CITS1401 Project 2 grading guide, Semester 1, 2023

There are 22 marks for functionality which are divided into 2 outputs test cases. Each test case checks each output with five different files. Marks for each test case are mentioned in the test cases mentioned below.

Comments mention why student lost the marks. In addition to any other comments. You may add a note in comments which includes something like x/22 (test) + x/5 (style) + z/3 (efficiency).

If output is not returned in proper format as required and simply printed, then deduct 4 marks extra as mentioned in the end and grade it accordingly. This is considered as marker's intervention to fix student's code. You will get a good idea from test cases output that what to expect from student's code.

Following table shows the marking criteria for each calculation they complete in Python:

Maximum awarded marks	**Criteria**
6	Cosine Similarity.
3	Standard error
2	Density calculation.
3	Ranking
2	Percentage
6	Error cases
8	Style and efficiency
Total: 30	

Output test cases:

1. First output (Cosine Similarity and Standard error) (9 Marks):

   If the outputs of both test files match then assign 9 marks, else
   If the output of only one test file fully matches then assign 4.5 marks.

2. Second output (Percentage calculation, Ranking and Density) (7 Marks):

   If the outputs of both test files match then assign 7 marks, else
   If the output of only one test file fully matches then assign 3.5 marks, else
   If values of any one output of test files is correct, then assign 1 mark.

3. Error State(6 Marks):

   For successfully passing each error state assign 1 mark (except iii) . We are checking following error state:

   i) Zero division
   ii) A region input has single country
   iii) Invalid input with multiple rows with same country in a region (2marks)
   iv) Invalid input with string for numerical data. All data zero for a specified region.
   v) Random rows and columns.

Note: Deduct 1 mark for each output if it is failed in rounding in each calculation.

Style and efficiency: (be lenient but mention in comments to improve for next time)

- Style (5/8) which involves intuitive variable and function names, consistent indentation, comments, etc.
    - Default is 5.
    - Deduct 1 mark if person's name or student id is not on the file to identify author of the code.
    - Deduct 2 marks if scant comments are provided.
    - Deduct 2 marks if no or one function other than the main is created.
    - Minimum can be zero.

- Efficiency (3/8):
    - Default is 3 marks.
    - Deduct 1 mark if readline() function is used in a loop or file is opened multiple times.
    - Deduct 2 marks if the code includes repeated blocks instead of loops or code has more loops than necessary.
    - Deduct 1 mark if the code is taking long time to compile the big testing file.

For any intervention to fix the code, deduct 4 marks extra for each intervention. However, it should be quick and simple. Normally missing a colon or wrong indentation or missing a character of some instruction is considered as a simple debug. Re-writing or adding or removing the code is not part of the grading and code should be graded accordingly as mentioned above.

If student has imported any module then comment it out and run the code, grade it accordingly and assign 0/3 in efficiency.

Sample Outcomes:

```
>>> FirstOutput, SecondOutput = main('countries.csv')
>>> FirstOutput
{'asia': [106617709.6196, 0.8699], 'africa': [16530585.7337,
0.8023], 'europe': [12535004.8413, 0.7383], 'latin america &
caribbean': [22441416.3173, 0.9446], 'northern america':
[80089583.5645, 0.7841], 'oceania': [2553663.855, 0.9514]}
>>> SecondOutput
{'asia': {'china': [1439323776, 5540090, 44.7684, 153.3118, 1],
'india': [1380004385, 13586631, 42.9234, 464.1494, 2],
'indonesia': [273523615, 2898047, 8.5076, 150.9871, 3], 'sri
lanka': [21413249, 89516, 0.666, 341.4647, 4], 'kazakhstan':
[18776707, 225280, 0.584, 6.9551, 5], 'syria': [17500658, 430523,
0.5443, 95.3039, 6], 'cambodia': [16718965, 232423, 0.52, 94.7143,
7], 'united arab emirates': [9890402, 119873, 0.3076, 118.3062,
8], 'tajikistan': [9537645, 216627, 0.2967, 68.1455, 9], 'israel':
[8655535, 136158, 0.2692, 399.9785, 10], 'hong kong': [7496981,
60827, 0.2332, 7139.9819, 11], 'laos': [7275560, 106105, 0.2263,
31.5232, 12], 'timor-leste': [1318445, 25326, 0.041, 88.6648, 13],
'cyprus': [1207359, 8784, 0.0376, 130.6666, 14], 'bhutan': [771608,
8516, 0.024, 20.2431, 15], 'macao': [649335, 8890, 0.0202, 21644.5,
16], 'maldives': [540544, 9591, 0.0168, 1801.8133, 17], 'brunei':
[437479, 4194, 0.0136, 83.0131, 18]}, 'africa': {'nigeria':
[206139589, 5175990, 39.4792, 226.3355, 1], 'ethiopia':
[114963588, 2884858, 22.0175, 114.9636, 2], 'egypt': [102334404,
```

