
Andorra	203	AND	Andorra la Vella	Europe	79824	77700	71746	71519	66097	53569	35611	19860
...	...	...	...	...	...	...	...	...	...	...	...	...
Wallis and Futuna	226	WLF	Mata-Utu	Oceania	11572	11655	12182	13142	14723	13454	11315	9377
Western Sahara	172	ESH	El Aaiún	Africa	575986	556048	491824	413296	270375	178529	116775	76371
Yemen	46	YEM	Sanaa	Asia	33696614	32284046	28516545	24743946	18628700	13375121	9204938	6843607
Zambia	63	ZMB	Lusaka	Africa	20017675	18927715	16248230	13792086	9891136	7686401	5720438	4281671
Zimbabwe	74	ZWE	Harare	Africa	16320537	15669666	14154937	12839771	11834676	10113893	7049926	5202918

234 rows × 16 columns

In [20]:
```
df.reset_index(inplace=True)
```

In [21]:
```
df
```

Out[21]:

	index	Country	Rank	CCA3	Capital	Continent	2022 Population	2020 Population	2015 Population	2010 Population	2000 Population	1990 Population	1980 Population
0	0	Afghanistan	36	AFG	Kabul	Asia	41128771	38972230	33753499	28189672	19542982	10694796	12486631
1	1	Albania	138	ALB	Tirana	Europe	2842321	2866849	2882481	2913399	3182021	3295066	2941651
2	2	Algeria	34	DZA	Algiers	Africa	44903225	43451666	39543154	35856344	30774621	25518074	18739378
3	3	American Samoa	213	ASM	Pago Pago	Oceania	44273	46189	51368	54849	58230	47818	32886
4	4	Andorra	203	AND	Andorra la Vella	Europe	79824	77700	71746	71519	66097	53569	35611
...	...	...	...	...	...	...	...	...	...	...	...	...	...
229	229	Wallis and Futuna	226	WLF	Mata-Utu	Oceania	11572	11655	12182	13142	14723	13454	11315
230	230	Western Sahara	172	ESH	El Aaiún	Africa	575986	556048	491824	413296	270375	178529	116775
231	231	Yemen	46	YEM	Sanaa	Asia	33696614	32284046	28516545	24743946	18628700	13375121	9204938
232	232	Zambia	63	ZMB	Lusaka	Africa	20017675	18927715	16248230	13792086	9891136	7686401	5720438
233	233	Zimbabwe	74	ZWE	Harare	Africa	16320537	15669666	14154937	12839771	11834676	10113893	7049926

234 rows × 18 columns

In [22]:
```
df.set_index(['Continent','Country'], inplace=True)
```

In [23]:
```
df
```

Out[23]:

		index	Rank	CCA3	Capital	2022 Population	2020 Population	2015 Population	2010 Population	2000 Population	1990 Population	1980 Population	Pop
Continent	**Country**												
Asia	**Afghanistan**	0	36	AFG	Kabul	41128771	38972230	33753499	28189672	19542982	10694796	12486631	10
Europe	**Albania**	1	138	ALB	Tirana	2842321	2866849	2882481	2913399	3182021	3295066	2941651	2
Africa	**Algeria**	2	34	DZA	Algiers	44903225	43451666	39543154	35856344	30774621	25518074	18739378	13
Oceania	**American Samoa**	3	213	ASM	Pago Pago	44273	46189	51368	54849	58230	47818	32886	
Europe	**Andorra**	4	203	AND	Andorra la Vella	79824	77700	71746	71519	66097	53569	35611	
...	**...**	...	...	...	...	...	...	...	...	...	...	...	
Oceania	**Wallis and Futuna**	229	226	WLF	Mata-Utu	11572	11655	12182	13142	14723	13454	11315	
Africa	**Western Sahara**	230	172	ESH	El Aaiún	575986	556048	491824	413296	270375	178529	116775	
Asia	**Yemen**	231	46	YEM	Sanaa	33696614	32284046	28516545	24743946	18628700	13375121	9204938	6
Africa	**Zambia**	232	63	ZMB	Lusaka	20017675	18927715	16248230	13792086	9891136	7686401	5720438	4
	Zimbabwe	233	74	ZWE	Harare	16320537	15669666	14154937	12839771	11834676	10113893	7049926	5

234 rows × 16 columns

In [24]:
```
df.sort_index()
```

Out[24]:

Continent	Country	index	Rank	CCA3	Capital	2022 Population	2020 Population	2015 Population	2010 Population	2000 Population	1990 Population	1980 Population
Africa	Algeria	2	34	DZA	Algiers	44903225	43451666	39543154	35856344	30774621	25518074	18739378
	Angola	5	42	AGO	Luanda	35588987	33428485	28127721	23364185	16394062	11828638	8330047
	Benin	21	77	BEN	Porto-Novo	13352864	12643123	10932783	9445710	6998023	5133419	3833939
	Botswana	26	144	BWA	Gaborone	2630296	2546402	2305171	2091664	1726985	1341474	938578
	Burkina Faso	31	58	BFA	Ouagadougou	22673762	21522626	18718019	16116845	11882888	9131361	6932967
...	...	...	...	...	...	...	...	...	...	...	...	...
South America	Paraguay	161	109	PRY	Asunción	6780744	6618695	6177950	5768613	5123819	4059195	3078912
	Peru	162	44	PER	Lima	34049588	33304756	30711863	29229572	26654439	22109099	17492406
	Suriname	199	170	SUR	Paramaribo	618040	607065	575475	546080	478998	412756	375112
	Uruguay	223	133	URY	Montevideo	3422794	3429086	3402818	3352651	3292224	3117012	2953750
	Venezuela	227	51	VEN	Caracas	28301696	28490453	30529716	28715022	24427729	19750579	15210443

234 rows × 16 columns

In [28]:
```
df.sort_index()

pd.set_option('display.max.columns', 235)
```

In [29]:
```
df.sort_index(ascending=False)
```

Out[29]:

Continent	Country	index	Rank	CCA3	Capital	2022 Population	2020 Population	2015 Population	2010 Population	2000 Population	1990 Population	1980 Population
South America	Venezuela	227	51	VEN	Caracas	28301696	28490453	30529716	28715022	24427729	19750579	15210443
	Uruguay	223	133	URY	Montevideo	3422794	3429086	3402818	3352651	3292224	3117012	2953750
	Suriname	199	170	SUR	Paramaribo	618040	607065	575475	546080	478998	412756	375112
	Peru	162	44	PER	Lima	34049588	33304756	30711863	29229572	26654439	22109099	17492406
	Paraguay	161	109	PRY	Asunción	6780744	6618695	6177950	5768613	5123819	4059195	3078912
...	...	...	...	...	...	...	...	...	...	...	...	...
Africa	Burkina Faso	31	58	BFA	Ouagadougou	22673762	21522626	18718019	16116845	11882888	9131361	6932967
	Botswana	26	144	BWA	Gaborone	2630296	2546402	2305171	2091664	1726985	1341474	938578
	Benin	21	77	BEN	Porto-Novo	13352864	12643123	10932783	9445710	6998023	5133419	3833939
	Angola	5	42	AGO	Luanda	35588987	33428485	28127721	23364185	16394062	11828638	8330047
	Algeria	2	34	DZA	Algiers	44903225	43451666	39543154	35856344	30774621	25518074	18739378

234 rows × 16 columns

In [30]:
```
df.sort_index(ascending=[False, True])
```

Out[30]:

