

Instituto Tecnológico de Tijuana
Unidad “Tomas Aquino”



Estudiante:

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Matricula:

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Materia:

Estructura de Datos

Trabajo:

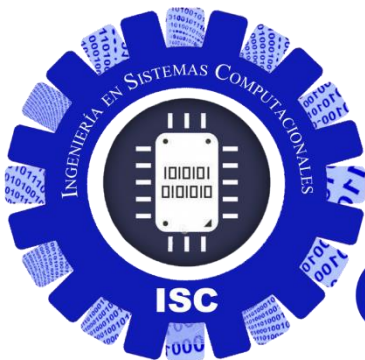
**“Proyecto final Estructura de Datos –
Métodos de Ordenamiento”**

Docente:

Parra Galaviz Ray Brunnette

Fecha de entrega:

30 Noviembre 2018



**INGENIERÍA EN
SISTEMAS
COMPUTACIONALES**

Documentación del proyecto

El proyecto consta de lo siguiente:

1.- Se crea un arreglo aleatorio de 1000 elementos con un intervalo de 0 a 1000 el cual será ordenado.

2.- Los métodos de ordenamiento son los siguientes:

- Burbuja
- QuickSort
- ShellSort
- MergeSort

3.- Cada método recibirá el mismo arreglo unidimensional revuelto para ser ordenado. En cada ordenamiento se contabiliza el tiempo de ejecución.

4.- Se despliega el tiempo que demora cada método en ordenar el mismo arreglo así como la suma de todos los tiempos.

5.- La siguiente parte del programa consiste en realizar el mismo procedimiento 30 veces con diferentes arreglos para poder realizar una comparativa estadística.

6.- Después de ordenar 30 arreglos diferentes en 4 métodos de ordenamientos distintos y de guardar el tiempo que demora cada uno, se despliega en una tabla los tiempos con sus respectivos métodos.

7.- Para finalizar se realiza un promedio de cada método para poder visualizar de una mejor manera cual método es el más rápido y eficaz.

La documentación del código del programa se encuentra en el programa .py

Ejemplo programa ejecutando el ordenamiento de 1 arreglo aleatorio

RESTART: /home/eduardo/Programas/Phyton/Proyecto Final Estructura D Datos.py
Arreglo de 1000 elementos creado aleatoriamente...