1946331, 19.5988, 102.8022, 3], 'angola': [32866272, 1040977, 6.2944, 26.3626, 4], 'mozambique': [31255435, 889399, 5.9859, 39.746, 5], 'ghana': [31072940, 655084, 5.951, 136.5603, 6], 'reunion': [895312, 6385, 0.1715, 358.1248, 7], 'comoros': [869601, 18715, 0.1665, 467.2762, 8], 'western sahara': [597339, 14876, 0.1144, 2.2456, 9], 'cabo verde': [555987, 6052, 0.1065, 137.962, 10], 'mayotte': [272815, 6665, 0.0522, 727.5067, 11], 'sao tome & principe': [219159, 4103, 0.042, 228.2906, 12], 'seychelles': [98347, 608, 0.0188, 213.7978, 13], 'saint helena': [6077, 18, 0.0012, 15.5821, 14]}, 'europe': {'russia': [145934462, 62206, 29.667, 8.911, 1], 'germany': [83783942, 266897, 17.0324, 240.3716, 2], 'united kingdom': [67886011, 355839, 13.8005, 280.6019, 3], 'france': [65273511, 143783, 13.2695, 119.2086, 4], 'italy': [60461826, -88249, 12.2913, 205.5546, 5], 'spain': [46754778, 18002, 9.5048, 93.7345, 6], 'norway': [5421241, 42384, 1.1021, 14.8418, 7], 'ireland': [4937786, 55291, 1.0038, 71.6764, 8], 'croatia': [4105267, -25037, 0.8346, 73.3607, 9], 'moldova': [4033963, -9300, 0.8201, 122.7995, 10], 'bosnia and herzegovina': [3280819, -20181, 0.667, 64.3298, 11], 'gibraltar': [33691, -10, 0.0068, 3369.1, 12], 'holy see': [801, 2, 0.0002, 0.0384, 13]}, 'latin america & caribbean': {'brazil': [212559417, 1509890, 45.1146, 25.4314, 1], 'mexico': [128932753, 1357224, 27.3653, 66.3251, 2], 'colombia': [50882891, 543448, 10.7996, 45.8611, 3], 'argentina': [45195774, 415097, 9.5926, 16.5148, 4], 'peru': [32971854, 461401, 6.9981, 25.7593, 5], 'french guiana': [298682, 7850, 0.0634, 3.6336, 6], 'aruba': [106766, 452, 0.0227, 593.1444, 7], 'u.s. virgin islands': [104425, -153, 0.0222, 298.3571, 8], 'antigua and barbuda': [97929, 811, 0.0208, 222.5659, 9], 'falkland islands': [3480, 103, 0.0007, 0.2859, 10]}, 'northern america': {'united states': [331002651, 1937734, 89.7357, 36.1854, 1], 'canada': [37742154, 331107, 10.232, 4.1504, 2], 'bermuda': [62278, -228, 0.0169, 1245.56, 3], 'greenland': [56770, 98, 0.0154, 0.1383, 4]}, 'oceania': {'australia': [25499884, 296686, 62.2796, 3.3193, 1], 'papua new guinea': [8947024, 170915, 21.8517, 19.7567, 2], 'new zealand': [4822233, 39170, 11.7776, 18.3139, 3], 'fiji': [896445, 6492, 2.1894, 49.0665, 4], 'new caledonia': [285498, 2748, 0.6973, 15.6181, 5], 'french polynesia': [280908, 1621, 0.6861, 76.7508, 6], 'samoa': [198414, 1317, 0.4846, 70.111, 7], 'nauru': [10824, 68, 0.0264, 541.2, 8], 'niue': [1626, 11, 0.004, 6.2538, 9], 'tokelau': [1357, 17, 0.0033, 135.7, 10]}}