Continent	Country	index	Rank	CCA3	Capital	2022 Population	2020 Population	2015 Population	2010 Population	2000 Population	1990 Population	1980 Population	Popu
South America	Argentina	8	33	ARG	Buenos Aires	45510318	45036032	43257065	41100123	37070774	32637657	28024803	238
	Bolivia	24	80	BOL	Sucre	12224110	11936162	11090085	10223270	8592656	7096194	5736088	45
	Brazil	27	7	BRA	Brasilia	215313498	213196304	205188205	196353492	175873720	150706446	122288383	963
	Chile	40	65	CHL	Santiago	19603733	19300315	17870124	17004162	15351799	13342868	11469828	98
	Colombia	42	28	COL	Bogota	51874024	50930662	47119728	44816108	39215135	32601393	26176195	209
...	...	...	...	...	...	...	...	...	...	...	...	...	
Africa	Tunisia	212	79	TUN	Tunis	12356117	12161723	11557779	10895063	9893316	8440023	6578156	50
	Uganda	217	31	UGA	Kampala	47249585	44404611	37477356	32341728	24020697	17586630	13284026	103
	Western Sahara	230	172	ESH	El Aaiún	575986	556048	491824	413296	270375	178529	116775	
	Zambia	232	63	ZMB	Lusaka	20017675	18927715	16248230	13792086	9891136	7686401	5720438	42
	Zimbabwe	233	74	ZWE	Harare	16320537	15669666	14154937	12839771	11834676	10113893	7049926	52

234 rows × 16 columns

In [31]:
```
df.loc['Africa']
```

Out[31]:

Country	index	Rank	CCA3	Capital	2022 Population	2020 Population	2015 Population	2010 Population	2000 Population	1990 Population	1980 Population	19 Populati
Algeria	2	34	DZA	Algiers	44903225	43451666	39543154	35856344	30774621	25518074	18739378	137959
Angola	5	42	AGO	Luanda	35588987	33428485	28127721	23364185	16394062	11828638	8330047	60297
Benin	21	77	BEN	Porto-Novo	13352864	12643123	10932783	9445710	6998023	5133419	3833939	30234
Botswana	26	144	BWA	Gaborone	2630296	2546402	2305171	2091664	1726985	1341474	938578	5922
Burkina Faso	31	58	BFA	Ouagadougou	22673762	21522626	18718019	16116845	11882888	9131361	6932967	56116
Burundi	32	78	BDI	Bujumbura	12889576	12220227	10727148	9126605	6307659	5483793	4312834	34978
Cameroon	34	53	CMR	Yaounde	27914536	26491087	23012646	19878036	15091594	11430520	8519891	64527
Cape Verde	36	171	CPV	Praia	593149	582640	552166	521212	458251	364563	317234	2872
Central African Republic	38	117	CAF	Bangui	5579144	5343020	4819333	4660067	3759170	2809221	2415276	20673
Chad	39	69	TCD	N'Djamena	17723315	16644701	14140274	11894727	8259137	5827069	4408230	36673
Comoros	43	163	COM	Moroni	836774	806166	730216	656024	536758	431119	328328	2423
Djibouti	52	160	DJI	Djibouti	1120849	1090156	1006259	919199	742033	577173	324121	1443
DR Congo	55	15	COD	Kinshasa	99010212	92853164	78656904	66391257	48616317	35987541	26708686	201517
Egypt	57	14	EGY	Cairo	110990103	107465134	97723799	87252413	71371371	57214630	43748556	347819
Equatorial Guinea	59	152	GNQ	Malabo	1674908	1596049	1346973	1094524	684977	465549	282509	3169
Eritrea	60	132	ERI	Asmara	3684032	3555868	3340006	3147727	2392880	2149960	1657982	12727
Eswatini	62	159	SWZ	Mbabane	1201670	1180655	1133936	1099920	1030496	854011	598564	4428
Ethiopia	63	12	ETH	Addis Ababa	123379924	117190911	102471895	89237791	67031867	47878073	34945469	283082
Gabon	71	146	GAB	Libreville	2388992	2292573	2028517	1711105	1272935	983028	749078	5971
Gambia	72	142	GMB	Banjul	2705992	2573995	2253133	1937275	1437539	1040616	718586	5287
Ghana	75	47	GHA	Accra	33475870	32180401	28870939	25574719	19665502	15446982	11865246	88618
Guinea	84	75	GIN	Conakry	13859341	13205153	11625998	10270728	8336967	6354145	4972609	42223
Guinea-Bissau	85	149	GNB	Bissau	2105566	2015828	1788919	1567220	1230849	973551	831462	5916
Ivory Coast	100	52	CIV	Yamoussoukro	28160542	26811790	23596741	21120042	16799670	11910540	8303809	54770
Kenya	106	27	KEN	Nairobi	54027487	51985780	46851488	41517895	30851606	23162269	16187124	114730
Lesotho	113	147	LSO	Maseru	2305825	2254100	2118521	2022747	1998630	1798997	1407672	10234
Liberia	114	121	LBR	Monrovia	5302681	5087584	4612329	4019956	2895224	2209731	1932169	14635
Libya	115	107	LBY	Tripoli	6812341	6653942	6192235	6491988	5154790	4236983	2962720	19091
Madagascar	120	50	MDG	Antananarivo	29611714	28225177	24850912	21731053	16216431	11882762	8948162	66397
Malawi	121	62	MWI	Lilongwe	20405317	19377061	16938942	14718422	11229387	9539665	6267369	46251

Mali	124	59	MLI	Bamako	22593590	21224040	18112907	15529181	11239101	8945026	7372581	61535
Mauritania	128	126	MRT	Nouakchott	4736139	4498604	3946220	3419461	2695003	2006027	1506694	11221
Mauritius	129	157	MUS	Port Louis	1299469	1297828	1293153	1283330	1215930	1090290	954865	8301
Mayotte	130	182	MYT	Mamoudzou	326101	305587	249545	211786	159215	92659	52233	353
Morocco	138	40	MAR	Rabat	37457971	36688772	34680458	32464865	28554415	24570814	19678444	152743
Mozambique	139	48	MOZ	Maputo	32969517	31178239	26843246	23073723	17768505	13303459	11413587	84116
Namibia	141	145	NAM	Windhoek	2567012	2489098	2282704	2099271	1819141	1369011	975994	7544
Niger	148	54	NER	Niamey	26207977	24333639	20128124	16647543	11622665	8370647	6173177	46697
Nigeria	149	6	NGA	Abuja	218541212	208327405	183995785	160952853	122851984	95214257	72951439	555692
Republic of the Congo	168	114	COG	Brazzaville	5970424	5702174	5064386	4437884	3134030	2385435	1829256	13969
Reunion	169	161	REU	Saint-Denis	974052	957822	922495	890130	785424	658992	551674	4739
Rwanda	172	76	RWA	Kigali	13776698	13146362	11642959	10309031	8109989	7319962	5247532	38963
Sao Tome and Principe	181	187	STP	São Tomé	227380	218641	201124	182138	143714	120343	97210	775
Senegal	183	72	SEN	Dakar	17316449	16436119	14356181	12530121	9704287	7536001	5703869	43677
Seychelles	185	196	SYC	Victoria	107118	105530	99240	92409	80060	71057	65290	543
Sierra Leone	186	102	SLE	Freetown	8605718	8233969	7314773	6436698	4584067	4325388	3367477	27785
Somalia	192	70	SOM	Mogadishu	17597511	16537016	13763906	12026649	8721465	6999096	5892224	37209
South Africa	193	24	ZAF	Pretoria	59893885	58801927	55876504	51784921	46813266	39877570	29463549	223683
South Sudan	195	86	SSD	Juba	10913164	10606227	11194299	9714419	6114440	4750817	4192011	33424
Sudan	198	32	SDN	Khartoum	46874204	44440486	38171178	33739933	26298773	21090886	16673586	113052
Tanzania	205	22	TZA	Dodoma	65497748	61704518	52542823	45110527	34463704	26206012	19297659	136181
Togo	208	100	TGO	Lomé	8848699	8442580	7473229	6571855	5008035	3875947	2838110	21973
Tunisia	212	79	TUN	Tunis	12356117	12161723	11557779	10895063	9893316	8440023	6578156	50474
Uganda	217	31	UGA	Kampala	47249585	44404611	37477356	32341728	24020697	17586630	13284026	103172
Western Sahara	230	172	ESH	El Aaiún	575986	556048	491824	413296	270375	178529	116775	763
Zambia	232	63	ZMB	Lusaka	20017675	18927715	16248230	13792086	9891136	7686401	5720438	42816
Zimbabwe	233	74	ZWE	Harare	16320537	15669666	14154937	12839771	11834676	10113893	7049926	52029