[838, 206, 221, 427, 876, 474, 559, 784, 367, 978, 905, 902, 329, 474, 923, 579, 823, 551, 344, 66, 73, 971, 709, 675, 32, 657, 598, 27, 129, 591, 380, 526, 642, 664, 202, 931, 203, 27, 434, 833, 238, 334, 662, 434, 332, 944, 717, 980, 419, 28, 941, 303, 477, 524, 526, 335, 502, 704, 653, 989, 679, 113, 37, 826, 332, 611, 671, 95, 475, 265, 188, 231, 16, 453, 21, 662, 542, 698, 194, 140, 20, 520, 772, 679, 27, 577, 880, 191, 20, 930, 162, 779, 129, 262, 703, 318, 726, 204, 789, 180, 54, 105, 793, 426, 524, 47, 714, 52, 62, 736, 634, 659, 768, 429, 844, 226, 734, 913, 744, 724, 122, 903, 872, 371, 656, 255, 520, 690, 437, 186, 815, 84, 978, 776, 309, 48, 702, 148, 460, 676, 784, 568, 960, 653, 105, 58, 8, 84, 267, 305, 729, 472, 243, 667, 8, 988, 540, 848, 631, 968, 924, 58, 695, 238, 205, 88, 123, 406, 791, 675, 570, 644, 24, 843, 867, 239, 386, 812, 268, 113, 679, 371, 409, 607, 772, 515, 91, 523, 537, 83, 574, 555, 320, 989, 703, 1, 41, 230, 268, 974, 451, 664, 629, 769, 759, 551, 662, 604, 10, 652, 376, 760, 473, 98, 438, 411, 104, 60, 424, 748, 978, 223, 575, 853, 76, 100, 311, 198, 712, 935, 247, 973, 364, 204, 954, 330, 963, 256, 721, 748, 879, 280, 741, 219, 6, 45, 799, 234, 358, 174, 230, 72, 643, 619, 832, 403, 753, 31, 549, 238, 873, 523, 441, 206, 248, 485, 343, 112, 421, 578, 306, 572, 632, 755, 264, 611, 302, 501, 512, 582, 181, 346, 267, 963, 536, 136, 923, 142, 847, 823, 977, 573, 951, 466, 990, 251, 182, 495, 986, 951, 308, 957, 148, 863, 130, 509, 905, 390, 987, 221, 328, 974, 389, 252, 489, 823, 477, 557, 999, 445, 927, 826, 946, 684, 219, 109, 447, 638, 879, 887, 165, 354, 380, 28, 858, 770, 961, 618, 343, 855, 24, 24, 675, 679, 885, 463, 569, 424, 925, 401, 655, 0, 580, 833, 291, 102, 968, 825, 948, 849, 640, 336, 759, 354, 468, 792, 878, 693, 247, 394, 949, 472, 137, 333, 313, 510, 128, 505, 107, 359, 176, 969, 228, 465, 838, 980, 747, 282, 62, 4, 102, 522, 353, 881, 20, 564, 33, 150, 530, 631, 535, 582, 845, 42, 706, 274, 837, 603, 482, 257, 793, 327, 365, 77, 738, 701, 900, 771, 637, 39, 154, 981, 781, 618, 917, 434, 150, 609, 157, 376, 258, 98, 414, 790, 582, 13, 766, 992, 165, 994, 737, 956, 74, 691, 858, 855, 665, 705, 837, 859, 384, 950, 41, 87, 951, 104, 137, 452, 616, 207, 878, 10, 845, 454, 987, 311, 925, 969, 699, 915, 367, 410, 750, 544, 265, 792, 679, 282, 569, 878, 532, 243, 185, 139, 136, 76, 6, 8, 466, 677, 261, 226, 43, 886, 699, 274, 90, 974, 702, 462, 599, 992, 215, 875, 502, 95, 716, 805, 874, 856, 121, 83, 218, 540, 756, 284, 270, 478, 594, 466, 397, 592, 499, 39, 973, 76, 626, 40, 109, 166, 311, 272, 975, 731, 115, 8, 19, 3, 763, 362, 341, 517, 444, 121, 364, 857, 625, 946, 130, 668, 29, 896, 877, 614, 639, 393, 408, 137, 717, 702, 527, 420, 495, 90, 196, 814, 27, 669, 195, 991, 217, 616, 527, 962, 564, 752, 463, 429, 607, 990, 105, 66, 773, 57, 988, 959, 778, 186, 402, 888, 700, 128, 76, 972, 168, 135, 651, 229, 796, 80, 364, 945, 966, 899, 583, 267, 533, 831, 64, 435, 95, 291, 302, 780, 285, 707, 27, 433, 618, 722, 900, 332, 272, 122, 894, 194, 103, 490, 696, 946, 701, 144, 236, 695, 128, 929, 155, 626, 214, 862, 523, 868, 165, 861, 459, 871, 297, 60, 809, 677, 938, 599, 814, 460, 483, 228, 514, 232, 579, 870, 888, 856, 663, 454, 989, 982, 562, 951, 608, 503, 843, 626, 89, 889, 195, 878, 875, 677, 771, 236, 591, 294, 212, 896, 658, 195, 503, 397, 996, 754, 953, 971, 381, 345, 488, 940, 168, 932, 455, 521, 805, 185, 548, 383, 706, 330, 145, 401, 667, 809, 131, 902, 717, 402, 229, 410, 894, 737, 868, 111, 612, 33, 389, 747, 846, 153, 592, 242, 309, 906, 822, 897, 997, 113, 378, 145, 107, 389, 288, 679, 618, 855, 469, 758, 373, 96, 282, 257, 890, 773, 235, 647, 640, 937, 773, 501, 459, 264, 315, 402, 576, 456, 127, 467, 365, 475, 299, 96, 818, 588, 830, 436, 503, 122, 506, 117, 825, 342, 249, 201, 520, 369, 492, 362, 255, 770, 259, 683, 874, 497, 70, 129, 923, 145, 449, 242, 749, 485, 246, 98, 819, 960, 710, 684, 163, 206, 360, 875, 705, 315, 187, 709, 343, 125, 12, 178, 438, 698, 129, 822, 274, 177, 586, 390, 71, 0, 657, 313, 692, 632, 68, 90, 979, 510, 111, 735, 349, 267, 830, 410, 858, 242, 484, 538, 647, 825, 317, 813, 978, 550, 927, 597, 744, 252, 701, 489, 617, 701, 680, 187, 460, 282, 979, 415, 652, 542, 463, 411, 791, 512, 177, 156, 369, 733, 554, 321, 774, 92, 114, 23, 709, 668, 304, 362, 127, 689, 280, 24, 288, 359, 954, 530, 324, 109, 895, 132, 411, 408, 315, 520, 941, 723, 703, 433, 845, 330, 336, 516, 712, 113, 674, 98, 959, 95, 487, 974, 232, 334, 13, 295, 818, 74, 8, 400, 250, 572, 246, 604, 629, 122, 467, 211, 877, 384, 674, 500, 748, 530, 865, 997, 964, 522, 575, 840, 993, 475, 472, 976, 529, 934, 58, 785, 833, 728, 15, 782, 890, 110, 352, 326, 609, 558, 492, 805, 439, 637, 892, 997, 650, 250, 263, 211, 663, 154, 106, 124, 317, 903, 121, 219, 500, 980, 933, 232, 518, 415, 874, 213, 222, 592, 940, 256, 422, 430, 236, 268, 977, 331, 728, 971, 11, 545, 382, 407, 32, 442, 844, 927]