#Testing random rows and columns.

```
>>> FirstOutput, SecondOutput = main('countries_random.csv')
>>> FirstOutput
{'asia': [106617709.6196, 0.8699], 'europe': [12535004.8413, 0.7383], 'latin america & caribbean': [22441416.3173, 0.9446], 'africa': [16530585.7337, 0.8023], 'northern america': [80089583.5645, 0.7841], 'oceania': [2553663.855, 0.9514]}

>>> SecondOutput
{'asia': {'china': [1439323776, 5540090, 44.7684, 153.3118, 1], 'india': [1380004385, 13586631, 42.9234, 464.1494, 2], 'indonesia': [273523615, 2898047, 8.5076, 150.9871, 3], 'sri lanka': [21413249, 89516, 0.666, 341.4647, 4], 'kazakhstan':
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[18776707, 225280, 0.584, 6.9551, 5], 'syria': [17500658, 430523, 0.5443, 95.3039, 6], 'cambodia': [16718965, 232423, 0.52, 94.7143, 7], 'united arab emirates': [9890402, 119873, 0.3076, 118.3062, 8], 'tajikistan': [9537645, 216627, 0.2967, 68.1455, 9], 'israel': [8655535, 136158, 0.2692, 399.9785, 10], 'hong kong': [7496981, 60827, 0.2332, 7139.9819, 11], 'laos': [7275560, 106105, 0.2263, 31.5232, 12], 'timor-leste': [1318445, 25326, 0.041, 88.6648, 13], 'cyprus': [1207359, 8784, 0.0376, 130.6666, 14], 'bhutan': [771608, 8516, 0.024, 20.2431, 15], 'macao': [649335, 8890, 0.0202, 21644.5, 16], 'maldives': [540544, 9591, 0.0168, 1801.8133, 17], 'brunei': [437479, 4194, 0.0136, 83.0131, 18]}, 'europe': {'russia': [145934462, 62206, 29.667, 8.911, 1], 'germany': [83783942, 266897, 17.0324, 240.3716, 2], 'united kingdom': [67886011, 355839, 13.8005, 280.6019, 3], 'france': [65273511, 143783, 13.2695, 119.2086, 4], 'italy': [60461826, -88249, 12.2913, 205.5546, 5], 'spain': [46754778, 18002, 9.5048, 93.7345, 6], 'norway': [5421241, 42384, 1.1021, 14.8418, 7], 'ireland': [4937786, 55291, 1.0038, 71.6764, 8], 'croatia': [4105267, -25037, 0.8346, 73.3607, 9], 'moldova': [4033963, -9300, 0.8201, 122.7995, 10], 'bosnia and herzegovina': [3280819, -20181, 0.667, 64.3298, 11], 'gibraltar': [33691, -10, 0.0068, 3369.1, 12], 'holy see': [801, 2, 0.0002, 0.0384, 13]}, 'latin