In [32]:
```
df.loc['Africa', 'Angola']
```

Out[32]:
```
index                           5
Rank                           42
CCA3                          AGO
Capital                    Luanda
2022 Population          35588987
2020 Population          33428485
2015 Population          28127721
2010 Population          23364185
2000 Population          16394062
1990 Population          11828638
1980 Population           8330047
1970 Population           6029700
Area (km²)                1246700
Density (per km²)         28.5466
Growth Rate                1.0315
World Population Percentage  0.45
Name: (Africa, Angola), dtype: object
```

In [ ]:

Merge, Join, and Concatenate in Pandas by Alex

In [1]:
```
import pandas as pd
```

In [3]:
```
df1 = pd.read_csv(r"C:\Users\PAVILION\Downloads\LOTR.csv")
df1
```

Out[3]:

	FellowshipID	FirstName	Skills
0	1001	Frodo	Hiding
1	1002	Samwise	Gardening
2	1003	Gandalf	Spells
3	1004	Pippin	Fireworks

In [7]:
```
df2 = pd.read_csv(r"C:\Users\PAVILION\Downloads\LOTR 2.csv")
df2
```

Out[7]:

	FellowshipID	FirstName	Age
0	1001	Frodo	50
1	1002	Samwise	39
2	1006	Legolas	2931
3	1007	Elrond	6520
4	1008	Barromir	51

In [8]:
```
df1.merge(df2)
```

Out[8]:

	FellowshipID	FirstName	Skills	Age
0	1001	Frodo	Hiding	50
1	1002	Samwise	Gardening	39

In [9]:
```
df1.merge(df2, how = 'inner')
```

Out[9]:

	FellowshipID	FirstName	Skills	Age
0	1001	Frodo	Hiding	50
1	1002	Samwise	Gardening	39

In [11]:
```
df1.merge(df2, how = 'inner', on = 'FellowshipID')
```

Out[11]:

	FellowshipID	FirstName_x	Skills	FirstName_y	Age
0	1001	Frodo	Hiding	Frodo	50
1	1002	Samwise	Gardening	Samwise	39

In [14]:
```
df1.merge(df2, how = 'inner', on = ['FellowshipID', 'FirstName'])
```

Out[14]:

	FellowshipID	FirstName	Skills	Age
0	1001	Frodo	Hiding	50
1	1002	Samwise	Gardening	39

In [15]:
```
df1.merge(df2, how = 'outer')
```

Out[15]:

	FellowshipID	FirstName	Skills	Age
0	1001	Frodo	Hiding	50.0
1	1002	Samwise	Gardening	39.0
2	1003	Gandalf	Spells	NaN
3	1004	Pippin	Fireworks	NaN
4	1006	Legolas	NaN	2931.0
5	1007	Elrond	NaN	6520.0
6	1008	Barromir	NaN	51.0

In [16]:
```
df1.merge(df2, how = 'left')
```

Out[16]:

	FellowshipID	FirstName	Skills	Age
0	1001	Frodo	Hiding	50.0
1	1002	Samwise	Gardening	39.0
2	1003	Gandalf	Spells	NaN
3	1004	Pippin	Fireworks	NaN

In [17]:
```
df1.merge(df2, how = 'right')
```

Out[17]:

	FellowshipID	FirstName	Skills	Age
0	1001	Frodo	Hiding	50
1	1002	Samwise	Gardening	39
2	1006	Legolas	NaN	2931
3	1007	Elrond	NaN	6520
4	1008	Barromir	NaN	51

In [18]:
```
df1.merge(df2, how = 'cross')
```

Out[18]:

	FellowshipID_x	FirstName_x	Skills	FellowshipID_y	FirstName_y	Age
0	1001	Frodo	Hiding	1001	Frodo	50
1	1001	Frodo	Hiding	1002	Samwise	39
2	1001	Frodo	Hiding	1006	Legolas	2931
3	1001	Frodo	Hiding	1007	Elrond	6520
4	1001	Frodo	Hiding	1008	Barromir	51
5	1002	Samwise	Gardening	1001	Frodo	50
6	1002	Samwise	Gardening	1002	Samwise	39
7	1002	Samwise	Gardening	1006	Legolas	2931
8	1002	Samwise	Gardening	1007	Elrond	6520
9	1002	Samwise	Gardening	1008	Barromir	51
10	1003	Gandalf	Spells	1001	Frodo	50
11	1003	Gandalf	Spells	1002	Samwise	39
12	1003	Gandalf	Spells	1006	Legolas	2931
13	1003	Gandalf	Spells	1007	Elrond	6520
14	1003	Gandalf	Spells	1008	Barromir	51
15	1004	Pippin	Fireworks	1001	Frodo	50
16	1004	Pippin	Fireworks	1002	Samwise	39
17	1004	Pippin	Fireworks	1006	Legolas	2931
18	1004	Pippin	Fireworks	1007	Elrond	6520
19	1004	Pippin	Fireworks	1008	Barromir	51

In [19]:
```
df1.join(df2, on = 'FellowshipID', how = 'outer', lsuffix = '_Left', rsuffix = '_Right')
```

Out[19]:

	FellowshipID	FellowshipID_Left	FirstName_Left	Skills	FellowshipID_Right	FirstName_Right	Age
0.0	1001	1001.0	Frodo	Hiding	NaN	NaN	NaN
1.0	1002	1002.0	Samwise	Gardening	NaN	NaN	NaN
2.0	1003	1003.0	Gandalf	Spells	NaN	NaN	NaN
3.0	1004	1004.0	Pippin	Fireworks	NaN	NaN	NaN
NaN	0	NaN	NaN	NaN	1001.0	Frodo	50.0
NaN	1	NaN	NaN	NaN	1002.0	Samwise	39.0
NaN	2	NaN	NaN	NaN	1006.0	Legolas	2931.0
NaN	3	NaN	NaN	NaN	1007.0	Elrond	6520.0
NaN	4	NaN	NaN	NaN	1008.0	Barromir	51.0

In [20]:
```
df4 = df1.set_index('FellowshipID').join(df2.set_index('FellowshipID'), lsuffix = '_Left', rsuffix = '_Right')
df4
```

Out[20]:

FellowshipID	FirstName_Left	Skills	FirstName_Right	Age
1001	Frodo	Hiding	Frodo	50.0
1002	Samwise	Gardening	Samwise	39.0
1003	Gandalf	Spells	NaN	NaN
1004	Pippin	Fireworks	NaN	NaN

In [22]:
```
df4 = df1.set_index('FellowshipID').join(df2.set_index('FellowshipID'), lsuffix = '_Left', rsuffix = '_Right',
df4
```

Out[22]:

FellowshipID	FirstName_Left	Skills	FirstName_Right	Age
1001	Frodo	Hiding	Frodo	50.0
1002	Samwise	Gardening	Samwise	39.0
1003	Gandalf	Spells	NaN	NaN
1004	Pippin	Fireworks	NaN	NaN
1006	NaN	NaN	Legolas	2931.0
1007	NaN	NaN	Elrond	6520.0
1008	NaN	NaN	Barromir	51.0

In [23]:
```
pd.concat([df1,df2])
```

Out[23]:

	FellowshipID	FirstName	Skills	Age
0	1001	Frodo	Hiding	NaN
1	1002	Samwise	Gardening	NaN
2	1003	Gandalf	Spells	NaN
3	1004	Pippin	Fireworks	NaN
0	1001	Frodo	NaN	50.0
1	1002	Samwise	NaN	39.0
2	1006	Legolas	NaN	2931.0
3	1007	Elrond	NaN	6520.0
4	1008	Barromir	NaN	51.0

