CSE 102 SPRING 2025-COMPUTER PROGRAMMING ASSIGNMENT 8

Achievements

- Learned to use key C concepts such as enum, switch-case, stack, dynamic memory, and file I/O in a practical scenario.
- Implemented a working system where the user-selected operation (max or avg) is stored in a stack and then applied.
- Gained experience in handling RGB, BGR, and GRAY color formats and writing structured outputs to a file.

How It Works

At the start, the program generates random-sized chunk and line data, which are saved into input.txt. The user is asked to select a color format (RGB/BGR/GRAY) and an operation (max or avg).

- **In RGB/BGR mode:** The sliding window is applied on three separate lines to compute R, G, and B values.
- **In GRAY mode:** Each line is processed individually, and the results are written as arrays into output.txt.

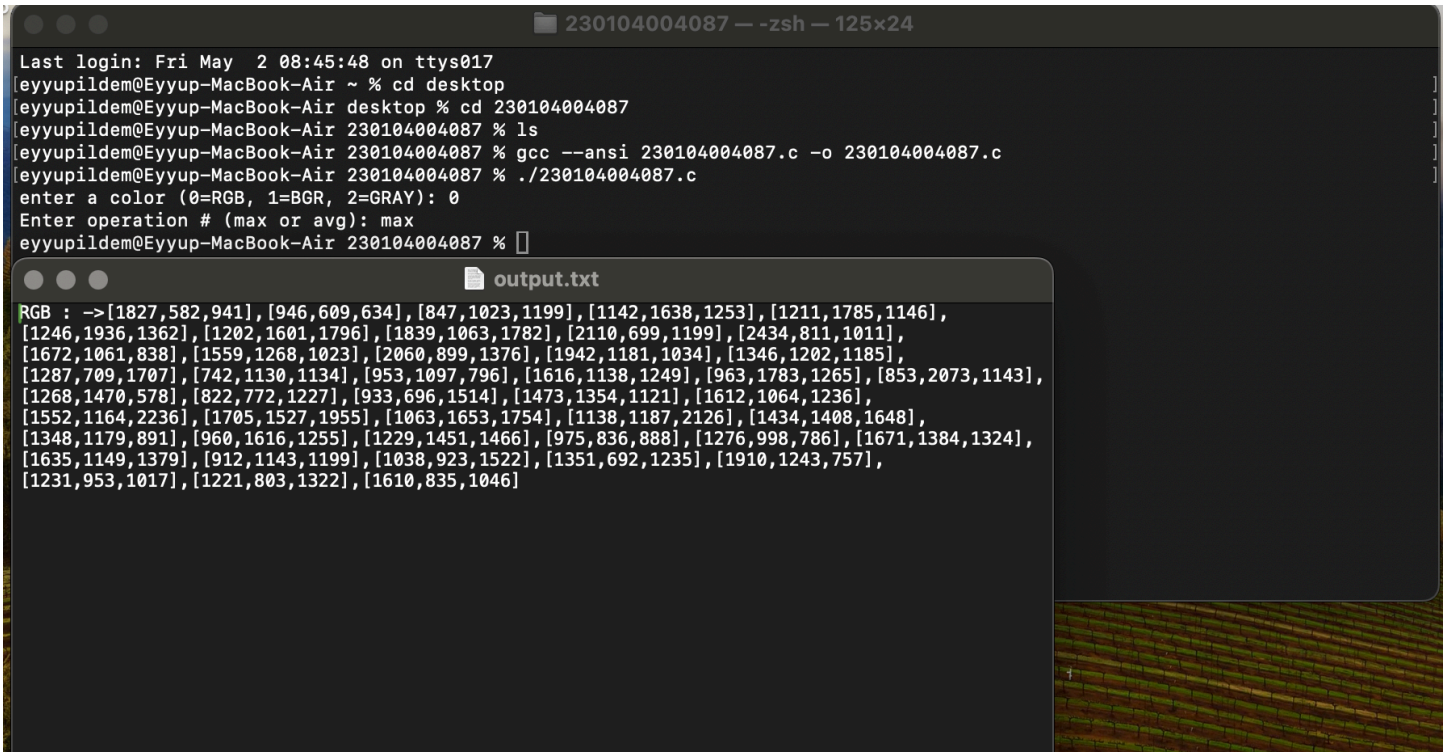
For every window shift, a subset of the line (equal in length to the chunk) is multiplied with the chunk, and the selected operation is applied.

