

Karel Norek, xnorek01 - zadání 299

Bod 1: [0; -1; 2] Bod 2: [-3; -1; -3] Bod 3: [1; -3; 2] Bod 4: [-2; -2; 2] Bod 5: [1; 2; -4]
Bod 6: [0; -4; 3] Bod 7: [1; 0; -3] Bod 8: [-3; 0; 0] Bod 9: [-2; 2; -4] Bod 10: [-2; 4; 3]
Bod 11: [3; -2; 4] Bod 12: [2; -5; -4]

Střed 1: [-3; 4; 1] Střed 2: [0; -3; -1] Střed 3: [4; -4; 2]

Iterace 1:

Ukázka výpočtu vzdálenosti bodu 1 a středu 1:

$$\sqrt{(0-3)^2 + (-1-4)^2 + (-2-1)^2} \approx 6.557439$$

	Střed 1	Střed 2	Střed 3
Bod 1	6.55744	3.60555	6.40312
Bod 2	6.40312	5.38516	9.11043
Bod 3	8.12404	1.41421	3.16228
Bod 4	6.16441	2.44949	6.32456
Bod 5	6.70820	7.14143	9
Bod 6	8.77496	2.23607	4.12311
Bod 7	6.92820	5.09902	7.07107
Bod 8	4.12311	4.3589	8.30662
Bod 9	5.47723	7.34847	10.39231
Bod 10	2.23607	7.54983	10.04988
Bod 11	9	4.3589	3
Bod 12	11.44552	5.74456	6.40312

Nejmenší vzdálenost je označena modrou barvou

Shluk 1: Bod 5: [1; 2; -4], Bod 8: [-3; 0; 0], Bod 9: [-2; 2; -4], Bod 10: [-2; 4; 3]

Shluk 2: Bod 1: [0; -1; 2], Bod 2: [-3; -1; -3], Bod 3: [1; -3; 2], Bod 4: [-2; -2; 2],
Bod 6: [0; -4; 3], Bod 7: [1; 0; -3], Bod 12: [2; -5; -4]

Shluk 3: Bod 11: [3; -2; 4]

Ukázka výpočtu nového středového bodu:

$$\frac{1-3-2-2}{4} = -1.5 \quad \frac{2+0+2+4}{4} = 2 \quad \frac{-4+0-4+3}{4} = -1.25 \quad [-1.5, 2.0, -1.25]$$

Nové středy:

Střed 1: [-1.5, 2.0, -1.25]

Střed 2: [-0.14285714285714285, -2.2857142857142856, -0.7142857142857143]

Střed 3: [3.0, -2.0, 4.0]

Iterace 2:

	Střed 1	Střed 2	Střed 3
Bod 1	3.43693	1.82388	6.78233
Bod 2	3.78319	3.87825	9.27362
Bod 3	6.46626	3.03046	3
Bod 4	5.17808	3.30121	5.38516
Bod 5	3.71652	5.51991	9.16515
Bod 6	7.50417	4.09330	3.74166
Bod 7	3.64863	3.42857	7.54983
Bod 8	2.79508	3.728	7.48331
Bod 9	2.79508	5.71071	10.24695
Bod 10	4.72361	7.5336	7.87401
Bod 11	7.98827	5.67307	0
Bod 12	8.29533	4.77023	8.60232

Shluk 1: Bod 2: [-3; -1; -3], Bod 5: [1; 2; -4], Bod 8: [-3; 0; 0], Bod 9: [-2; 2; -4],
Bod 10: [-2; 4; 3]

Shluk 2: Bod 1: [0; -1; 2], Bod 4: [-2; -2; 2], Bod 7: [1; 0; -3], Bod 12: [2; -5; -4]

Shluk 3: Bod 3: [1; -3; 2], Bod 6: [0; -4; 3], Bod 11: [3; -2; 4]

Nové středy:

Střed 1: [-1.8, 1.4, -1.6]

Střed 2: [0.25, -2.0, -1.75]

Střed 3: [1.33333, -3.0, 3.0]

Iterace 3:

	Střed 1	Střed 2	Střed 3
Bod 1	3.02655	1.06066	5.54777
Bod 2	3.02655	3.62284	7.66667
Bod 3	6.33719	3.95285	1.05409
Bod 4	4.9558	4.37321	3.62093
Bod 5	3.73631	4.65027	8.60878
Bod 6	7.31847	5.15994	1.66667
Bod 7	3.42929	2.47487	6.71648
Bod 8	2.44131	4.19821	6.06447
Bod 9	2.48193	5.11126	9.22557
Bod 10	5.28772	7.97653	7.75314
Bod 11	8.12158	6.37377	2.18581
Bod 12	7.82049	4.13824	7.31057

Shluk 1: Bod 2: [-3; -1; -3], Bod 5: [1; 2; -4], Bod 8: [-3; 0; 0], Bod 9: [-2; 2; -4],
Bod 10: [-2; 4; 3]

Shluk 2: Bod 1: [0; -1; 2], Bod 7: [1; 0; -3], Bod 12: [2; -5; -4]

Shluk 3: Bod 3: [1; -3; 2], Bod 4: [-2; -2; 2], Bod 6: [0; -4; 3], Bod 11: [3; -2; 4]

Nové středy:

Střed 1: [-1.8, 1.4, -1.6]

Střed 2: [1.0, -2.0, -3.0]

Střed 3: [0.5, -2.75, 2.75]

Iterace 4:

	Střed 1	Střed 2	Střed 3
Bod 1	3.02655	1.73205	5.08675
Bod 2	3.02655	4.12311	6.95521
Bod 3	6.33719	5.09902	0.93541
Bod 4	4.9558	5.83095	2.7157
Bod 5	3.73631	4.12311	8.26892
Bod 6	7.31847	6.40312	1.36931
Bod 7	3.42929	2	6.39336
Bod 8	2.44131	5.38516	5.23211
Bod 9	2.48193	5.09902	8.62409
Bod 10	5.28772	9	7.20243
Bod 11	8.12158	7.28011	2.89396
Bod 12	7.82049	3.31662	7.27152

Shluk 1: Bod 2: [-3; -1; -3], Bod 5: [1; 2; -4], Bod 8: [-3; 0; 0], Bod 9: [-2; 2; -4],
Bod 10: [-2; 4; 3]

Shluk 2: Bod 1: [0; -1; 2], Bod 7: [1; 0; -3], Bod 12: [2; -5; -4]

Shluk 3: Bod 3: [1; -3; 2], Bod 4: [-2; -2; 2], Bod 6: [0; -4; 3], Bod 11: [3; -2; 4]

Shluky jsou stejné, to znamená, že i středy jsou stejné. Ukončíme tedy algoritmus.

Konečný výsledek:

Shluk 1: Bod 2: [-3; -1; -3], Bod 5: [1; 2; -4], Bod 8: [-3; 0; 0], Bod 9: [-2; 2; -4],
Bod 10: [-2; 4; 3]

Shluk 2: Bod 1: [0; -1; 2], Bod 7: [1; 0; -3], Bod 12: [2; -5; -4]

Shluk 3: Bod 3: [1; -3; 2], Bod 4: [-2; -2; 2], Bod 6: [0; -4; 3], Bod 11: [3; -2; 4]

Střed 1: [-1.8, 1.4, -1.6]

Střed 2: [1.0, -2.0, -3.0]

Střed 3: [0.5, -2.75, 2.75]