In [24]:
```
pd.concat([df1,df2], join='inner')
```

Out[24]:

	FellowshipID	FirstName
0	1001	Frodo
1	1002	Samwise
2	1003	Gandalf
3	1004	Pippin
0	1001	Frodo
1	1002	Samwise
2	1006	Legolas
3	1007	Elrond
4	1008	Barromir

In [25]:
```
pd.concat([df1,df2], join='outer', axis=1)
```

Out[25]:

	FellowshipID	FirstName	Skills	FellowshipID	FirstName	Age
0	1001.0	Frodo	Hiding	1001	Frodo	50
1	1002.0	Samwise	Gardening	1002	Samwise	39
2	1003.0	Gandalf	Spells	1006	Legolas	2931
3	1004.0	Pippin	Fireworks	1007	Elrond	6520
4	NaN	NaN	NaN	1008	Barromir	51

In [26]:
```
df1.append(df2)
```

```
---------------------------------------------------------------------------
AttributeError                            Traceback (most recent call last)
~\AppData\Local\Temp\ipykernel_1768\3062608662.py in ?()
----> 1 df1.append(df2)

~\anaconda3\envs\Lib\site-packages\pandas\core\generic.py in ?(self, name)
   5985             and name not in self._accessors
   5986             and self._info_axis._can_hold_identifiers_and_holds_name(name)
   5987         ):
   5988             return self[name]
-> 5989         return object.__getattribute__(self, name)

AttributeError: 'DataFrame' object has no attribute 'append'
```

In [ ]:

In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

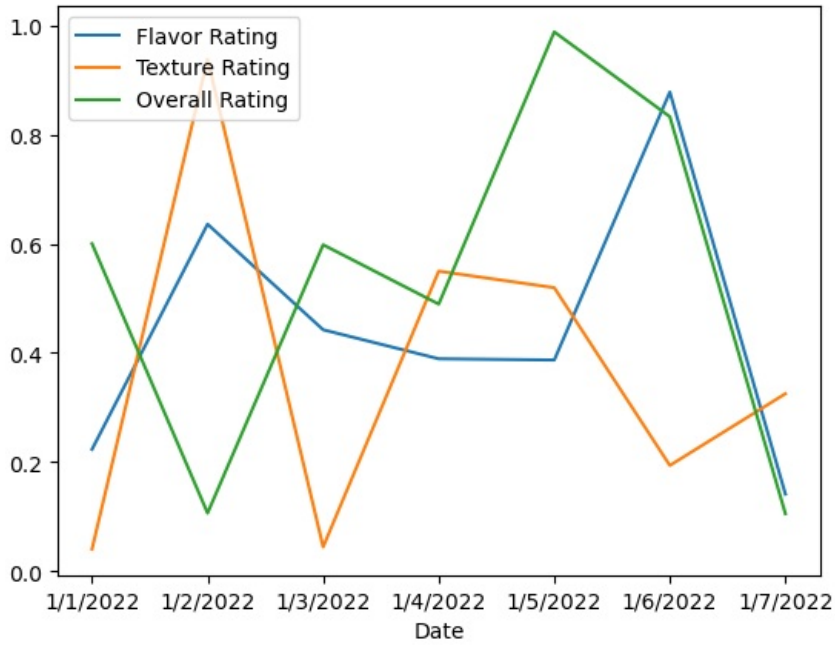
In [9]:
```
df = pd.read_csv(r"C:\Users\PAVILION\Downloads\Ice Cream Ratings.csv")
df = df.set_index('Date')
df
```

Out[9]:

Date	Flavor Rating	Texture Rating	Overall Rating
1/1/2022	0.223090	0.040220	0.600129
1/2/2022	0.635886	0.938476	0.106264
1/3/2022	0.442323	0.044154	0.598112
1/4/2022	0.389128	0.549676	0.489353
1/5/2022	0.386887	0.519439	0.988280
1/6/2022	0.877984	0.193588	0.832827
1/7/2022	0.140995	0.325110	0.105147