Important Notes

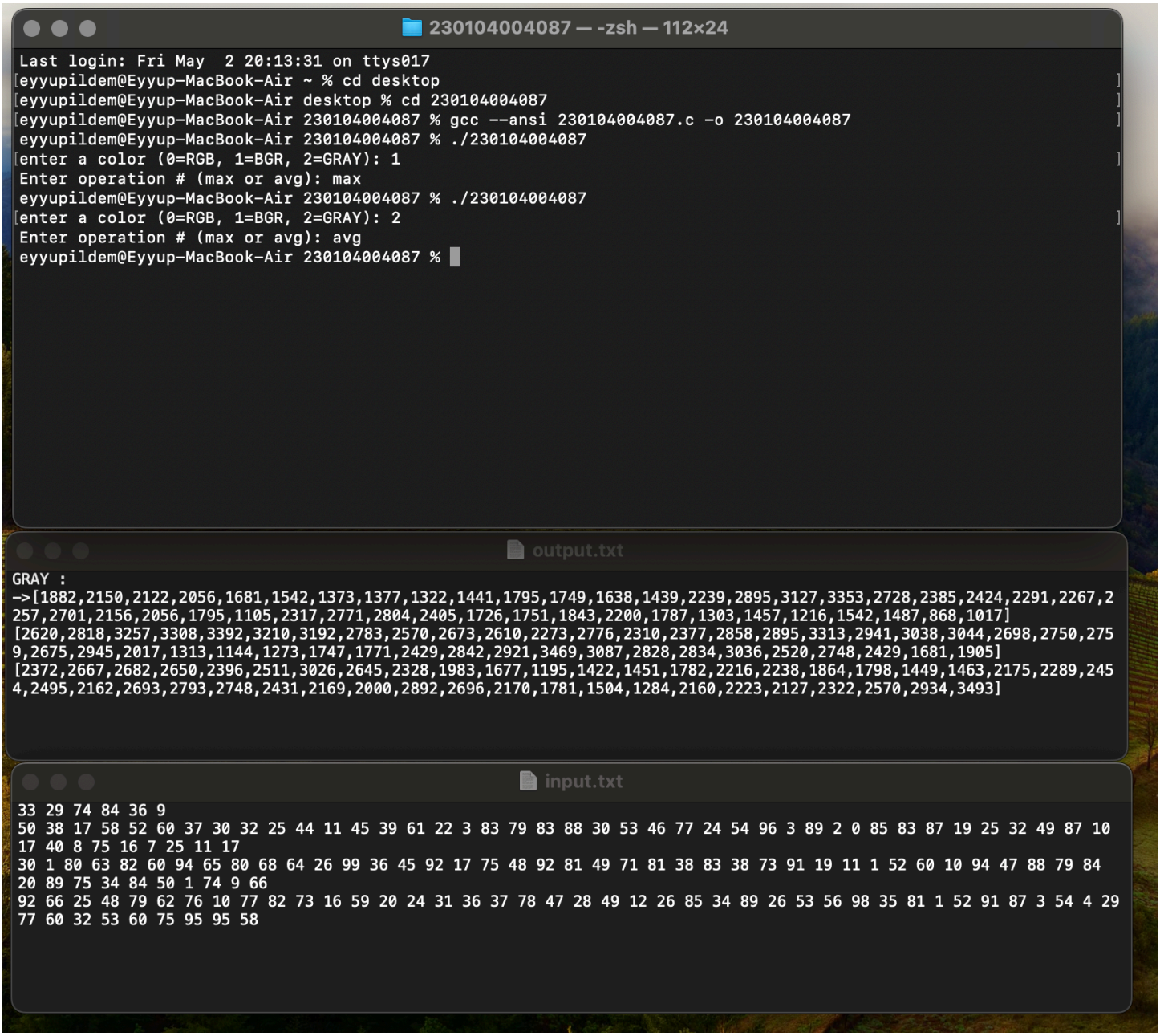
- chunk_size must always be smaller than line_size, which is ensured by the predefined size ranges.
- If pop() is called on an empty stack, it may lead to invalid results — inputs must be handled carefully.
- All dynamically allocated memory is properly released with free() to avoid memory leaks.

below are some screenshots of the program :