america & caribbean': {'brazil': [212559417, 1509890, 45.1146, 25.4314, 1], 'mexico': [128932753, 1357224, 27.3653, 66.3251, 2], 'colombia': [50882891, 543448, 10.7996, 45.8611, 3], 'argentina': [45195774, 415097, 9.5926, 16.5148, 4], 'peru': [32971854, 461401, 6.9981, 25.7593, 5], 'french guiana': [298682, 7850, 0.0634, 3.6336, 6], 'aruba': [106766, 452, 0.0227, 593.1444, 7], 'u.s. virgin islands': [104425, -153, 0.0222, 298.3571, 8], 'antigua and barbuda': [97929, 811, 0.0208, 222.5659, 9], 'falkland islands': [3480, 103, 0.0007, 0.2859, 10]}, 'africa': {'nigeria': [206139589, 5175990, 39.4792, 226.3355, 1], 'ethiopia': [114963588, 2884858, 22.0175, 114.9636, 2], 'egypt': [102334404, 1946331, 19.5988, 102.8022, 3], 'angola': [32866272, 1040977, 6.2944, 26.3626, 4], 'mozambique': [31255435, 889399, 5.9859, 39.746, 5], 'ghana': [31072940, 655084, 5.951, 136.5603, 6], 'reunion': [895312, 6385, 0.1715, 358.1248, 7], 'comoros': [869601, 18715, 0.1665, 467.2762, 8], 'western sahara': [597339, 14876, 0.1144, 2.2456, 9], 'cabo verde': [555987, 6052, 0.1065, 137.962, 10], 'mayotte': [272815, 6665, 0.0522, 727.5067, 11], 'sao tome & principe': [219159, 4103, 0.042, 228.2906, 12], 'seychelles': [98347, 608, 0.0188, 213.7978, 13], 'saint helena': [6077, 18, 0.0012, 15.5821, 14]}, 'northern america': {'united states': [331002651, 1937734, 89.7357, 36.1854, 1], 'canada': [37742154, 331107, 10.232, 4.1504, 2], 'bermuda': [62278, -228, 0.0169, 1245.56, 3], 'greenland': [56770, 98, 0.0154, 0.1383, 4]}, 'oceania': {'australia': [25499884, 296686, 62.2796, 3.3193, 1], 'papua new guinea': [8947024, 170915, 21.8517, 19.7567, 2], 'new zealand': [4822233, 39170, 11.7776, 18.3139, 3], 'fiji': [896445, 6492, 2.1894, 49.0665, 4], 'new caledonia': [285498, 2748, 0.6973, 15.6181, 5], 'french polynesia': [280908, 1621, 0.6861, 76.7508, 6], 'samoa': [198414, 1317, 0.4846, 70.111, 7], 'nauru': [10824, 68, 0.0264, 541.2, 8], 'niue': [1626, 11, 0.004, 6.2538, 9], 'tokelau': [1357, 17, 0.0033, 135.7, 10]}}

#Testing with a bigger datasets