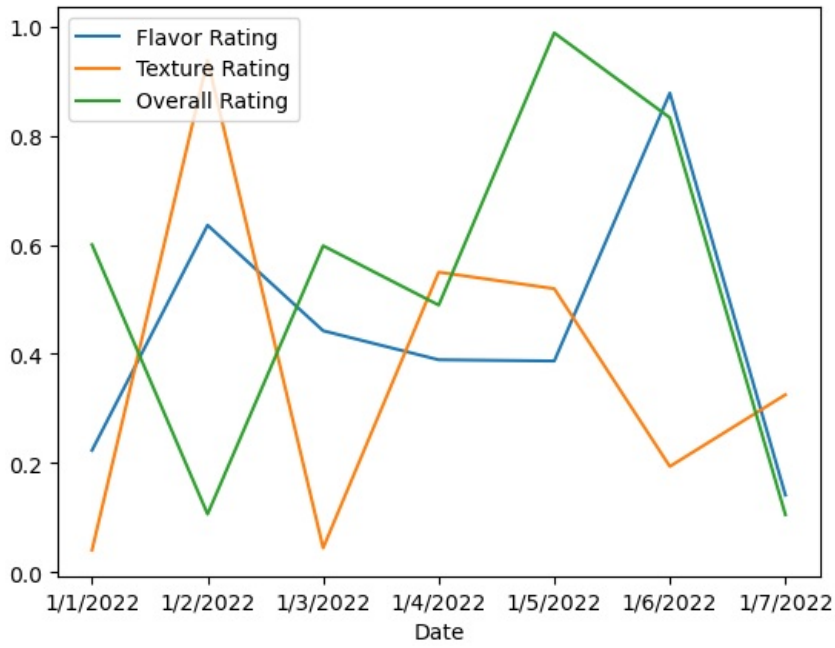
In [10]:
```
df.plot()
```

Out[10]:
```
<Axes: xlabel='Date'>
```



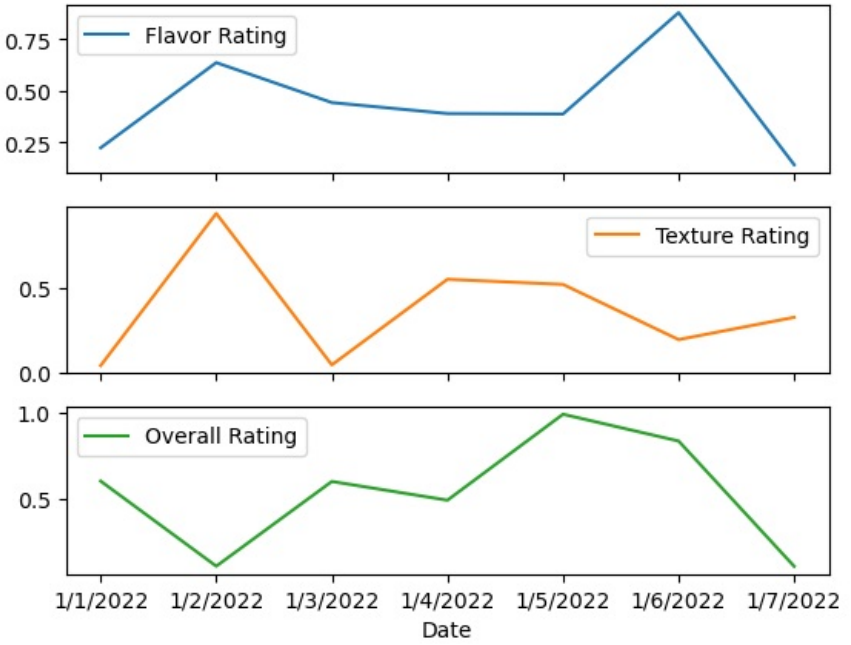
In [11]:
```
df.plot(kind ='line')
```

Out[11]:
```
<Axes: xlabel='Date'>
```



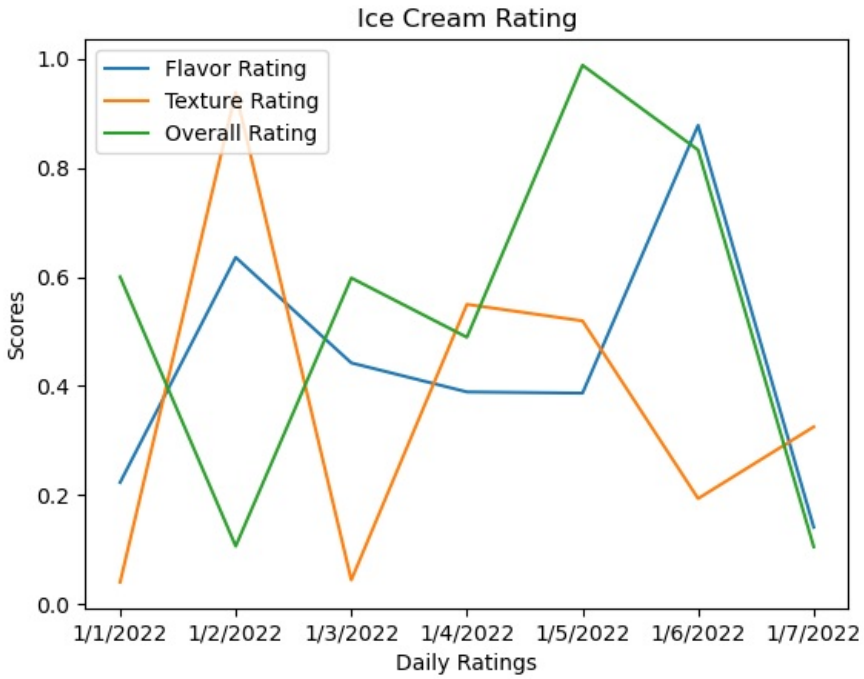
In [12]:
```
df.plot(kind ='line', subplots = True)
```

Out[12]:
```
array([<Axes: xlabel='Date'>, <Axes: xlabel='Date'>,
       <Axes: xlabel='Date'>], dtype=object)
```



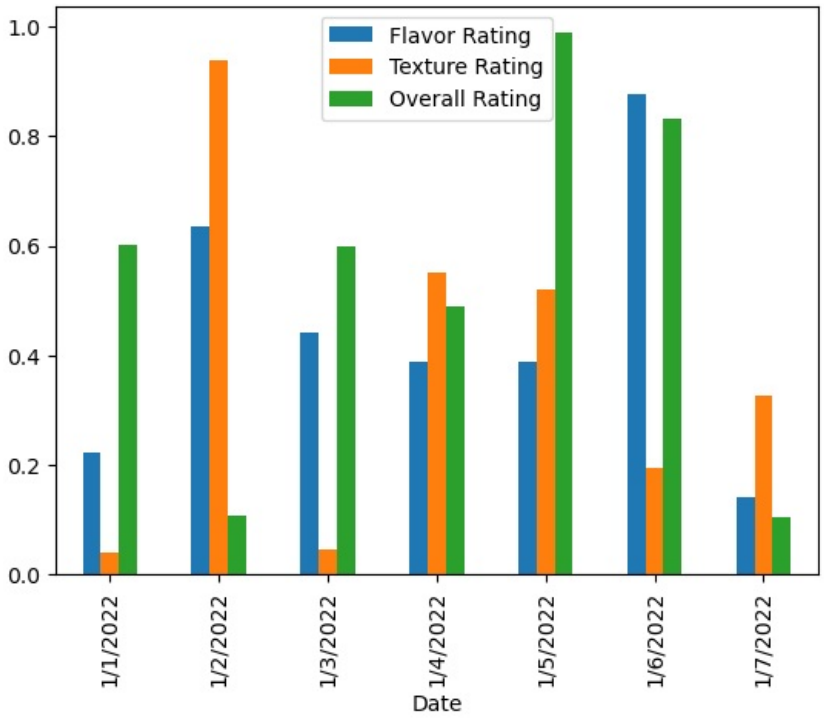
In [13]:
```
df.plot(kind ='line', title='Ice Cream Rating', xlabel = 'Daily Ratings', ylabel = 'Scores')
```

Out[13]:
```
<Axes: title={'center': 'Ice Cream Rating'}, xlabel='Daily Ratings', ylabel='Scores'>
```



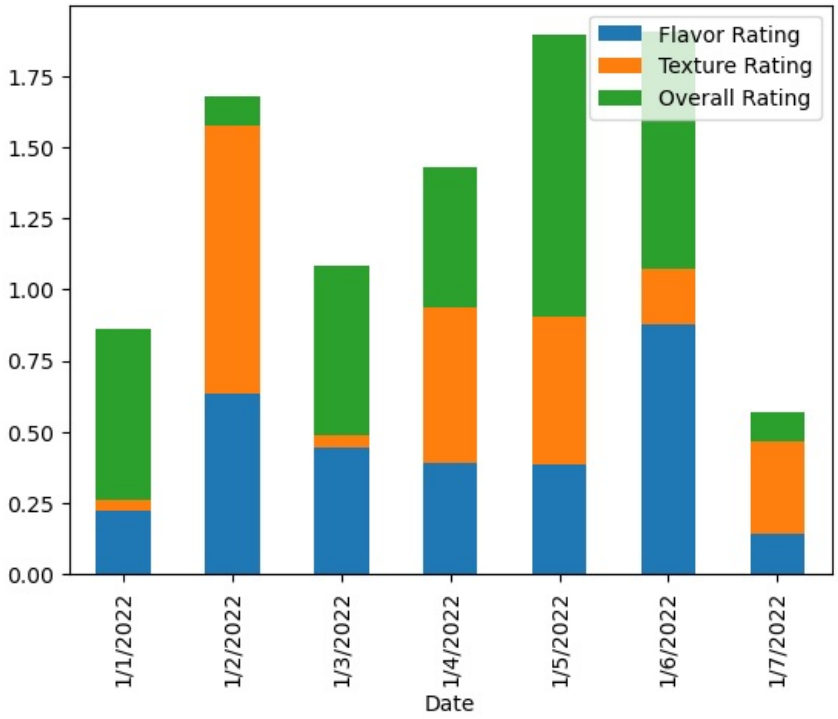
In [14]:
```
df.plot(kind = 'bar')
```

Out[14]:
```
<Axes: xlabel='Date'>
```



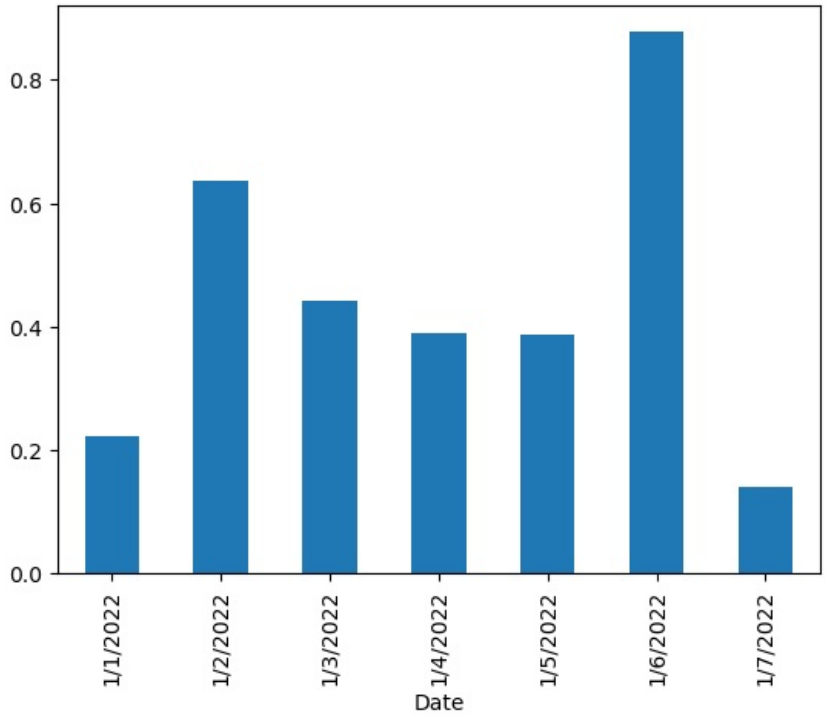
In [15]:
```
df.plot(kind = 'bar', stacked = True)
```