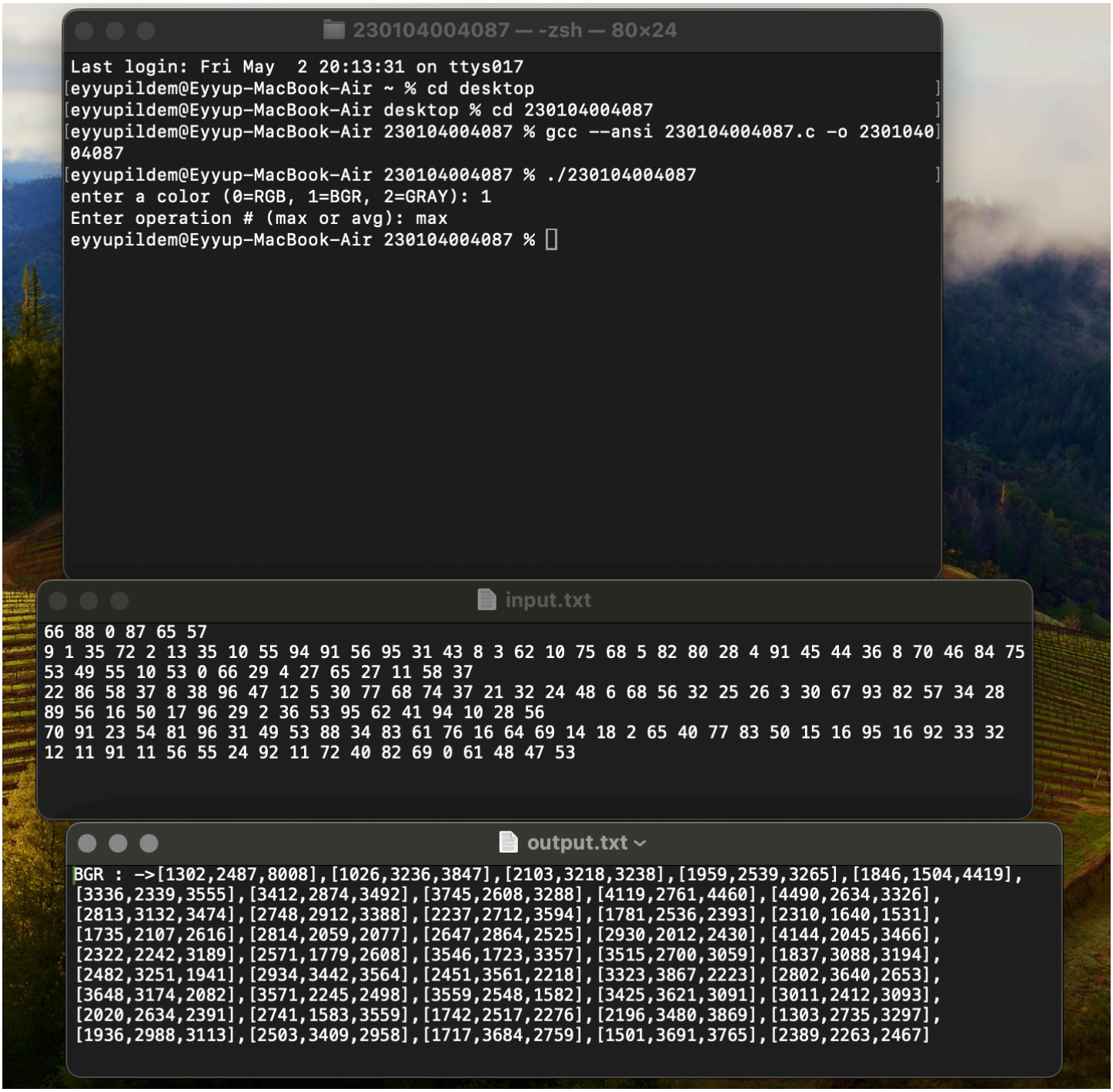
GRAY AND MAX


230104004087 — -zsh — 125×24
Last login: Fri May 2 08:45:48 on ttys017
eyyupildem@Eyyup-MacBook-Air ~ % cd desktop
eyyupildem@Eyyup-MacBook-Air desktop % cd 230104004087
eyyupildem@Eyyup-MacBook-Air 230104004087 % ls
eyyupildem@Eyyup-MacBook-Air 230104004087 % gcc --ansi 230104004087.c -o 230104004087.c
eyyupildem@Eyyup-MacBook-Air 230104004087 % ./230104004087.c
enter a color (0=RGB, 1=BGR, 2=GRAY): 0
Enter operation # (max or avg): max
eyyupildem@Eyyup-MacBook-Air 230104004087 %
output.txt
RGB : ->[1827,582,941],[946,609,634],[847,1023,1199],[1142,1638,1253],[1211,1785,1146],
[1246,1936,1362],[1202,1601,1796],[1839,1063,1782],[2110,699,1199],[2434,811,1011],
[1672,1061,838],[1559,1268,1023],[2060,899,1376],[1942,1181,1034],[1346,1202,1185],
[1287,709,1707],[742,1130,1134],[953,1097,796],[1616,1138,1249],[963,1783,1265],[853,2073,1143],
[1268,1470,578],[822,772,1227],[933,696,1514],[1473,1354,1121],[1612,1064,1236],
[1552,1164,2236],[1705,1527,1955],[1063,1653,1754],[1138,1187,2126],[1434,1408,1648],
[1348,1179,891],[960,1616,1255],[1229,1451,1466],[975,836,888],[1276,998,786],[1671,1384,1324],
[1635,1149,1379],[912,1143,1199],[1038,923,1522],[1351,692,1235],[1910,1243,757],
[1231,953,1017],[1221,803,1322],[1610,835,1046]