```
>>> FirstOutput, SecondOutput = main('countries_big.csv')
>>> FirstOutput
{'asia': [39270197.9162, 0.839], 'africa': [4603824.8359, 0.6617],
'europe': [4030057.1392, 0.7125], 'latin america & caribbean':
[5110483.6308, 0.9382], 'northern america': [80089583.5645,
0.7841], 'oceania': [1154706.2964, 0.9509]}

>>> SecondOutput['africa']
{'nigeria': [206139589, 5175990, 15.3767, 226.3355, 1],
'ethiopia': [114963588, 2884858, 8.5755, 114.9636, 2], 'egypt':
[102334404, 1946331, 7.6335, 102.8022, 3], 'dr congo': [89561403,
2770836, 6.6807, 39.5057, 4], 'tanzania': [59734218, 1728755,
4.4558, 67.4353, 5], 'south africa': [59308690, 750420, 4.424,
48.8906, 6], 'kenya': [53771296, 1197323, 4.011, 94.4782, 7],
'uganda': [45741007, 1471413, 3.412, 228.9225, 8], 'algeria':
[43851044, 797990, 3.271, 18.4113, 9], 'sudan': [43849260, 1036022,
3.2709, 24.8431, 10], 'morocco': [36910560, 438791, 2.7533,
82.7035, 11], 'angola': [32866272, 1040977, 2.4516, 26.3626, 12],
'mozambique': [31255435, 889399, 2.3315, 39.746, 13], 'ghana':
[31072940, 655084, 2.3178, 136.5603, 14], 'madagascar': [27691018,
721711, 2.0656, 47.5958, 15], 'cameroon': [26545863, 669483,
1.9802, 56.1568, 16], 'cote divoire': [26378274, 661730, 1.9676,
82.9505, 17], 'niger': [24206644, 895929, 1.8057, 19.11, 18],
'burkina faso': [20903273, 581895, 1.5592, 76.4009, 19], 'mali':
[20250833, 592802, 1.5106, 16.5965, 20], 'malawi': [19129952,
501205, 1.427, 202.9057, 21], 'zambia': [18383955, 522925, 1.3713,
24.7299, 22], 'senegal': [16743927, 447563, 1.249, 86.9679, 23],
'chad': [16425864, 478988, 1.2253, 13.0447, 24], 'somalia':
[15893222, 450317, 1.1855, 25.3343, 25], 'zimbabwe': [14862924,
217456, 1.1087, 38.4204, 26], 'guinea': [13132795, 361549, 0.9796,
53.4462, 27], 'rwanda': [12952218, 325268, 0.9662, 525.019, 28],
'benin': [12123200, 322049, 0.9043, 107.5133, 29], 'burundi':
[11890784, 360204, 0.887, 463.0368, 30], 'tunisia': [11818619,
123900, 0.8816, 76.0725, 31], 'south sudan': [11193725, 131612,
0.835, 18.3218, 32], 'togo': [8278724, 196358, 0.6175, 152.2104,
33], 'sierra leone': [7976983, 163768, 0.595, 110.5151, 34],
'libya': [6871292, 93840, 0.5126, 3.9052, 35], 'congo': [5518087,
137579, 0.4116, 16.1584, 36], 'liberia': [5057681, 120307, 0.3773,
52.5091, 37], 'central african republic': [4829767, 84582, 0.3603,
7.7527, 38], 'mauritania': [4649658, 123962, 0.3468, 4.5112, 39],
'eritrea': [3546421, 49304, 0.2645, 35.1131, 40], 'namibia':
[2540905, 46375, 0.1895, 3.0863, 41], 'gambia': [2416668, 68962,
0.1803, 238.8012, 42], 'botswana': [2351627, 47930, 0.1754, 4.1495,
43], 'gabon': [2225734, 53155, 0.166, 8.6379, 44], 'lesotho':
[2142249, 16981, 0.1598, 70.5616, 45], 'guinea-bissau': [1968001,
47079, 0.1468, 69.9858, 46], 'equatorial guinea': [1402985, 46999,
0.1047, 50.0173, 47], 'mauritius': [1271768, 2100, 0.0949,
626.4867, 48], 'eswatini': [1160164, 12034, 0.0865, 67.4514, 49],
'djibouti': [988000, 14440, 0.0737, 42.623, 50], 'reunion':
[895312, 6385, 0.0668, 358.1248, 51], 'comoros': [869601, 18715,
0.0649, 467.2762, 52], 'western sahara': [597339, 14876, 0.0446,
2.2456, 53], 'cabo verde': [555987, 6052, 0.0415, 137.962, 54],
'mayotte': [272815, 6665, 0.0204, 727.5067, 55], 'sao tome &
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principe': [219159, 4103, 0.0163, 228.2906, 56], 'seychelles': [98347, 608, 0.0073, 213.7978, 57], 'saint helena': [6077, 18, 0.0005, 15.5821, 58]}