Out[15]:
```
<Axes: xlabel='Date'>
```



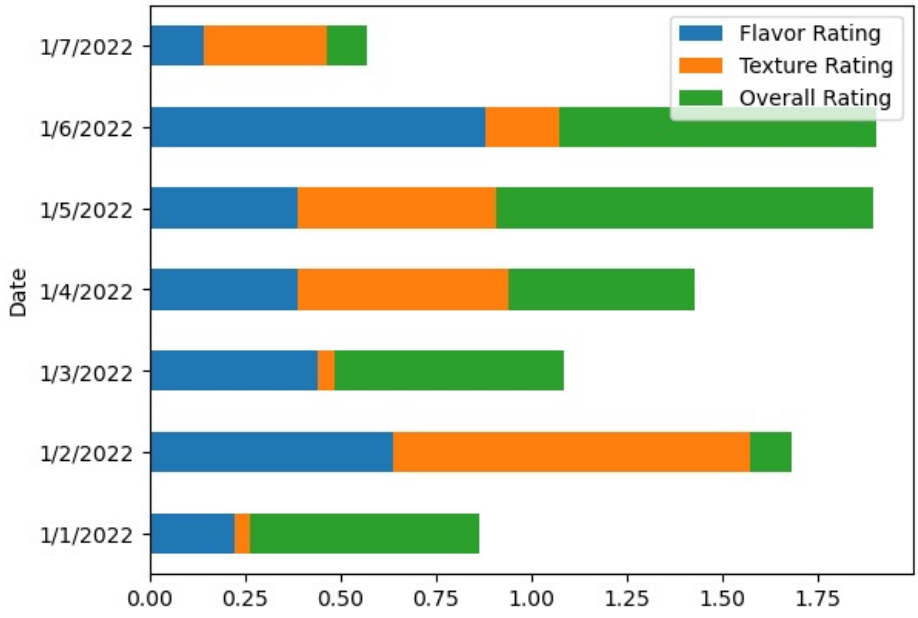
In [16]:
```
df['Flavor Rating'].plot(kind = 'bar', stacked = True)
```

Out[16]: <Axes: xlabel='Date'>



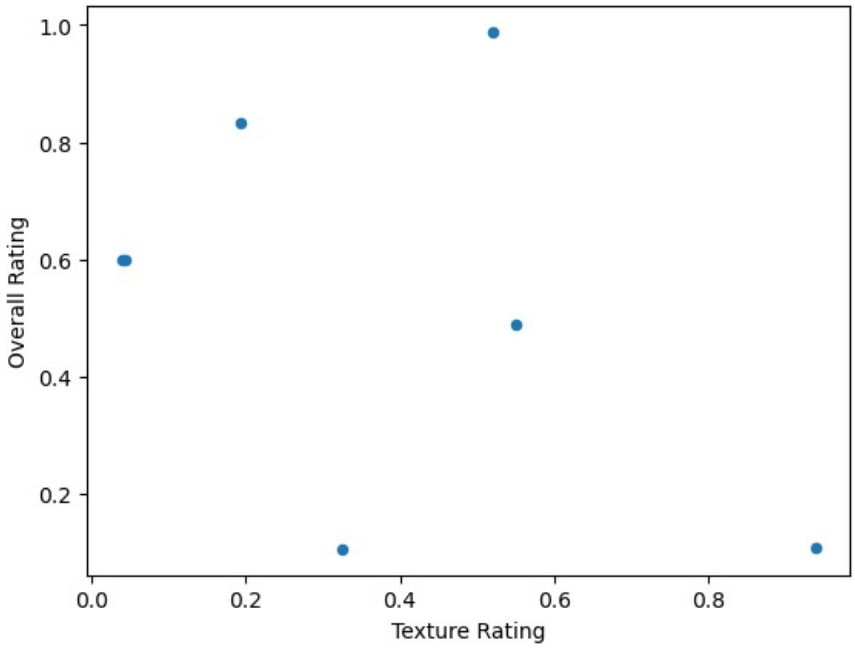
In [17]:
```
df.plot.barh(stacked = True)
```

Out[17]: <Axes: ylabel='Date'>



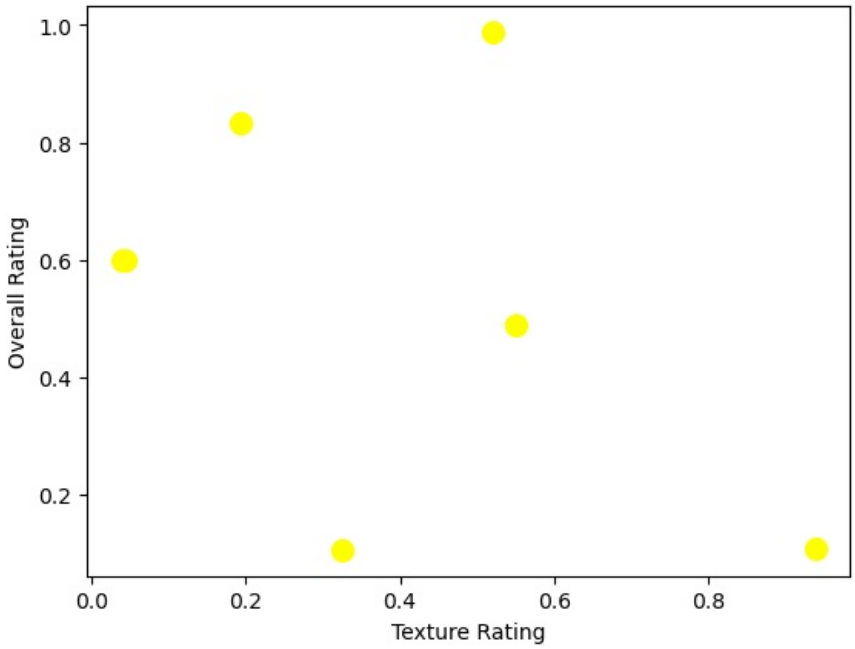
In [18]:
```
df.plot.scatter(x ='Texture Rating', y ='Overall Rating')
```

Out[18]: <Axes: xlabel='Texture Rating', ylabel='Overall Rating'>



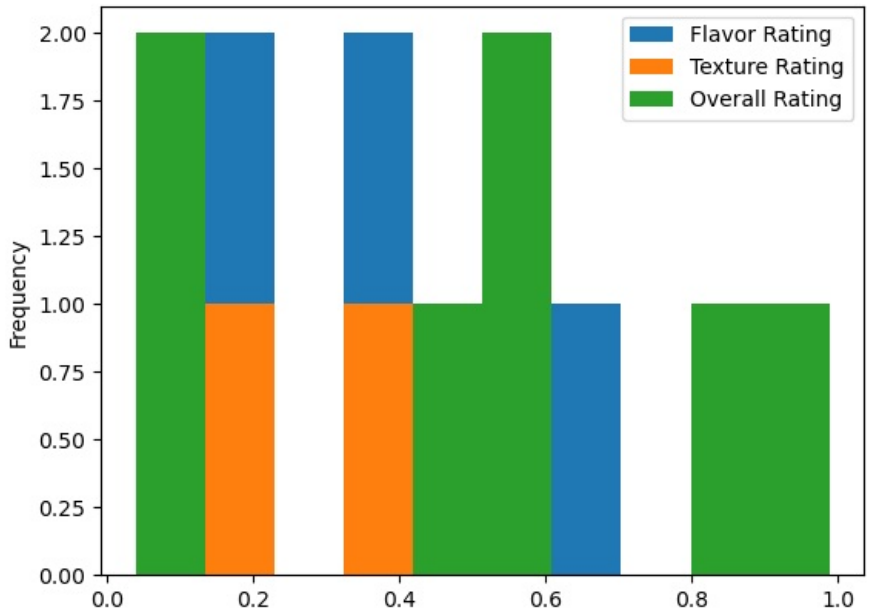
In [20]:
```
df.plot.scatter(x ='Texture Rating', y ='Overall Rating', s=100, c='Yellow')
```