Arreglo revuelto ordenado por el metodo de la burbuja...

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Arreglo revuelto ordenado por el metodo de QuickSort...

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Arreglo revuelto ordenado por el metodo de ShellSort...

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[-|-|-|-] Este metodo de ordenamiento tardó 0.31506244140625 segundos. [-|-|-|-]

Arreglo revuelto ordenado por el metodo de MergeSort...

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[-|-|-|-] Este metodo de ordenamiento tardó 0.03304433822631836 segundos. [-|-|-|-]

[-|-|-|-] Total de tiempo ejecutado: 0.6111869812011719 segundos. [-|-|-|-]

1.- Probar denuevo (1 nuevo arreglo desordenado).

2.- Probar 30 arreglos y generar estadística.

2.- Salir.

Que desea realizar?: |

Al realizar el ordenamiento de 30 arreglos diferentes se obtiene el siguiente resultado:

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685, 688, 689, 690, 690, 691, 691, 692, 693, 695, 696, 696, 697, 698, 700, 700, 700, 701, 702, 702, 704, 705, 705, 706, 706, 707, 707, 710, 711, 711, 711, 712, 712, 713, 713, 717, 718, 719, 720, 7
32, 734, 735, 735, 736, 737, 738, 738, 739, 739, 740, 741, 742, 745, 746, 746, 747, 748, 749, 751, 753, 754, 755, 757, 760, 760, 761, 762, 762, 762, 762, 762, 762, 764, 765, 765, 765, 766, 766, 76
5, 776, 777, 777, 778, 779, 780, 780, 782, 783, 787, 787, 790, 792, 793, 794, 794, 797, 797, 798, 799, 799, 799, 802, 804, 805, 805, 806, 806, 806, 807, 808, 810, 810, 810, 811, 812, 812, 813, 814
, 822, 824, 826, 826, 829, 830, 831, 832, 832, 833, 835, 836, 837, 838, 838, 839, 839, 840, 840, 842, 844, 845, 848, 848, 848, 849, 849, 849, 853, 854, 855, 856, 856, 856, 857, 857, 858, 858, 858,
869, 870, 871, 871, 872, 873, 875, 882, 882, 882, 883, 888, 888, 889, 890, 890, 890, 890, 892, 894, 896, 896, 897, 901, 903, 903, 908, 908, 913, 915, 915, 918, 919, 919, 921, 921, 922, 922, 922, 9
29, 929, 930, 930, 932, 932, 933, 933, 933, 934, 935, 935, 937, 938, 942, 944, 944, 946, 946, 946, 948, 949, 951, 951, 953, 956, 958, 958, 961, 962, 963, 964, 965, 965, 966, 966, 966, 966, 967, 96
5, 976, 976, 977, 977, 977, 978, 979, 981, 981, 983, 985, 986, 986, 988, 989, 989, 990, 991, 991, 991, 992, 993, 995, 995, 996, 996, 997, 997, 997, 998]
|-|-|-|-| Este metodo de ordenamiento tardo 0.023910045623779297 segundos. |-|-|-|-|
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|-|-|-|-| Total de tiempo ejecutado: 0.5061273574829102 segundos. |-|-|-|-|
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La siguiente tabla muestra el tiempo que tardo en segundos cada metodo en ordenar un arreglo aleatorio de 1000 elementos...

