

Walchand College of Engineering, Sangli
Department of Computer Science and Engineering

Class: Final Year (Computer Science and Engineering)

Year: 2022-23

Semester: 1

Course: High Performance Computing Lab

Practical No. 1

Exam Seat No: 2019BTECS00064

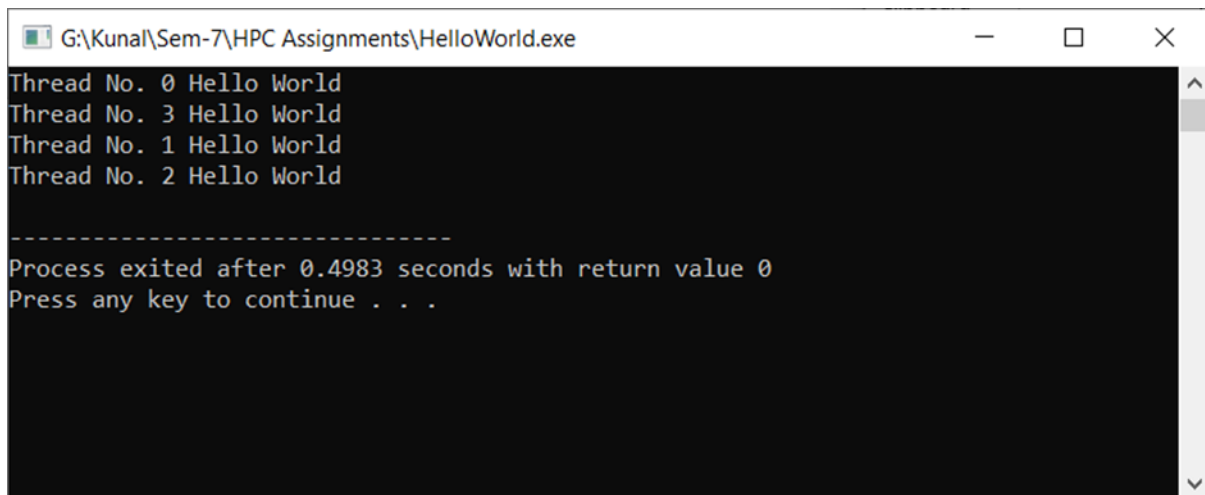
Name – Kunal Santosh Kadam

Title of practical: Use of OpenMP in C

Problem Statement 1:

Write a program that prints Hello World using OpenMP

Screenshot #:



```
G:\Kunal\Sem-7\HPC Assignments\HelloWorld.exe
Thread No. 0 Hello World
Thread No. 3 Hello World
Thread No. 1 Hello World
Thread No. 2 Hello World

-----
Process exited after 0.4983 seconds with return value 0
Press any key to continue . . .
```