Out[20]:
```
<Axes: xlabel='Texture Rating', ylabel='Overall Rating'>
```



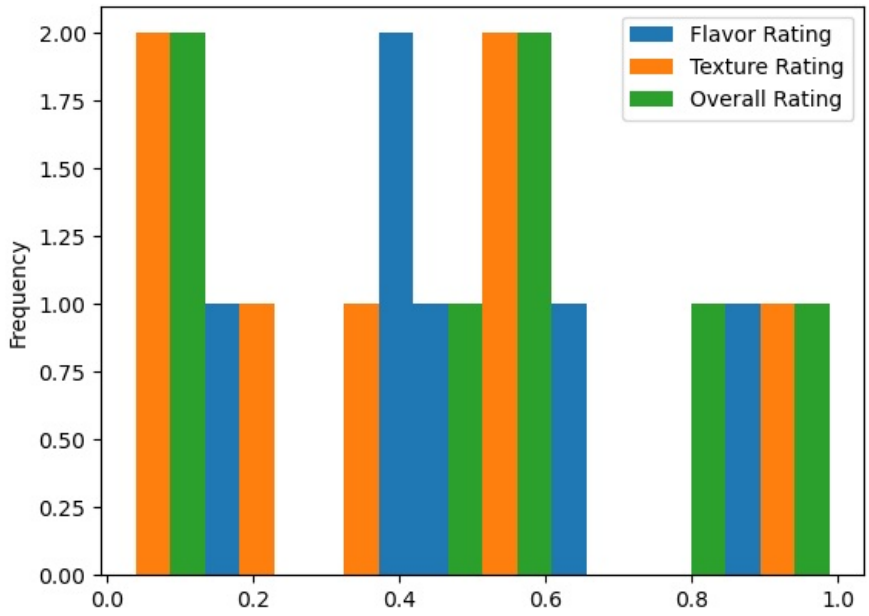
In [21]:
```
df.plot.hist()
```

Out[21]:
```
<Axes: ylabel='Frequency'>
```



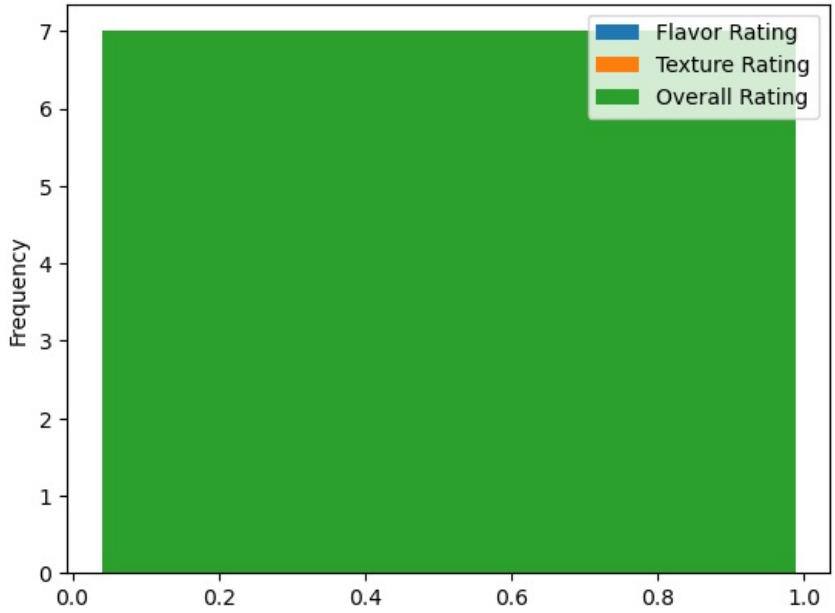
In [23]:
```
df.plot.hist(bins = 20)
```