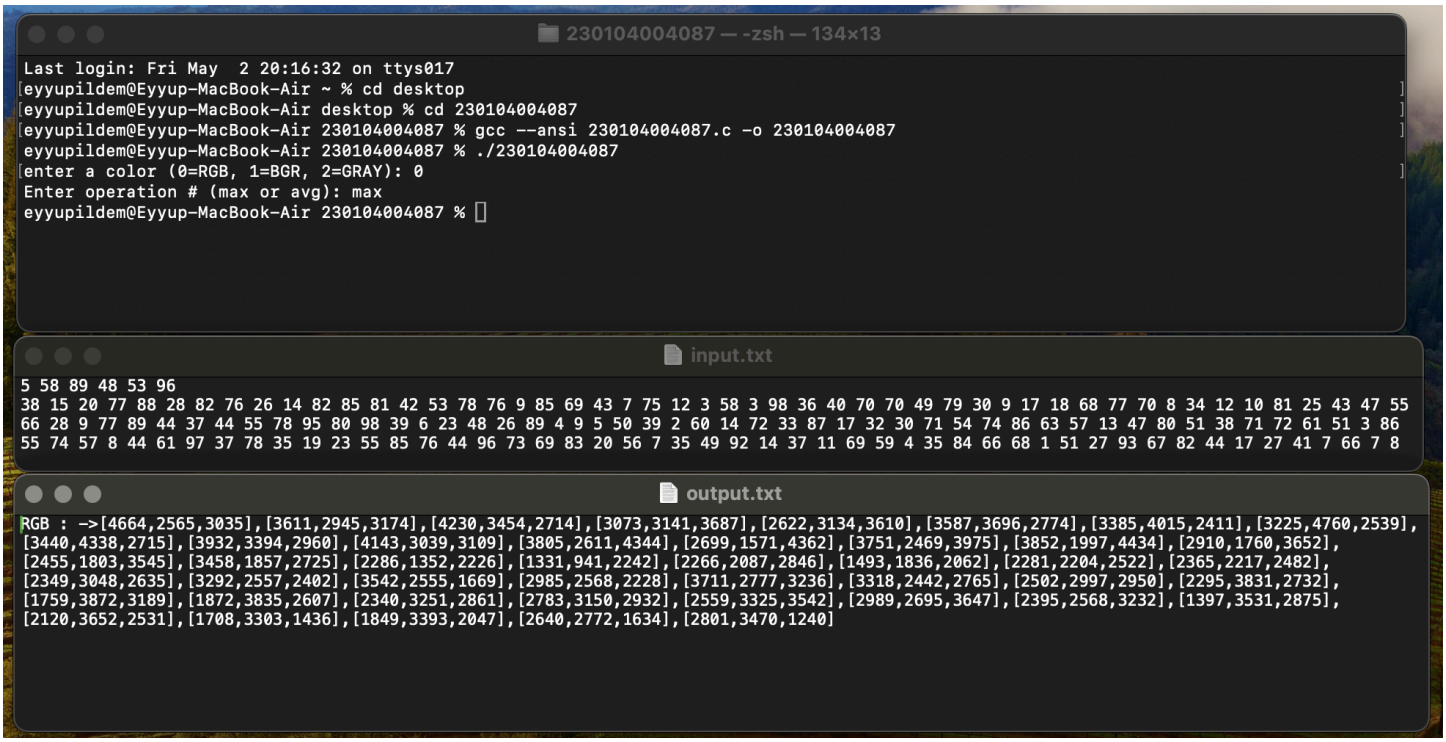
BGR AND AVG


230104004087 — -zsh — 112×24
Last login: Fri May 2 20:13:31 on ttys017
eyyupildem@Eyyup-MacBook-Air ~ % cd desktop
eyyupildem@Eyyup-MacBook-Air desktop % cd 230104004087
eyyupildem@Eyyup-MacBook-Air 230104004087 % gcc --ansi 230104004087.c -o 230104004087
eyyupildem@Eyyup-MacBook-Air 230104004087 % ./230104004087
enter a color (0=RGB, 1=BGR, 2=GRAY): 1
Enter operation # (max or avg): max
eyyupildem@Eyyup-MacBook-Air 230104004087 % ./230104004087
enter a color (0=RGB, 1=BGR, 2=GRAY): 2
Enter operation # (max or avg): avg
eyyupildem@Eyyup-MacBook-Air 230104004087 %
output.txt
GRAY :
->[1882,2150,2122,2056,1681,1542,1373,1377,1322,1441,1795,1749,1638,1439,2239,2895,3127,3353,2728,2385,2424,2291,2267,2257,2701,2156,2056,1795,1105,2317,2771,2804,2405,1726,1751,1843,2200,1787,1303,1457,1216,1542,1487,868,1017]
[2620,2818,3257,3308,3392,3210,3192,2783,2570,2673,2610,2273,2776,2310,2377,2858,2895,3313,2941,3038,3044,2698,2750,2759,2675,2945,2017,1313,1144,1273,1747,1771,2429,2842,2921,3469,3087,2828,2834,3036,2520,2748,2429,1681,1905]
[2372,2667,2682,2650,2396,2511,3026,2645,2328,1983,1677,1195,1422,1451,1782,2216,2238,1864,1798,1449,1463,2175,2289,2454,2495,2162,2693,2793,2748,2431,2169,2000,2892,2696,2170,1781,1504,1284,2160,2223,2127,2322,2570,2934,3493]
input.txt
33 29 74 84 36 9
50 38 17 58 52 60 37 30 32 25 44 11 45 39 61 22 3 83 79 83 88 30 53 46 77 24 54 96 3 89 2 0 85 83 87 19 25 32 49 87 10
17 40 8 75 16 7 25 11 17
30 1 80 63 82 60 94 65 80 68 64 26 99 36 45 92 17 75 48 92 81 49 71 81 38 83 38 73 91 19 11 1 52 60 10 94 47 88 79 84
20 89 75 34 84 50 1 74 9 66
92 66 25 48 79 62 76 10 77 82 73 16 59 20 24 31 36 37 78 47 28 49 12 26 85 34 89 26 53 56 98 35 81 1 52 91 87 3 54 4 29
77 60 32 53 60 75 95 95 58

BGR AND MAX


230104004087 — -zsh — 80×24
Last login: Fri May 2 20:13:31 on ttys017
eyyupildem@Eyyup-MacBook-Air ~ % cd desktop
eyyupildem@Eyyup-MacBook-Air desktop % cd 230104004087
eyyupildem@Eyyup-MacBook-Air 230104004087 % gcc --ansi 230104004087.c -o 230104004087
eyyupildem@Eyyup-MacBook-Air 230104004087 % ./230104004087
enter a color (0=RGB, 1=BGR, 2=GRAY): 1
Enter operation # (max or avg): max
eyyupildem@Eyyup-MacBook-Air 230104004087 %
input.txt
66 88 0 87 65 57
9 1 35 72 2 13 35 10 55 94 91 56 95 31 43 8 3 62 10 75 68 5 82 80 28 4 91 45 44 36 8 70 46 84 75
53 49 55 10 53 0 66 29 4 27 65 27 11 58 37
22 86 58 37 8 38 96 47 12 5 30 77 68 74 37 21 32 24 48 6 68 56 32 25 26 3 30 67 93 82 57 34 28
89 56 16 50 17 96 29 2 36 53 95 62 41 94 10 28 56
70 91 23 54 81 96 31 49 53 88 34 83 61 76 16 64 69 14 18 2 65 40 77 83 50 15 16 95 16 92 33 32
12 11 91 11 56 55 24 92 11 72 40 82 69 0 61 48 47 53
output.txt
BGR : ->[1302,2487,8008],[1026,3236,3847],[2103,3218,3238],[1959,2539,3265],[1846,1504,4419],
[3336,2339,3555],[3412,2874,3492],[3745,2608,3288],[4119,2761,4460],[4490,2634,3326],
[2813,3132,3474],[2748,2912,3388],[2237,2712,3594],[1781,2536,2393],[2310,1640,1531],
[1735,2107,2616],[2814,2059,2077],[2647,2864,2525],[2930,2012,2430],[4144,2045,3466],
[2322,2242,3189],[2571,1779,2608],[3546,1723,3357],[3515,2700,3059],[1837,3088,3194],
[2482,3251,1941],[2934,3442,3564],[2451,3561,2218],[3323,3867,2223],[2802,3640,2653],
[3648,3174,2082],[3571,2245,2498],[3559,2548,1582],[3425,3621,3091],[3011,2412,3093],
[2020,2634,2391],[2741,1583,3559],[1742,2517,2276],[2196,3480,3869],[1303,2735,3297],
[1936,2988,3113],[2503,3409,2958],[1717,3684,2759],[1501,3691,3765],[2389,2263,2467]

RGB AND MAX


230104004087 — -zsh — 134×13
Last login: Fri May 2 20:16:32 on ttys017
eyyupildem@Eyyup-MacBook-Air ~ % cd desktop
eyyupildem@Eyyup-MacBook-Air desktop % cd 230104004087
eyyupildem@Eyyup-MacBook-Air 230104004087 % gcc --ansi 230104004087.c -o 230104004087
eyyupildem@Eyyup-MacBook-Air 230104004087 % ./230104004087
enter a color (0=RGB, 1=BGR, 2=GRAY): 0
Enter operation # (max or avg): max
eyyupildem@Eyyup-MacBook-Air 230104004087 %
input.txt
5 58 89 48 53 96
38 15 20 77 88 28 82 76 26 14 82 85 81 42 53 78 76 9 85 69 43 7 75 12 3 58 3 98 36 40 70 70 49 79 30 9 17 18 68 77 70 8 34 12 10 81 25 43 47 55
66 28 9 77 89 44 37 44 55 78 95 80 98 39 6 23 48 26 89 4 9 5 50 39 2 60 14 72 33 87 17 32 30 71 54 74 86 63 57 13 47 80 51 38 71 72 61 51 3 86
55 74 57 8 44 61 97 37 78 35 19 23 55 85 76 44 96 73 69 83 20 56 7 35 49 92 14 37 11 69 59 4 35 84 66 68 1 51 27 93 67 82 44 17 27 41 7 66 7 8
output.txt
RGB : ->[4664,2565,3035],[3611,2945,3174],[4230,3454,2714],[3073,3141,3687],[2622,3134,3610],[3587,3696,2774],[3385,4015,2411],[3225,4760,2539],
[3440,4338,2715],[3932,3394,2960],[4143,3039,3109],[3805,2611,4344],[2699,1571,4362],[3751,2469,3975],[3852,1997,4434],[2910,1760,3652],
[2455,1803,3545],[3458,1857,2725],[2286,1352,2226],[1331,941,2242],[2266,2087,2846],[1493,1836,2062],[2281,2204,2522],[2365,2217,2482],
[2349,3048,2635],[3292,2557,2402],[3542,2555,1669],[2985,2568,2228],[3711,2777,3236],[3318,2442,2765],[2502,2997,2950],[2295,3831,2732],
[1759,3872,3189],[1872,3835,2607],[2340,3251,2861],[2783,3150,2932],[2559,3325,3542],[2989,2695,3647],[2395,2568,3232],[1397,3531,2875],
[2120,3652,2531],[1708,3303,1436],[1849,3393,2047],[2640,2772,1634],[2801,3470,1240]