#Testing with a second bigger datasets with an invalid row in Europe region. Zero division may have been caught here.

```
>>> FirstOutput, SecondOutput = main('countries_big2.csv')
>>> FirstOutput
{'asia': [39270197.9162, 0.839], 'africa': [4603824.8359, 0.6617], 'europe': [4102793.9466, 0.7125], 'latin america & caribbean': [5110483.6308, 0.9382], 'northern america': [80089583.5645, 0.7841], 'oceania': [1154706.2964, 0.9509]}

>>> SecondOutput['europe']
{'russia': [145934462, 62206, 19.5195, 8.911, 1], 'germany': [83783942, 266897, 11.2065, 240.3716, 2], 'united kingdom': [67886011, 355839, 9.0801, 280.6019, 3], 'france': [65273511, 143783, 8.7307, 119.2086, 4], 'italy': [60461826, -88249, 8.0871, 205.5546, 5], 'spain': [46754778, 18002, 6.2537, 93.7345, 6], 'ukraine': [43733762, -259876, 5.8496, 75.4915, 7], 'poland': [37846611, -41157, 5.0622, 123.5888, 8], 'romania': [19237691, -126866, 2.5731, 83.5804, 9], 'netherlands': [17134872, 37742, 2.2919, 508.1516, 10], 'belgium': [11589623, 50295, 1.5502, 382.7484, 11], 'czech republic (czechia)': [10708981, 19772, 1.4324, 138.6455, 12], 'greece': [10423054, -50401, 1.3941, 80.8616, 13], 'portugal': [10196709, -29478, 1.3639, 111.3299, 14], 'sweden': [10099265, 62886, 1.3508, 24.6119, 15], 'hungary': [9660351, -24328, 1.2921, 106.7088, 16], 'belarus': [9449323, -3088, 1.2639, 46.569, 17], 'austria': [9006398, 51296, 1.2047, 109.289, 18], 'serbia': [8737371, -34864, 1.1687, 99.9013, 19], 'switzerland': [8654622, 63257, 1.1576, 219.0156, 20], 'bulgaria': [6948445, -51674, 0.9294, 64.0056, 21], 'denmark': [5792202, 20326, 0.7747, 136.5119, 22], 'finland': [5540720, 8564, 0.7411, 18.2326, 23], 'slovakia': [5459642, 2629, 0.7303, 113.5344, 24], 'norway': [5421241, 42384, 0.7251, 14.8418, 25], 'ireland': [4937786, 55291, 0.6605, 71.6764, 26], 'croatia': [4105267, -25037, 0.5491, 73.3607, 27], 'moldova': [4033963, -9300, 0.5396, 122.7995, 28], 'bosnia and herzegovina': [3280819, -20181, 0.4388, 64.3298, 29], 'albania': [2877797, -3120, 0.3849, 105.0291, 30], 'lithuania': [2722289, -37338, 0.3641, 43.4357, 31], 'north macedonia': [2083374, -85, 0.2787, 82.608, 32], 'slovenia': [2078938, 284, 0.2781, 103.2243, 33], 'latvia': [1886198, -20545, 0.2523, 30.3247, 34], 'estonia': [1326535, 887, 0.1774, 31.2936, 35], 'montenegro': [628066, 79, 0.084, 46.6964, 36], 'luxembourg': [625978, 10249, 0.0837, 241.6903, 37], 'malta': [441543, 1171, 0.0591, 1379.8219, 38], 'iceland': [341243, 2212, 0.0456, 3.4039, 39], 'channel islands': [173863, 1604, 0.0233, 915.0684, 40], 'isle of man': [85033, 449, 0.0114, 149.1807, 41], 'andorra': [77265, 123, 0.0103, 164.3936, 42], 'faeroe islands': [48863, 185, 0.0065, 35.0021, 43], 'monaco': [39242, 278, 0.0052, 39242.0, 44], 'liechtenstein': [38128, 109, 0.0051, 238.3, 45], 'san marino': [33931, 71, 0.0045, 565.5167, 46], 'gibraltar': [33691, -10, 0.0045, 3369.1, 47]}
```

 # Testing for single country in a region, all zeros data, zero division,multiple rows with same country and invalid input etc.

```
>>>FirstOutput,SecondOutput=main('countries_zero_invalid_test.csv
')
>>> FirstOutput
{'africa': [20106396.272, 0.8023], 'europe': [9476198.9866,
0.8655], 'latin america & caribbean': [22441416.3173, 0.9446],
'northern america': [0, 1.0], 'oceania': [2553663.855, 0.9514]}

>>> SecondOutput
{'africa': {'nigeria': [206139589, 5175990, 39.5169, 226.3355, 1],
'ethiopia': [114963588, 2884858, 22.0385, 114.9636, 2], 'egypt':
[102334404, 1946331, 19.6175, 102.8022, 3], 'angola': [32866272,
1040977, 6.3005, 26.3626, 4], 'mozambique': [31255435, 889399,
5.9917, 39.746, 5], 'ghana': [31072940, 655084, 5.9567, 136.5603,
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