# Arreglo	Burbuja	QuickSort	ShellSort	MergeSort
1	0.22225404	0.01752567	0.21378875	0.02343178
2	0.24565840	0.02264833	0.22471714	0.03830242
3	0.24446535	0.02213788	0.22584486	0.02519870
4	0.22208595	0.02428603	0.22493529	0.03022718
5	0.24596405	0.03346753	0.25592732	0.02723408
6	0.21579099	0.02332687	0.21691346	0.07241607
7	0.22367001	0.02362895	0.23176312	0.02550817
8	0.21865010	0.02352047	0.23354030	0.03228974
9	0.22466898	0.03328681	0.25351071	0.03899550
10	0.22490358	0.05554867	0.23588538	0.03352928
11	0.22474027	0.02843809	0.25394392	0.06705022
12	0.23526955	0.02584314	0.25778604	0.02620173
13	0.22698760	0.02869105	0.22335315	0.02550197
14	0.23578286	0.02183628	0.21516919	0.02795744
15	0.22497439	0.05732870	0.22997022	0.03271127
16	0.22556520	0.01961040	0.21470475	0.02946162
17	0.21341228	0.02437711	0.22710824	0.03251362
18	0.22666287	0.02594376	0.21999574	0.03179860
19	0.22173119	0.02616978	0.22373796	0.03444171
20	0.23710728	0.03412747	0.24971199	0.03702116
21	0.22942233	0.01782131	0.22101927	0.02427673
22	0.22256708	0.02542782	0.24659061	0.03534436
23	0.22108412	0.02690530	0.24268341	0.03665042
24	0.21827769	0.02218533	0.22666788	0.03151560
25	0.21969318	0.03005815	0.24280548	0.03755975
26	0.25064611	0.03398013	0.24382281	0.04218817
27	0.21972275	0.02420092	0.23699498	0.02802539
28	0.23197579	0.03391194	0.21534109	0.02744174
29	0.24509501	0.02122808	0.22320628	0.03209400
30	0.23538804	0.02441192	0.22241735	0.02391005

Promedio de tiempo que demoran en ejecutar los metodos de ordenamiento en un arreglo de 1000 elementos:

Burbuja = 0.22847390174865723

QuickSort = 0.027729129791259764

ShellSort = 0.23179522355397542

MergeSort = 0.03369328180948893

1.- Probar denuuevo (1 nuevo arreglo desordenado).

2.- Probar 30 arreglos y generar estadistica.

2.- Salir.

Que desea realizar?: 3

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En conclusión en base a los resultados desplegados en la tabla y los promedios, el método de ordenamiento QuickSort es el más rápido y eficiente, seguido del MergeSort. En cuanto al método de la Burbuja y ShellSort los resultados en la tabla nos dice que depende el arreglo uno era más veloz que el otro pero en el promedio el método de la burbuja termina siendo mejor, por mínimas diferencias.