Out[23]:
```
<Axes: ylabel='Frequency'>
```



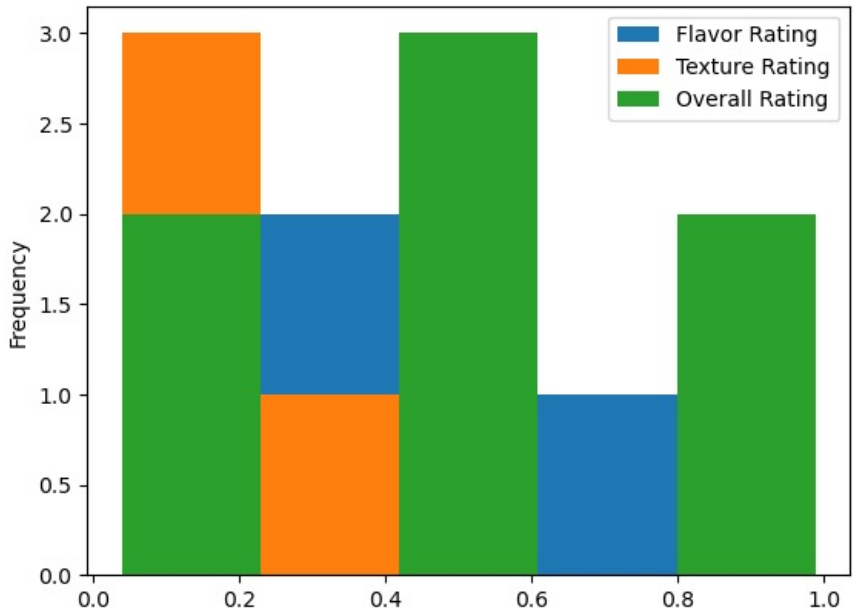
In [24]:
```
df.plot.hist(bins = 1)
```

Out[24]:
```
<Axes: ylabel='Frequency'>
```



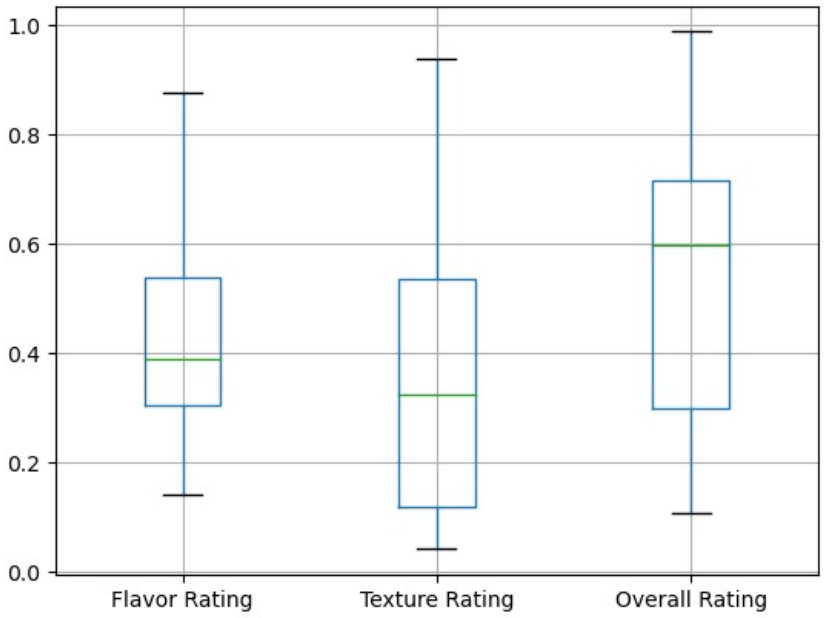
In [25]:
```
df.plot.hist(bins = 5)
```

Out[25]:
```
<Axes: ylabel='Frequency'>
```



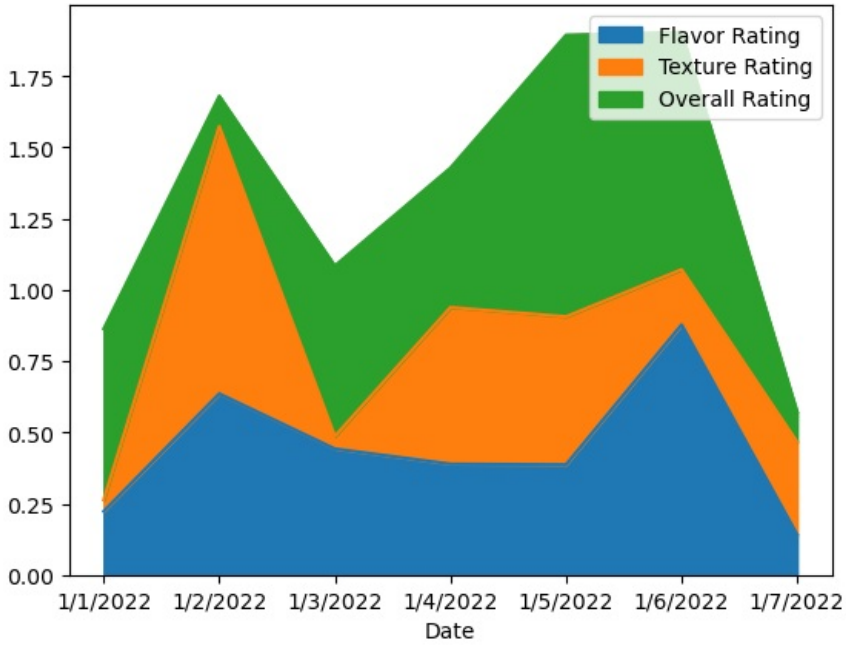
In [26]:
```
df.boxplot()
```

Out[26]:
```
<Axes: >
```



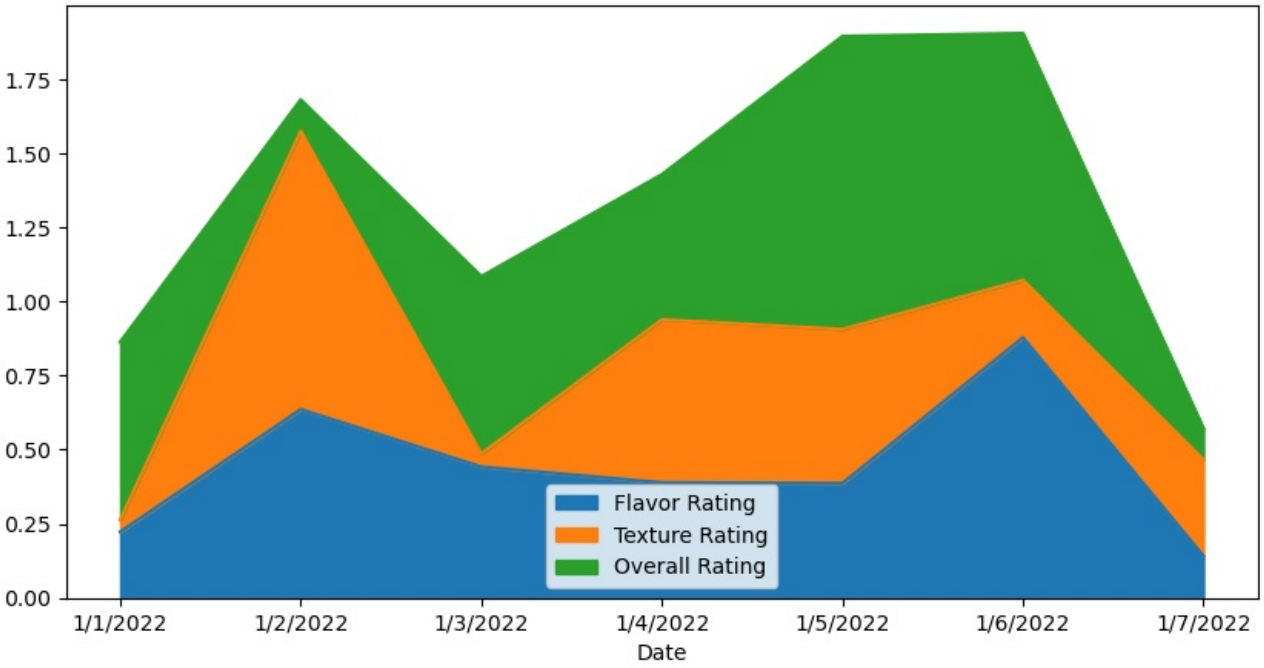
In [27]:
```
df.plot.area()
```

Out[27]:
```
<Axes: xlabel='Date'>
```



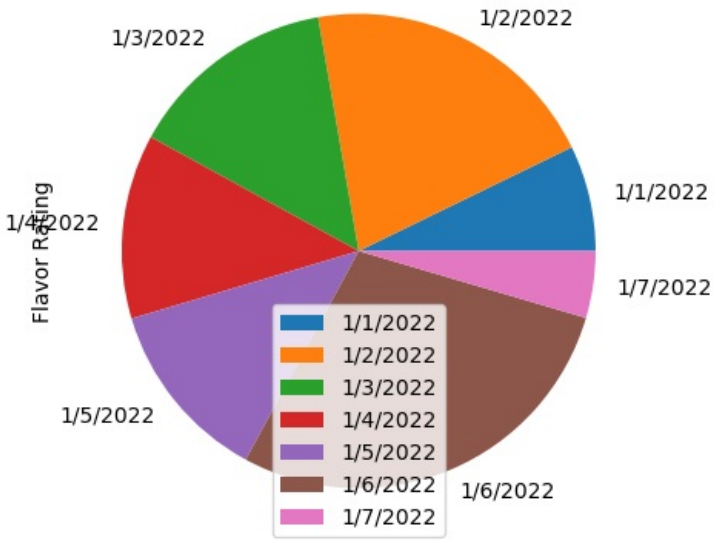
In [28]:
```
df.plot.area(figsize = (10,5))
```

Out[28]:
```
<Axes: xlabel='Date'>
```



In [30]:
```
df.plot.pie(y = 'Flavor Rating', figsize =(10,5))
```

Out[30]:
```
<Axes: ylabel='Flavor Rating'>
```



In [32]:
```
print(plt.style.available)
```

```
['Solarize_Light2', '_classic_test_patch', '_mpl-gallery', '_mpl-gallery-nogrid', 'bmh', 'classic', 'dark_backg
round', 'fast', 'fivethirtyeight', 'ggplot', 'grayscale', 'seaborn-v0_8', 'seaborn-v0_8-bright', 'seaborn-v0_8-
colorblind', 'seaborn-v0_8-dark', 'seaborn-v0_8-dark-palette', 'seaborn-v0_8-darkgrid', 'seaborn-v0_8-deep', 's
eaborn-v0_8-muted', 'seaborn-v0_8-notebook', 'seaborn-v0_8-paper', 'seaborn-v0_8-pastel', 'seaborn-v0_8-poster'
, 'seaborn-v0_8-talk', 'seaborn-v0_8-ticks', 'seaborn-v0_8-white', 'seaborn-v0_8-whitegrid', 'tableau-colorblin
d10']
```

In [ ]: