Name: Monica Karam

N = 73

Lab Assignment 2: Threads

- ## Code Organization:

- **int rowMultiply():**
  For each row in MAT1 creates a thread that calculates the first row elements in MAT3.
- **void* row calculate(void* tid):**
  Function used by thread to calculate the elem. of MAT3[tid]
- **int elementMult():**
  For each element in MAT3 creates a thread
- **void* element calculate(void* tid):**
  Calculates the value of MAT3[ROW][COL]
- **char* copyString(char* d, char* append)**
  Set the file names from input
- **int ReadFile(char* f1, int first);**
  Opens file
- **int scanFirst(FILE* fp);**
  Save first matrix from file to MAT1
- **int scanSecond(FILE* fp);**
  Save second matrix from file to MAT2
- **int print(char* name)**
  Print the output to its corresponding file
- **int check()**
  Check for the correctness of dimensions for Matrix multiplication

- ## Main Function:

- **int rowMultiply():**
  for each row creates a thread , if it returns a value to indicate the failure of creating it , an error message in printed with the error indicated by this code. Otherwise, it waits for all threads to terminate and then returns.
- **void* row_calculate(void* tid):**
  tid → indicates the row to be calculated.
- **int elementMult():**
  For each combination of (row,col) → creates a thread to calculate the matrix element mat[row][col].
- **void* element_calculate(void* tid):**
  casts tid → to its corresponding struct element. Calculates the value of MAT3[ROW][COL].

- ## How to compile and run code:

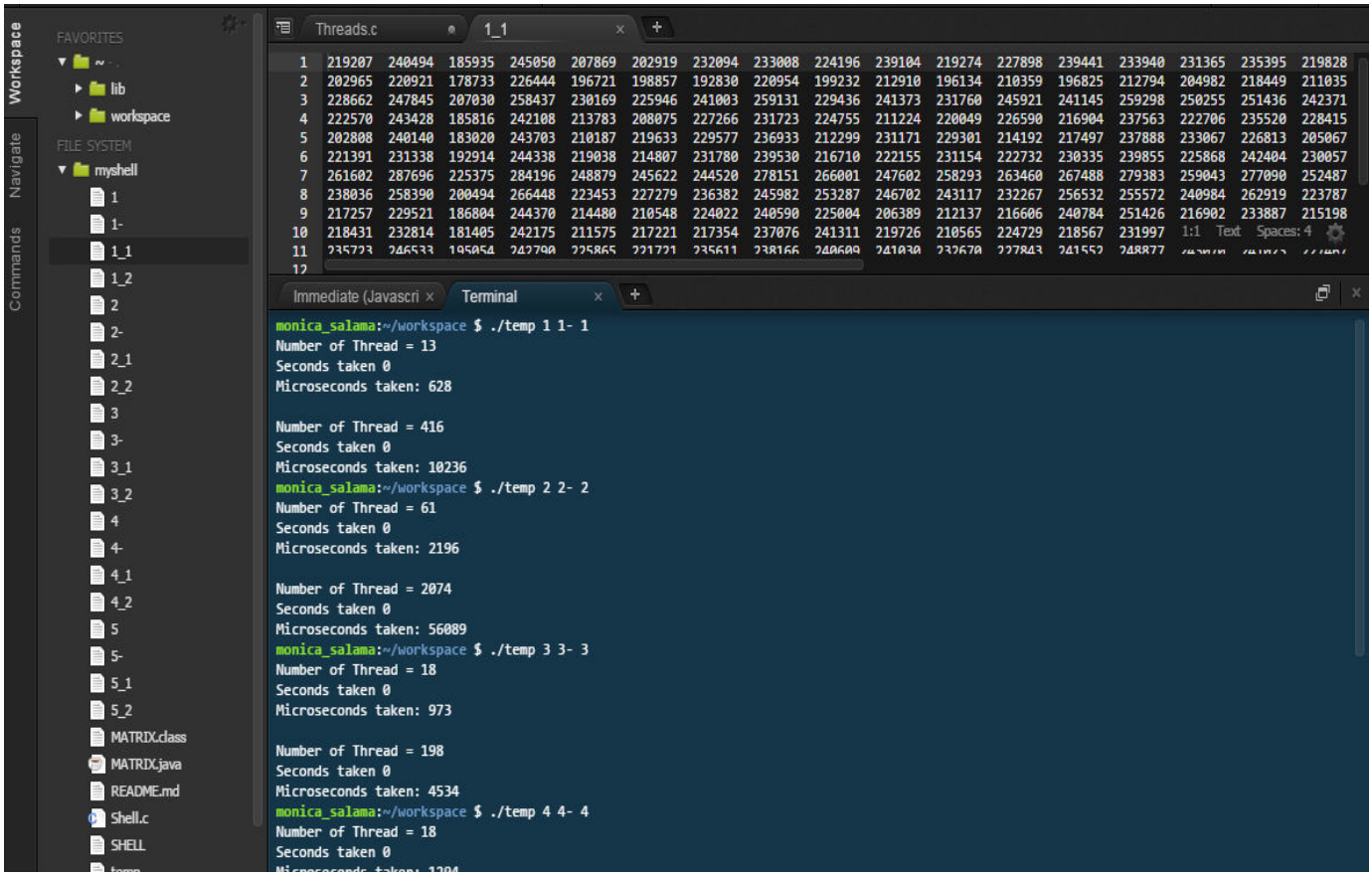
- make
- ./matMultp FirstMatrixFile SecondMatrixFile OutputFile

- ## Comparaison:

	(Row ,Element)	(Row ,Element)	(Row ,Element)	(Row ,Element)	(Row ,Element)
(row1 , col1) , (row2,col2)	(13,90),(90,32)	(61,79),(79,34)	(18,25),(25,11)	(18,41),(41,33)	(66,21),(21,27)
Time (s)	(0) , (0)	(0) , (0)	(0) , (0)	(0) , (0)	(0) , (0)
Time(micros)	(628),(10236)	(2196),(56089)	(973),(4534)	(1294) , (15365)	(1962),(51293)
Number Of Threads	(13) , (416)	(61),(2074)	(18) , (198)	(18) , (594)	(66),(1782)

	Method 1 : Row	Method 2 : Element
Speed	faster	slower
Number of Threads	less	more

- **Sample Runs:**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FAVORITES
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1_2
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3-
3_1
3_2
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4-
4_1
4_2
5
5-
5_1
5_2
MATRIX.class
MATRIX.java
README.md
Shell.c
SHELL
Threads.c
1_1
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4 222570 243428 185816 242108 213783 208075 227266 231723 224755 211224 220049 226590 216904 237563 222706 235520 228415
5 202808 240140 183020 243703 210187 219633 229577 236933 212299 231171 229301 214192 217497 237888 233067 226813 205067
6 221391 231338 192914 244338 219038 214807 231780 239530 216710 222155 231154 222732 230335 239855 225868 242404 230057
7 261602 287696 225375 284196 248879 245622 244520 278151 266001 247602 258293 263460 267488 279383 259043 277090 252487
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Immediate (Javascri
Terminal
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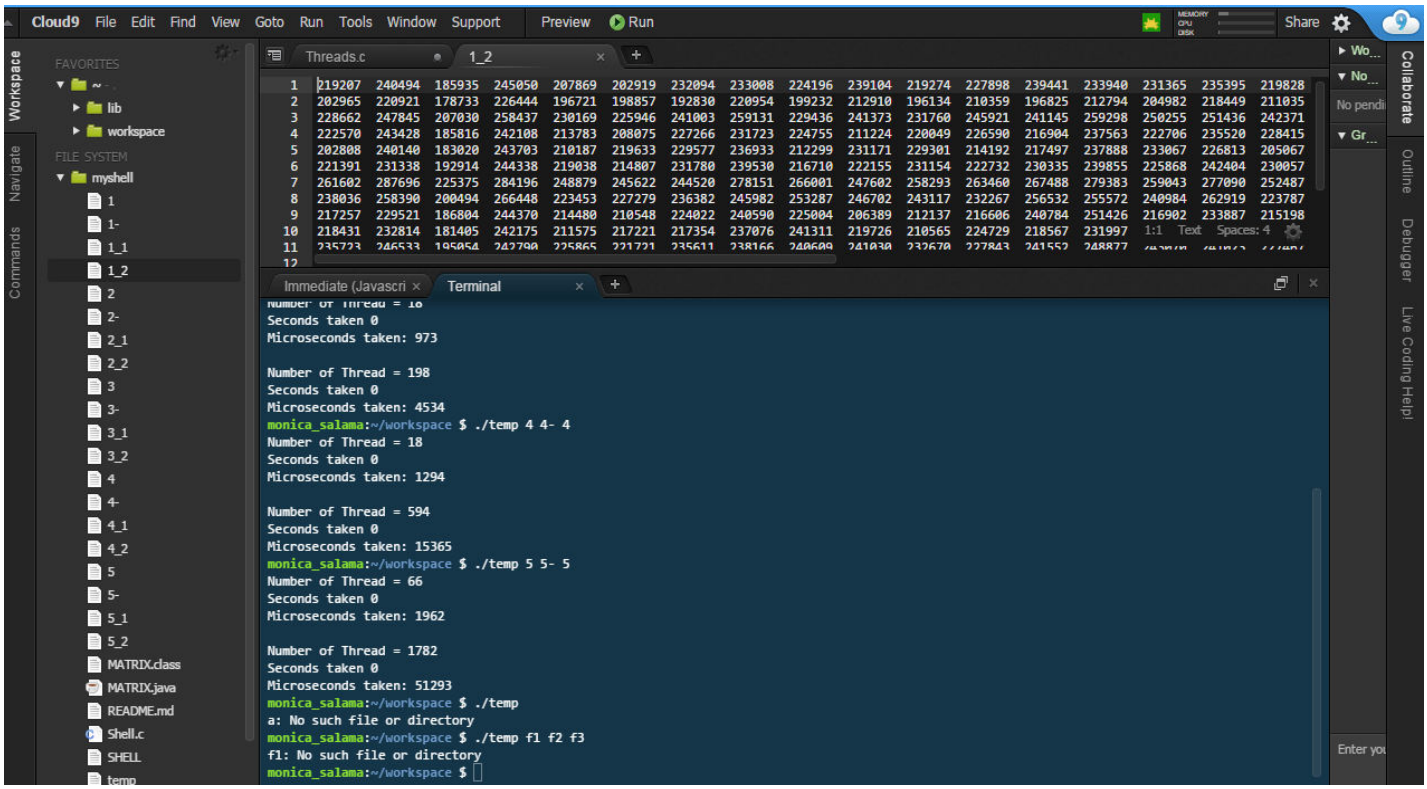
Number of Thread = 416
Seconds taken 0
Microseconds taken: 10236
monica_salama:~/workspace $ ./temp 2 2- 2
Number of Thread = 61
Seconds taken 0
Microseconds taken: 2196
Number of Thread = 2074
Seconds taken 0
Microseconds taken: 56089
monica_salama:~/workspace $ ./temp 3 3- 3
Number of Thread = 18
Seconds taken 0
Microseconds taken: 973
Number of Thread = 198
Seconds taken 0
Microseconds taken: 4534
monica_salama:~/workspace $ ./temp 4 4- 4
Number of Thread = 18
Seconds taken 0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3 228662 247845 207030 258437 230169 225946 241003 259131 229436 241373 231760 245921 241145 259298 250255 251436 242371
4 222570 243428 185816 242108 213783 208075 227266 231723 224755 211224 220049 226590 216904 237563 222706 235520 228415
5 202808 240140 183020 243703 210187 219633 229577 236933 212299 231171 229301 214192 217497 237888 233067 226813 205067
6 221391 231338 192914 244338 219038 214807 231780 239530 216710 222155 231154 222732 230335 239855 225868 242404 230057
7 261602 287696 225375 284196 248879 245622 244520 278151 266001 247602 258293 263460 267488 279383 259043 277090 252487
8 238036 258390 200494 266448 223453 227279 236382 245982 253287 246702 243117 232267 256532 255572 240984 262919 223787
9 217257 229521 186804 244370 214480 210548 224022 240590 225004 206389 212137 216606 240784 251426 216902 233887 215198
10 218431 232814 181405 242175 211575 217221 217354 237076 241311 219726 210565 224729 218567 231997
Immediate (Javascri
Terminal
Seconds taken 0
Microseconds taken: 973
Number of Thread = 198
Seconds taken 0
Microseconds taken: 4534
monica_salama:~/workspace $ ./temp 4 4- 4
Number of Thread = 18
Seconds taken 0
Microseconds taken: 1294
Number of Thread = 594
Seconds taken 0
Microseconds taken: 15365
monica_salama:~/workspace $ ./temp 5 5- 5
Number of Thread = 66
Seconds taken 0
Microseconds taken: 1962
Number of Thread = 1782
Seconds taken 0
Microseconds taken: 51293
monica_salama:~/workspace $ ./temp
a: No such file or directory
monica_salama:~/workspace $ ./temp f1 f2 f3
f1: No such file or directory
monica_salama:~/workspace $
FAVORITES
lib
workspace
FILE SYSTEM
myshell
1
1-
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1_2
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2-
2_1
2_2
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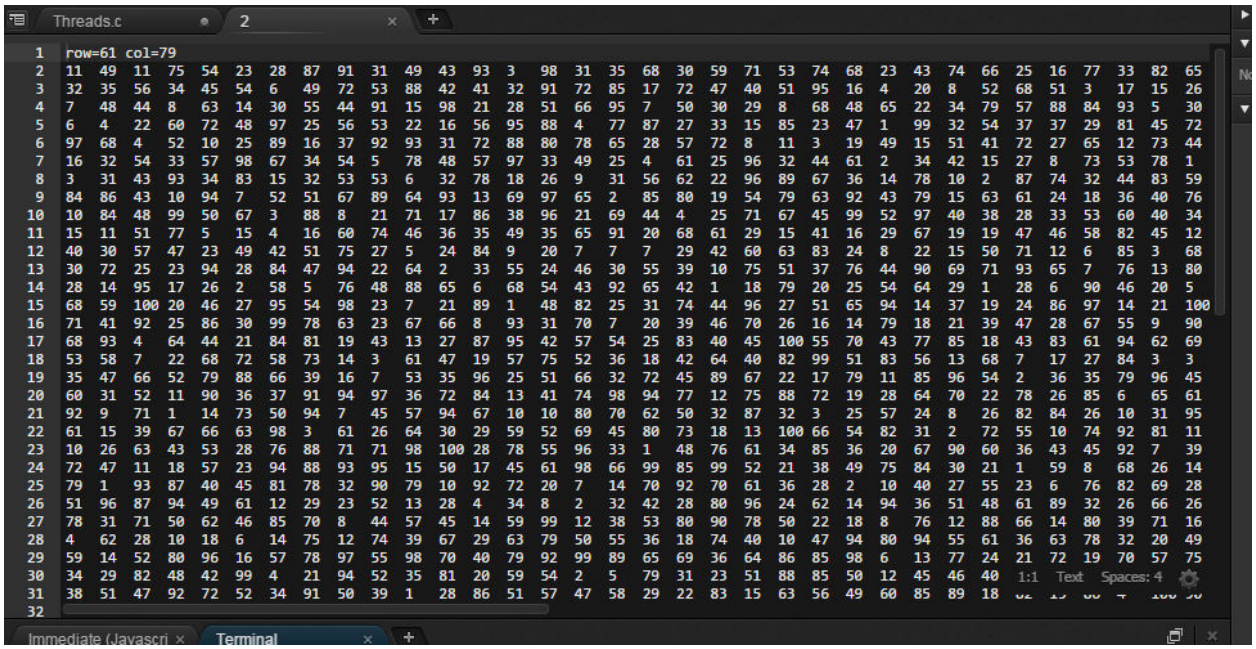
5_2
MATRIX.class
MATRIX.java
README.md
Shell.c
SHELL
temp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row=61 col=79
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2 32 35 56 34 45 54 6 49 72 53 88 42 41 32 91 72 85 17 72 47 40 51 95 16 4 20 8 52 68 51 3 17 15 26
3 7 48 44 8 63 14 30 55 44 91 15 98 21 28 51 66 95 7 50 30 29 8 68 48 65 22 34 79 57 88 84 93 5 30
4 6 4 22 60 72 48 97 25 56 53 22 16 56 95 88 4 77 87 27 33 15 85 23 47 1 99 32 54 37 37 29 81 45 72
5 97 68 4 52 10 25 89 16 37 92 93 31 72 88 80 78 65 28 57 72 8 11 3 19 49 15 51 41 72 27 65 12 73 44
6 16 32 54 33 57 98 67 34 54 5 78 48 57 97 33 49 25 4 61 25 96 32 44 61 2 34 42 15 27 8 73 53 78 1
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10 15 11 51 77 5 15 4 16 60 74 46 36 35 49 35 65 91 20 68 61 29 15 41 16 29 67 19 19 47 46 58 82 45 12
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12 30 72 25 23 94 28 84 47 94 22 64 2 33 55 24 46 30 55 39 10 75 51 37 76 44 90 69 71 93 65 7 76 13 80
13 28 14 95 17 26 2 58 5 76 48 88 65 6 68 54 43 92 65 42 1 18 79 20 25 54 64 29 1 28 6 90 46 20 5
14 68 59 100 20 46 27 95 54 98 23 7 21 89 1 48 82 25 31 74 44 96 27 51 65 94 14 37 19 24 86 97 14 21 100
15 71 41 92 25 86 30 99 78 63 23 67 66 8 93 31 70 7 20 39 46 70 26 16 14 79 18 21 39 47 28 67 55 9 90
16 68 93 4 64 44 21 84 81 19 43 13 27 87 95 42 57 54 25 83 40 45 100 55 70 43 77 85 18 43 83 61 94 62 69
17 53 58 7 22 68 72 58 73 14 3 61 47 19 57 75 52 36 18 42 64 40 82 99 51 83 56 13 68 7 17 27 84 3 3
18 35 47 66 52 79 88 66 39 16 7 53 35 96 25 51 66 32 72 45 89 67 22 17 79 11 85 96 54 2 36 35 79 96 45
19 60 31 52 11 90 36 37 91 94 97 36 72 84 13 41 74 98 94 77 12 75 88 72 19 28 64 70 22 78 26 85 6 65 61
20 92 9 71 1 14 73 50 94 7 45 57 94 67 10 10 80 70 62 50 32 87 32 3 25 57 24 8 26 82 84 26 10 31 95
21 61 15 39 67 66 63 98 3 61 26 64 30 29 59 52 69 45 80 73 18 13 100 66 54 82 31 2 72 55 10 74 92 81 11
22 10 26 63 43 53 28 76 88 71 71 98 100 28 78 55 96 33 1 48 76 61 34 85 36 20 67 90 60 36 43 45 92 7 39
23 72 47 11 18 57 23 94 88 93 95 15 50 17 45 61 98 66 99 85 99 52 21 38 49 75 84 30 21 1 59 8 68 26 14
24 79 1 93 87 40 45 81 78 32 90 79 10 92 72 20 7 14 70 92 70 61 36 28 2 10 40 27 55 23 6 76 82 69 28
25 51 96 87 94 49 61 12 29 23 52 13 28 4 34 8 2 32 42 28 80 96 24 62 14 94 36 51 48 61 89 32 26 66 26
26 78 31 71 50 62 46 85 70 8 44 57 45 14 59 99 12 38 53 80 90 78 50 22 18 8 76 12 88 66 14 80 39 71 16
27 4 62 28 10 18 6 14 75 12 74 39 67 29 63 79 50 55 36 18 74 40 10 47 94 80 94 55 61 36 63 78 32 20 49
28 59 14 52 80 96 16 57 78 97 55 98 70 40 79 92 99 89 65 69 36 64 86 85 98 6 13 77 24 21 72 19 70 57 75
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31
32
1:1 Text Spaces: 4
Immediate (Javascri
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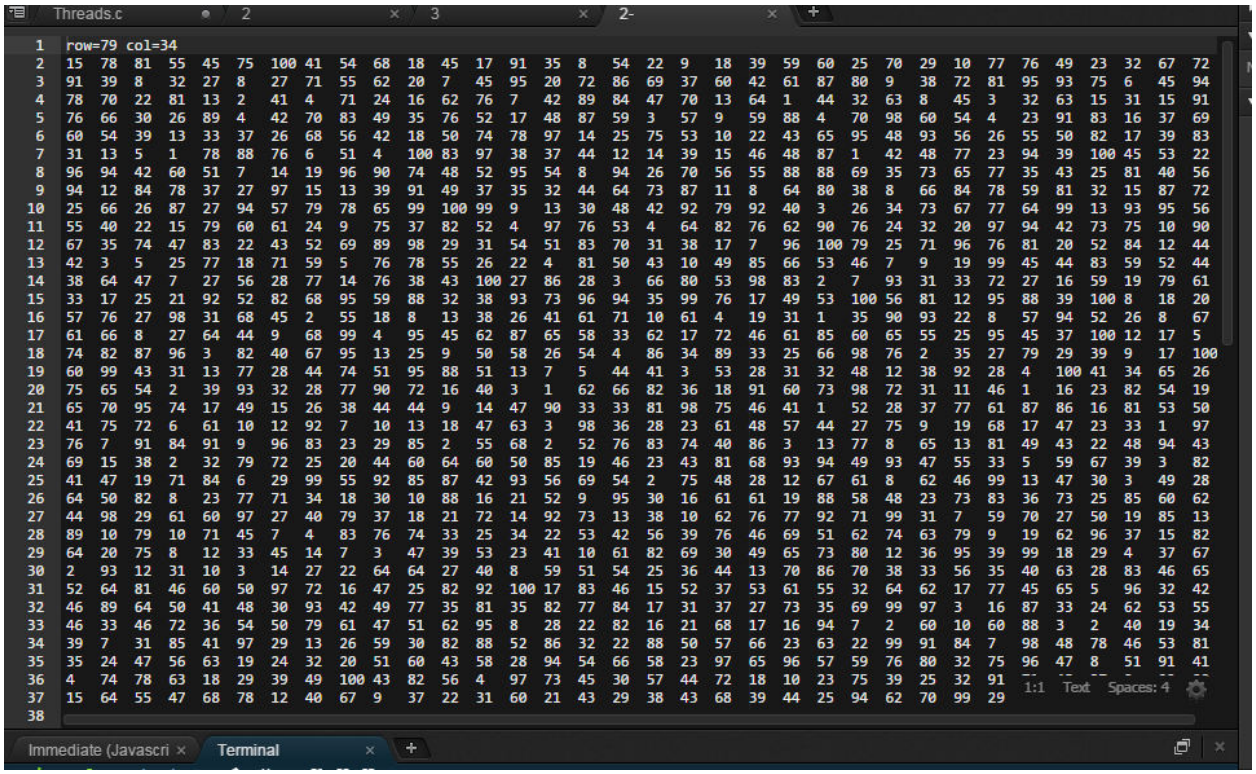

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3  91  39  8   32  27  8   27  71  55  62  20  7   45  95  20  72  86  69  37  60  42  61  87  80  9   38  72  81  95  93  75  6   45  94
4  78  70  22  81  13  2   41  4   71  24  16  62  76  7   42  89  84  47  70  13  64  1   44  32  63  8   45  3   32  63  15  31  15  91
5  76  66  30  26  89  4   42  70  83  49  35  76  52  17  48  87  59  3   57  9   59  88  4   70  98  60  54  4   23  91  83  16  37  69
6  60  54  39  13  33  37  26  68  56  42  18  50  74  78  97  14  25  75  53  10  22  43  65  95  48  93  56  26  55  50  82  17  39  83
7  31  13  5   1   78  88  76  6   51  4   100 83  97  38  37  44  12  14  39  15  46  48  87  1   42  48  77  23  94  39  100 45  53  22
8  96  94  42  60  51  7   14  19  96  90  74  48  52  95  54  8   94  26  70  56  55  88  88  69  35  73  65  77  35  43  25  81  40  56
9  94  12  84  78  37  27  97  15  13  39  91  49  37  35  32  44  64  73  87  11  8   64  80  38  8   66  84  78  59  81  32  15  87  72
10 25  66  26  87  27  94  57  79  78  65  99  100 99  9   13  30  48  42  92  79  92  40  3   26  34  73  67  77  64  99  13  93  95  56
11 55  40  22  15  79  60  61  24  9   75  37  82  52  4   97  76  53  4   64  82  76  62  90  76  24  32  20  97  94  42  73  75  10  90
12 67  35  74  47  83  22  43  52  69  89  98  29  31  54  51  83  70  31  38  17  7   96  100 79  25  71  96  76  81  20  52  84  12  44
13 42  3   5   25  77  18  71  59  5   76  78  55  26  22  4   81  50  43  10  49  85  66  53  46  7   9   19  99  45  44  83  59  52  44
14 38  64  47  7   27  56  28  77  14  76  38  43  100 27  86  28  3   66  80  53  98  83  2   7   93  31  33  72  27  16  59  19  79  61
15 33  17  25  21  92  52  82  68  95  59  88  32  38  93  73  96  94  35  99  76  17  49  53  100 56  81  12  95  88  39  100 8   18  20
16 57  76  27  98  31  68  45  2   55  18  8   13  38  26  41  61  71  10  61  4   19  31  1   35  90  93  22  8   57  94  52  26  8   67
17 61  66  8   27  64  44  9   68  99  4   95  45  62  87  65  58  33  62  17  72  46  61  85  60  65  55  25  95  45  37  100 12  17  5
18 74  82  87  96  3   82  40  67  95  13  25  9   50  58  26  54  4   86  34  89  33  25  66  98  76  2   35  27  79  29  39  9   17  100
19 60  99  43  31  13  77  28  44  74  51  95  88  51  13  7   5   44  41  3   53  28  31  32  48  12  38  92  28  4   100 41  34  65  26
20 75  65  54  2   39  93  32  28  77  90  72  16  40  3   1   62  66  82  36  18  91  60  73  98  72  31  11  46  1   16  23  82  54  19
21 65  70  95  74  17  49  15  26  38  44  44  9   14  47  90  33  33  81  98  75  46  41  1   52  28  37  77  61  87  86  16  81  53  50
22 41  75  72  6   61  10  12  92  7   10  13  18  47  63  3   98  36  28  23  61  48  57  44  27  75  9   19  68  17  47  23  33  1   97
23 76  7   91  84  91  9   96  83  23  29  85  2   55  68  2   52  76  83  74  40  86  3   13  77  8   65  13  81  49  43  22  48  94  43
24 69  15  38  2   32  79  72  25  20  44  60  64  60  50  85  19  46  23  43  81  68  93  94  49  93  47  55  33  5   59  67  39  3   82
25 41  47  19  71  84  6   29  99  55  92  85  87  42  93  56  69  54  2   75  48  28  12  67  61  8   62  46  99  13  47  30  3   49  28
26 64  50  82  8   23  77  71  34  18  30  10  88  16  21  52  9   95  30  16  61  61  19  88  58  48  23  73  83  36  73  25  85  60  62
27 44  98  29  61  60  97  27  40  79  37  18  21  72  14  92  73  13  38  10  62  76  77  92  71  99  31  7   59  70  27  50  19  85  13
28 89  10  79  10  71  45  7   4   83  76  74  33  25  34  22  53  42  56  39  76  46  69  51  62  74  63  79  9   19  62  96  37  15  82
29 64  20  75  8   12  33  45  14  7   3   47  39  53  23  41  10  61  82  69  30  49  65  73  80  12  36  95  39  99  18  29  4   37  67
30 2   93  12  31  10  3   14  27  22  64  64  27  40  8   59  51  54  25  36  44  13  70  86  70  38  33  56  35  40  63  28  83  46  65
31 52  64  81  46  60  50  97  72  16  47  25  82  92  100 17  83  46  15  52  37  53  61  55  32  64  62  17  77  45  65  5   96  32  42
32 46  89  64  50  41  48  30  93  42  49  77  35  81  35  82  77  84  17  31  37  27  73  35  69  99  97  3   16  87  33  24  62  53  55
33 46  33  46  72  36  54  50  79  61  47  51  62  95  8   28  22  82  16  21  68  17  16  94  7   2   60  10  60  88  3   2   40  19  34
34 39  7   31  85  41  97  29  13  26  59  30  82  88  52  86  32  22  88  50  57  66  23  63  22  99  91  84  7   98  48  78  46  53  81
35 35  24  47  56  63  19  24  32  20  51  60  43  58  28  94  54  66  58  23  97  65  96  57  59  76  80  32  75  96  47  8   51  91  41
36 4   74  78  63  18  29  39  49  100 43  82  56  4   97  73  45  30  57  44  72  18  10  23  75  39  25  32  91
37 15  64  55  47  68  78  12  40  67  9   37  22  31  60  21  43  29  38  43  68  39  44  25  94  62  70  99  29
38

1:1  Text  Spaces: 4

Immediate (Javascri    Terminal
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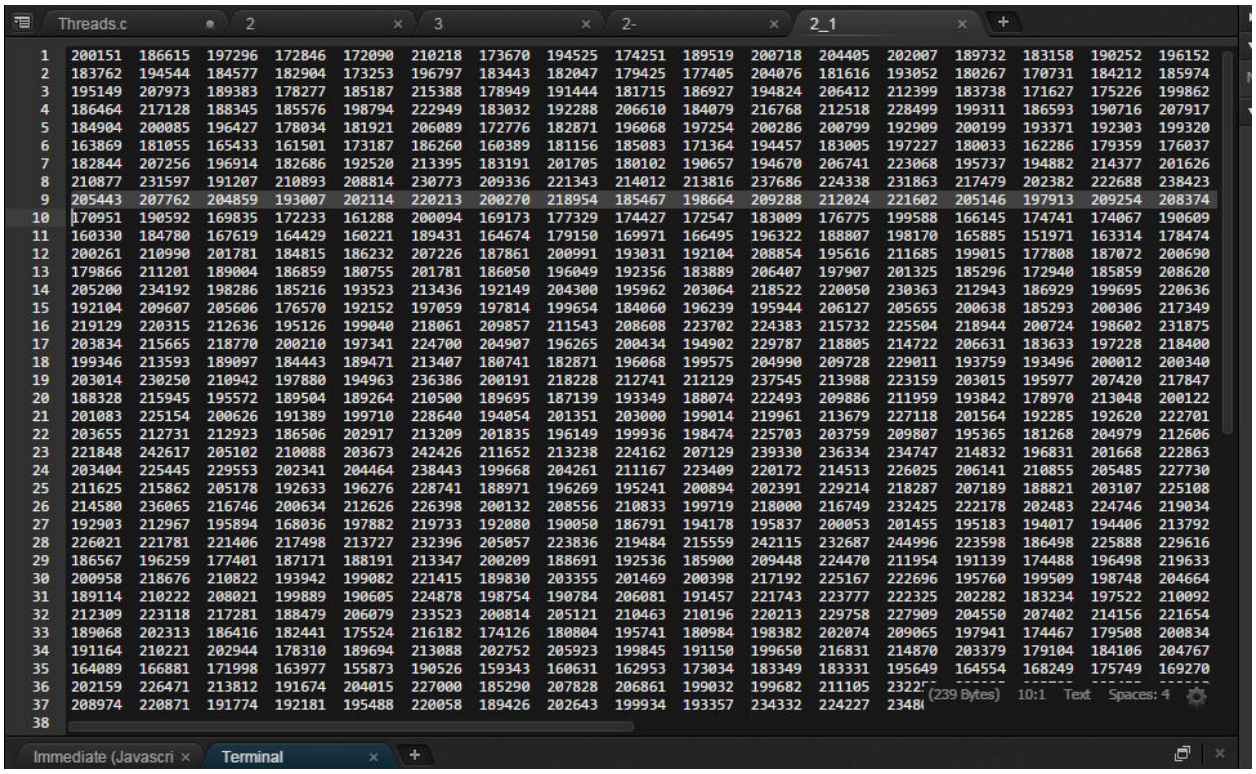

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2  183762  194544  184577  182904  173253  196797  183443  182047  179425  177405  204076  181616  193052  180267  170731  184212  185974
3  195149  207973  189383  178277  185187  215388  178949  191444  181715  186927  194824  206412  212399  183738  171627  175226  199862
4  186464  217128  188345  185576  198794  222949  183032  192288  206610  184079  216768  212518  228499  199311  186593  190716  207917
5  184904  200085  196427  178034  181921  206089  172776  182871  196068  197254  200286  200799  192909  200199  193371  192303  199320
6  163869  181055  165433  161501  173187  186260  160389  181156  185083  171364  194457  183005  197227  180033  162286  179359  176037
7  182844  207256  196914  182686  192520  213395  183191  201705  180102  190657  194670  206741  223068  195737  194882  214377  201626
8  210877  231597  191207  210893  208814  230773  209336  221343  214012  213816  237686  224338  231863  217479  202382  222688  238423
9  205443  207762  204859  193007  202114  220213  200270  218954  185467  198664  209288  212024  221602  205146  197913  209254  208374
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11 160330  184780  167619  164429  160221  189431  164674  179150  169971  166495  196322  188807  198170  165885  151971  163314  178474
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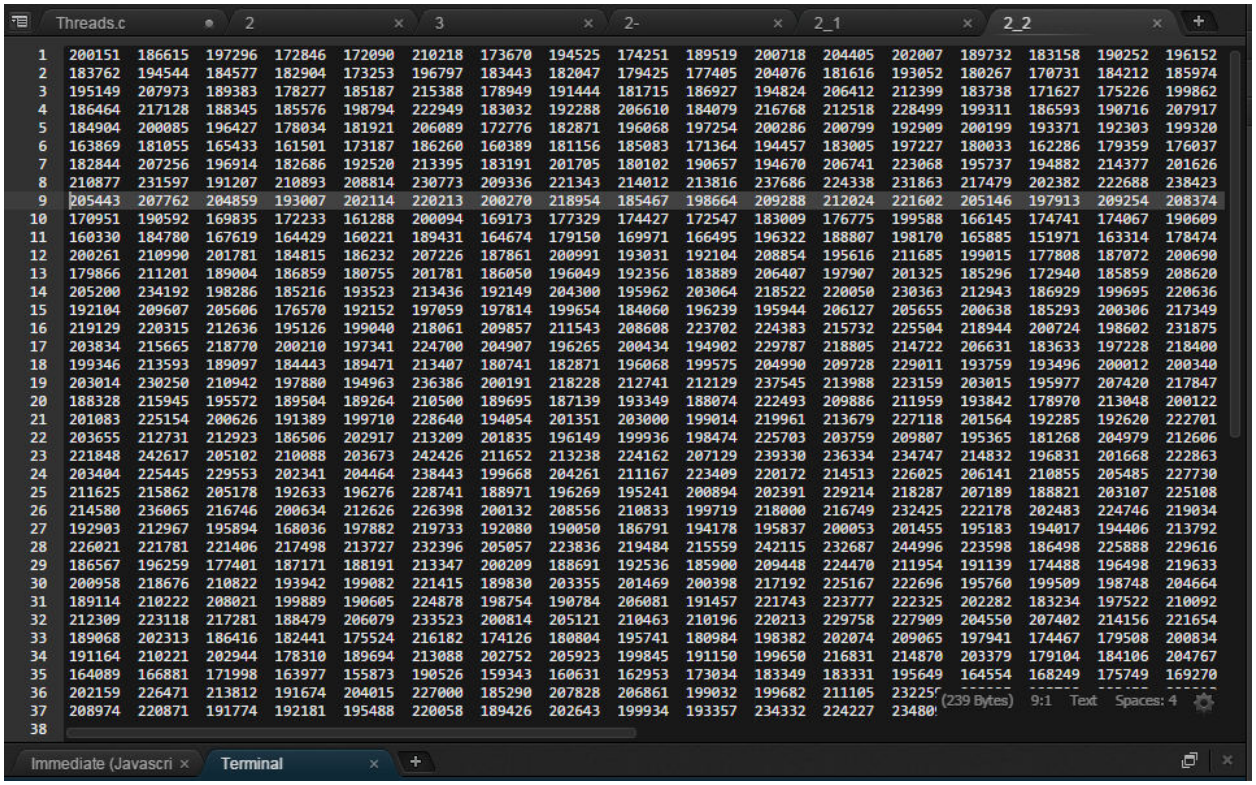
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