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Information #:

```
#include<omp.h>
#include<bits/stdc++.h>

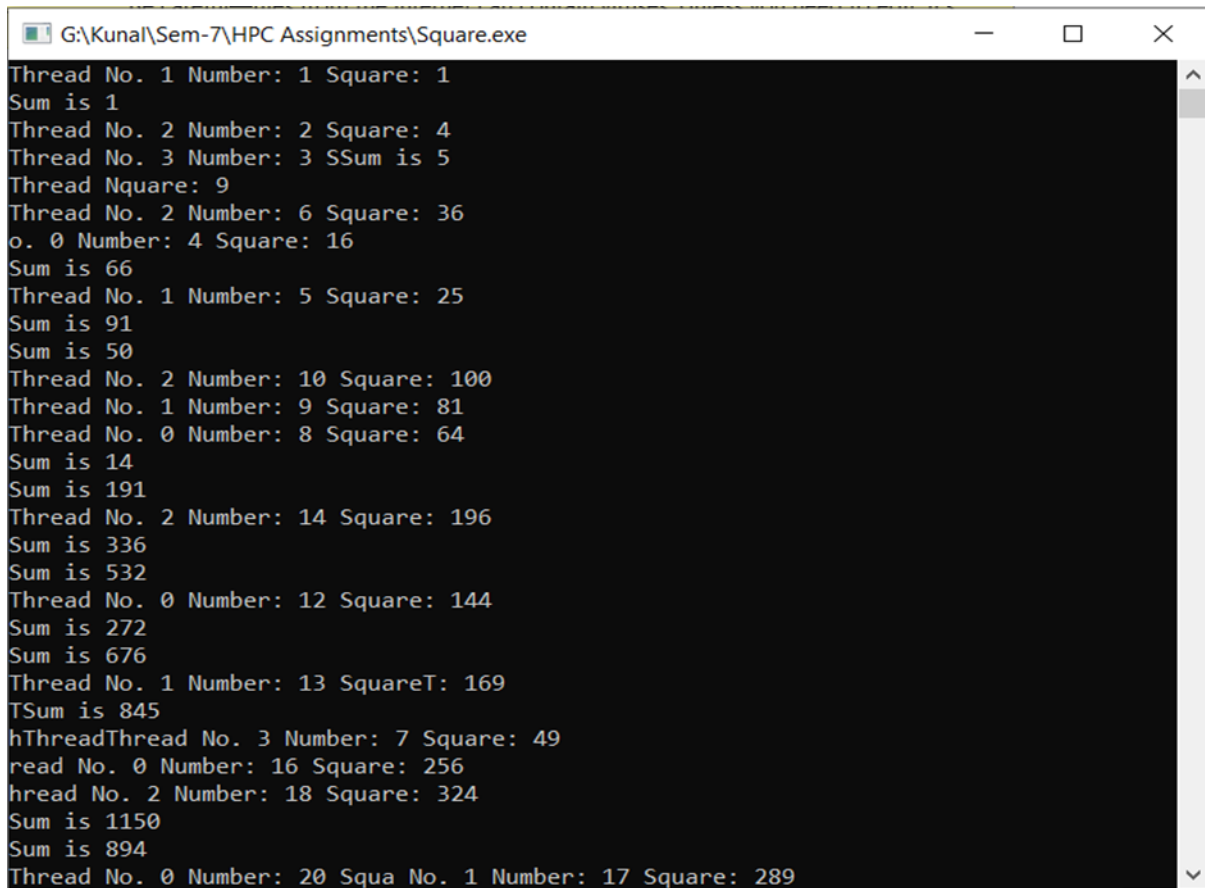
int main(int argc, char* argv[])
{
    #pragma omp parallel
    {
        printf("Thread No. %d Hello World\n",
omp_get_thread_num());
    }
    return 0;
}
```

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Problem Statement 2:

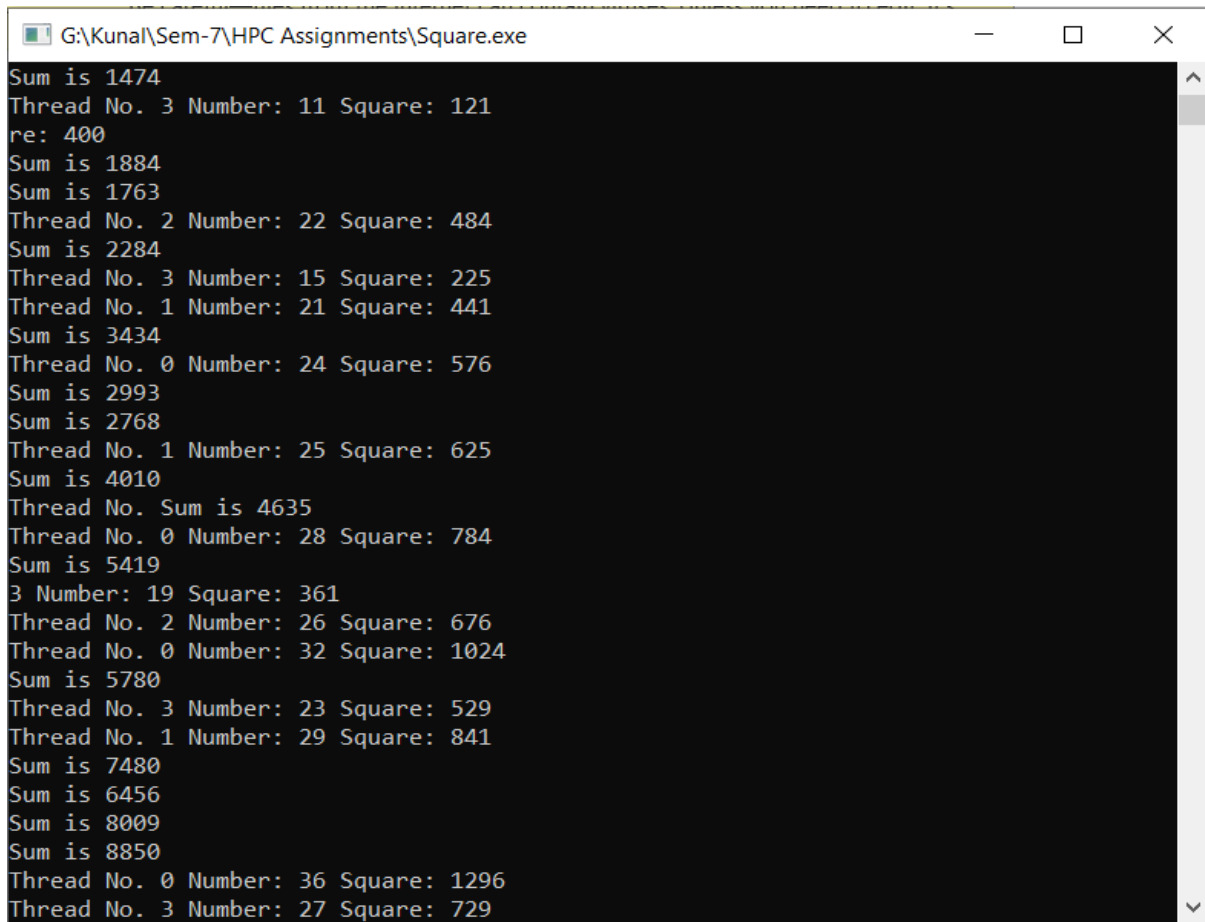
Write a program that print the square an their sum using the OpenMP

Screenshot #:



```
G:\Kunal\Sem-7\HPC Assignments\Square.exe
Thread No. 1 Number: 1 Square: 1
Sum is 1
Thread No. 2 Number: 2 Square: 4
Thread No. 3 Number: 3 SSum is 5
Thread Nquare: 9
Thread No. 2 Number: 6 Square: 36
o. 0 Number: 4 Square: 16
Sum is 66
Thread No. 1 Number: 5 Square: 25
Sum is 91
Sum is 50
Thread No. 2 Number: 10 Square: 100
Thread No. 1 Number: 9 Square: 81
Thread No. 0 Number: 8 Square: 64
Sum is 14
Sum is 191
Thread No. 2 Number: 14 Square: 196
Sum is 336
Sum is 532
Thread No. 0 Number: 12 Square: 144
Sum is 272
Sum is 676
Thread No. 1 Number: 13 SquareT: 169
TSum is 845
hThreadThread No. 3 Number: 7 Square: 49
read No. 0 Number: 16 Square: 256
hread No. 2 Number: 18 Square: 324
Sum is 1150
Sum is 894
Thread No. 0 Number: 20 Squa No. 1 Number: 17 Square: 289
```

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```
G:\Kunal\Sem-7\HPC Assignments\Square.exe
Sum is 1474
Thread No. 3 Number: 11 Square: 121
re: 400
Sum is 1884
Sum is 1763
Thread No. 2 Number: 22 Square: 484
Sum is 2284
Thread No. 3 Number: 15 Square: 225
Thread No. 1 Number: 21 Square: 441
Sum is 3434
Thread No. 0 Number: 24 Square: 576
Sum is 2993
Sum is 2768
Thread No. 1 Number: 25 Square: 625
Sum is 4010
Thread No. Sum is 4635
Thread No. 0 Number: 28 Square: 784
Sum is 5419
3 Number: 19 Square: 361
Thread No. 2 Number: 26 Square: 676
Thread No. 0 Number: 32 Square: 1024
Sum is 5780
Thread No. 3 Number: 23 Square: 529
Thread No. 1 Number: 29 Square: 841
Sum is 7480
Sum is 6456
Sum is 8009
Sum is 8850
Thread No. 0 Number: 36 Square: 1296
Thread No. 3 Number: 27 Square: 729
```

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```
G:\Kunal\Sem-7\HPC Assignments\Square.exe
Sum is 10875
Sum is 10146
Thread No. 0 Number: 40 Square: 1600 Thread No. 1 Number: 33 Square: 1089
Thread No. 3 Number: 31 Square: 961
Sum is 12925
Sum is 11964
0
Thread No. 1 Number: 37 Square: 1369
Sum is 15894
Thread No. 3 Number: 35 Square: 1225
Sum is 14525
Thread No. 2 Number: 30 Square: 900
Sum is 17119
Thread No. 0 Number: 44 Square: 1936
Thread No. 1 Number: 41 Square: 1681
Sum is 21636
Thread No. 3 Number: 39 Square: 1521
Sum is 19955
Sum is 18019
Thread No. 1 Number: 45 Square: 2025 Thread No. 2 Number: 34 Square: 1156
Sum is 23157
Thread No. 0 Number: 48 Square: 2304
: 2025
SSum is 26617
Thread No. 0 Number: 52 Sum is 28642
Square: 2704
um is 24313
Thread No. 1 Number: 50 Sum is 31346
Thread No. 0 Number: 56 Square: 3136
Sum is 34482 Thread No. 2 Number: 54 Square: 2916
```

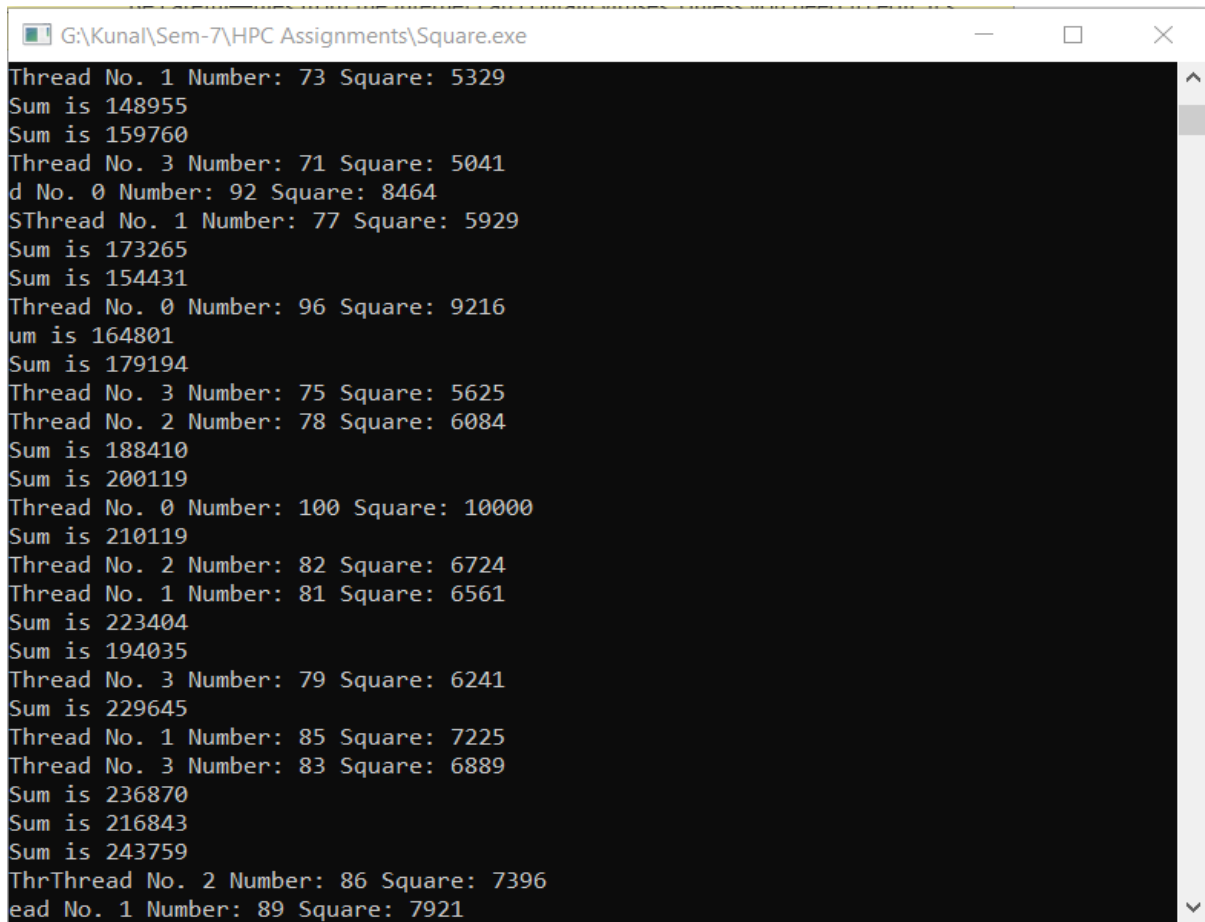
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```
G:\Kunal\Sem-7\HPC Assignments\Square.exe
Thread No. 0 Number: 38 Square: 1444
Sum is 38327
Thread No. 1 Number: 42 Square: 1764
Sum is 40176
Thread No. 2 Number: 46 Square: 2116
Sum is 43776
Thread No. 3 Number: 50 Square: 2500
Sum is 45540
Thread No. 0 Number: 54 Square: 2916
Sum is 46883
Thread No. 1 Number: 58 Square: 3364
Sum is 48247
Thread No. 2 Number: 62 Square: 3844
Sum is 49621
Thread No. 3 Number: 66 Square: 4356
Sum is 50995
Thread No. 0 Number: 70 Square: 4900
Sum is 52369
Thread No. 1 Number: 74 Square: 5476
Sum is 53743
Thread No. 2 Number: 78 Square: 6084
Sum is 55117
Thread No. 3 Number: 82 Square: 6724
Sum is 56491
Thread No. 0 Number: 86 Square: 7396
Sum is 57865
Thread No. 1 Number: 90 Square: 8100
Sum is 59239
Thread No. 2 Number: 94 Square: 8836
Sum is 60613
Thread No. 3 Number: 98 Square: 9604
Sum is 61987
Thread No. 0 Number: 102 Square: 10404
Sum is 63361
Thread No. 1 Number: 106 Square: 11236
Sum is 64735
Thread No. 2 Number: 110 Square: 12100
Sum is 66109
Thread No. 3 Number: 114 Square: 12996
Sum is 67483
Thread No. 0 Number: 118 Square: 13924
Sum is 68857
Thread No. 1 Number: 122 Square: 14884
Sum is 70231
Thread No. 2 Number: 126 Square: 15876
Sum is 71605
Thread No. 3 Number: 130 Square: 16900
Sum is 72979
Thread No. 0 Number: 134 Square: 17956
Sum is 74353
Thread No. 1 Number: 138 Square: 18936
Sum is 75727
Thread No. 2 Number: 142 Square: 20052
Sum is 77101
Thread No. 3 Number: 146 Square: 21196
Sum is 78475
Thread No. 0 Number: 150 Square: 22370
Sum is 79849
Thread No. 1 Number: 154 Square: 23524
Sum is 81223
Thread No. 2 Number: 158 Square: 24896
Sum is 82597
Thread No. 3 Number: 162 Square: 26300
Sum is 83971
Thread No. 0 Number: 166 Square: 27736
Sum is 85345
Thread No. 1 Number: 170 Square: 28900
Sum is 86719
Thread No. 2 Number: 174 Square: 30136
Sum is 88093
Thread No. 3 Number: 178 Square: 31504
Sum is 89467
Thread No. 0 Number: 182 Square: 32924
Sum is 90841
Thread No. 1 Number: 186 Square: 34356
Sum is 92215
Thread No. 2 Number: 190 Square: 35850
Sum is 93589
Thread No. 3 Number: 194 Square: 37384
Sum is 94963
Thread No. 0 Number: 198 Square: 38946
Sum is 96337
Thread No. 1 Number: 202 Square: 40532
Sum is 97711
Thread No. 2 Number: 206 Square: 42160
Sum is 99085
Thread No. 3 Number: 210 Square: 43820
Sum is 100459
Thread No. 0 Number: 214 Square: 45496
Sum is 101833
Thread No. 1 Number: 218 Square: 47284
Sum is 103207
Thread No. 2 Number: 222 Square: 48876
Sum is 104581
Thread No. 3 Number: 226 Square: 50500
Sum is 105955
Thread No. 0 Number: 230 Square: 52150
Sum is 107329
Thread No. 1 Number: 234 Square: 54636
Sum is 108703
Thread No. 2 Number: 238 Square: 56360
Sum is 110077
Thread No. 3 Number: 242 Square: 58076
Sum is 111451
Thread No. 0 Number: 246 Square: 60084
Sum is 112825
Thread No. 1 Number: 250 Square: 62100
Sum is 114229
Thread No. 2 Number: 254 Square: 64244
Sum is 115603
Thread No. 3 Number: 258 Square: 66408
Sum is 116977
Thread No. 0 Number: 262 Square: 68476
Sum is 118351
Thread No. 1 Number: 266 Square: 70556
Sum is 119725
Thread No. 2 Number: 270 Square: 72780
Sum is 121099
Thread No. 3 Number: 274 Square: 74996
Sum is 122473
Thread No. 0 Number: 278 Square: 77196
Sum is 123847
Thread No. 1 Number: 282 Square: 78964
Sum is 125221
Thread No. 2 Number: 286 Square: 81076
Sum is 126595
Thread No. 3 Number: 290 Square: 83220
Sum is 127969
Thread No. 0 Number: 294 Square: 85416
Sum is 129343
Thread No. 1 Number: 298 Square: 87664
Sum is 130717
Thread No. 2 Number: 302 Square: 89950
Sum is 132091
Thread No. 3 Number: 306 Square: 92276
Sum is 133465
Thread No. 0 Number: 310 Square: 94540
Sum is 134839
Thread No. 1 Number: 314 Square: 96916
Sum is 136213
Thread No. 2 Number: 318 Square: 99636
Sum is 137587
Thread No. 3 Number: 322 Square: 102390
Sum is 138961
Thread No. 0 Number: 326 Square: 104684
Sum is 140335
Thread No. 1 Number: 330 Square: 107400
Sum is 141709
Thread No. 2 Number: 334 Square: 110540
Sum is 143083
Thread No. 3 Number: 338 Square: 113704
Sum is 144457
Thread No. 0 Number: 342 Square: 115936
Sum is 145831
Thread No. 1 Number: 346 Square: 118036
Sum is 147205
Thread No. 2 Number: 350 Square: 121400
Sum is 148579
Thread No. 3 Number: 354 Square: 124796
Sum is 149953
Thread No. 0 Number: 358 Square: 126924
Sum is 151327
Thread No. 1 Number: 362 Square: 129196
Sum is 152701
Thread No. 2 Number: 366 Square: 132730
Sum is 154075
Thread No. 3 Number: 370 Square: 136290
Sum is 155449
Thread No. 0 Number: 374 Square: 138876
Sum is 156823
Thread No. 1 Number: 378 Square: 141864
Sum is 158197
Thread No. 2 Number: 382 Square: 144536
Sum is 159571
Thread No. 3 Number: 386 Square: 147232
Sum is 160945
Thread No. 0 Number: 390 Square: 149850
Sum is 162319
Thread No. 1 Number: 394 Square: 153524
Sum is 163693
Thread No. 2 Number: 398 Square: 156840
Sum is 165067
Thread No. 3 Number: 402 Square: 160180
Sum is 166441
Thread No. 0 Number: 406 Square: 162916
Sum is 167815
Thread No. 1 Number: 410 Square: 166900
Sum is 169219
Thread No. 2 Number: 414 Square: 170244
Sum is 170593
Thread No. 3 Number: 418 Square: 173610
Sum is 171967
Thread No. 0 Number: 422 Square: 175924
Sum is 173341
Thread No. 1 Number: 426 Square: 179916
Sum is 174715
Thread No. 2 Number: 430 Square: 183290
Sum is 176089
Thread No. 3 Number: 434 Square: 186616
Sum is 177463
Thread No. 0 Number: 438 Square: 188976
Sum is 178837
Thread No. 1 Number: 442 Square: 193964
Sum is 180211
Thread No. 2 Number: 446 Square: 197360
Sum is 181585
Thread No. 3 Number: 450 Square: 200700
Sum is 182959
Thread No. 0 Number: 454 Square: 203050
Sum is 184333
Thread No. 1 Number: 458 Square: 207236
Sum is 185707
Thread No. 2 Number: 462 Square: 210780
Sum is 187081
Thread No. 3 Number: 466 Square: 214276
Sum is 188455
Thread No. 0 Number: 470 Square: 216524
Sum is 189829
Thread No. 1 Number: 474 Square: 222564
Sum is 191203
Thread No. 2 Number: 478 Square: 226060
Sum is 192577
Thread No. 3 Number: 482 Square: 229560
Sum is 193951
Thread No. 0 Number: 486 Square: 231796
Sum is 195325
Thread No. 1 Number: 490 Square: 238000
Sum is 196729
Thread No. 2 Number: 494 Square: 241504
Sum is 198103
Thread No. 3 Number: 498 Square: 244960
Sum is 199477
Thread No. 0 Number: 502 Square: 247050
Sum is 200851
Thread No. 1 Number: 506 Square: 253436
Sum is 202225
Thread No. 2 Number: 510 Square: 256950
Sum is 203599
Thread No. 3 Number: 514 Square: 259916
Sum is 204973
Thread No. 0 Number: 518 Square: 262004
Sum is 206347
Thread No. 1 Number: 522 Square: 269944
Sum is 207721
Thread No. 2 Number: 526 Square: 263460
Sum is 209095
Thread No. 3 Number: 530 Square: 272800
Sum is 210469
Thread No. 0 Number: 534 Square: 274980
Sum is 211843
Thread No. 1 Number: 538 Square: 279984
Sum is 213217
Thread No. 2 Number: 542 Square: 283500
Sum is 214591
Thread No. 3 Number: 546 Square: 286956
Sum is 215965
Thread No. 0 Number: 550 Square: 277084
Sum is 217339
Thread No. 1 Number: 554 Square: 285000
Sum is 218713
Thread No. 2 Number: 558 Square: 288036
Sum is 220087
Thread No. 3 Number: 562 Square: 291060
Sum is 221461
Thread No. 0 Number: 566 Square: 293100
Sum is 222835
Thread No. 1 Number: 570 Square: 294036
Sum is 224209
Thread No. 2 Number: 574 Square: 297080
Sum is 225583
Thread No. 3 Number: 578 Square: 299996
Sum is 226957
Thread No. 0 Number: 582 Square: 295164
Sum is 228331
Thread No. 1 Number: 586 Square: 297064
Sum is 229705
Thread No. 2 Number: 590 Square: 299100
Sum is 231079
Thread No. 3 Number: 594 Square: 302000
Sum is 232453
Thread No. 0 Number: 598 Square: 297200
Sum is 233827
Thread No. 1 Number: 602 Square: 304036
Sum is 235201
Thread No. 2 Number: 606 Square: 307080
Sum is 236575
Thread No. 3 Number: 610 Square: 309996
Sum is 237949
Thread No. 0 Number: 614 Square: 309224
Sum is 239323
Thread No. 1 Number: 618 Square: 307064
Sum is 240717
Thread No. 2 Number: 622 Square: 309100
Sum is 242091
Thread No. 3 Number: 626 Square: 312036
Sum is 243465
Thread No. 0 Number: 630 Square: 310380
Sum is 244839
Thread No. 1 Number: 634 Square: 304036
Sum is 246213
Thread No. 2 Number: 638 Square: 306080
Sum is 247587
Thread No. 3 Number: 642 Square: 308956
Sum is 248961
Thread No. 0 Number: 646 Square: 310450
Sum is 250335
Thread No. 1 Number: 650 Square: 306000
Sum is 251709
Thread No. 2 Number: 654 Square: 308036
Sum is 253083
Thread No. 3 Number: 658 Square: 310800
Sum is 254457
Thread No. 0 Number: 662 Square: 310484
Sum is 255829
Thread No. 1 Number: 666 Square: 303984
Sum is 257203
Thread No. 2 Number: 670 Square: 305000
Sum is 258577
Thread No. 3 Number: 674 Square: 307836
Sum is 259951
Thread No. 0 Number: 678 Square: 310480
Sum is 261325
Thread No. 1 Number: 682 Square: 300960
Sum is 262729
Thread No. 2 Number: 686 Square: 302000
Sum is 264103
Thread No. 3 Number: 690 Square: 304680
Sum is 265477
Thread No. 0 Number: 694 Square: 310436
Sum is 266851
Thread No. 1 Number: 698 Square: 297984
Sum is 268217
Thread No. 2 Number: 702 Square: 298950
Sum is 269591
Thread No. 3 Number: 706 Square: 299800
Sum is 270965
Thread No. 0 Number: 710 Square: 310350
Sum is 272339
Thread No. 1 Number: 714 Square: 290960
Sum is 273713
Thread No. 2 Number: 718 Square: 291856
Sum is 275087
Thread No. 3 Number: 722 Square: 292600
Sum is 276461
Thread No. 0 Number: 726 Square: 310220
Sum is 277835
Thread No. 1 Number: 730 Square: 282000
Sum is 279209
Thread No. 2 Number: 734 Square: 282800
Sum is 280583
Thread No. 3 Number: 738 Square: 283400
Sum is 281957
Thread No. 0 Number: 742 Square: 310044
Sum is 283259
Thread No. 1 Number: 746 Square: 272960
Sum is 284633
Thread No. 2 Number: 750 Square: 273600
Sum is 285957
Thread No. 3 Number: 754 Square: 274000
Sum is 287331
Thread No. 0 Number: 758 Square: 309820
Sum is 288705
Thread No. 1 Number: 762 Square: 263400
Sum is 290017
Thread No. 2 Number: 766 Square: 263900
Sum is 291341
Thread No. 3 Number: 770 Square: 264100
Sum is 292715
Thread No. 0 Number: 774 Square: 309546
Sum is 294089
Thread No. 1 Number: 778 Square: 252760
Sum is 295463
Thread No. 2 Number: 782 Square: 253100
Sum is 296787
Thread No. 3 Number: 786 Square: 253600
Sum is 298161
Thread No. 0 Number: 790 Square: 309220
Sum is 299535
Thread No. 1 Number: 794 Square: 241200
Sum is 300841
Thread No. 2 Number: 798 Square: 241400
Sum is 302165
Thread No. 3 Number: 802 Square: 241600
Sum is 303539
Thread No. 0 Number: 806 Square: 308844
Sum is 304913
Thread No. 1 Number: 810 Square: 229760
Sum is 306217
Thread No. 2 Number: 814 Square: 229900
Sum is 307541
Thread No. 3 Number: 818 Square: 230000
Sum is 308915
Thread No. 0 Number: 822 Square: 308416
Sum is 310289
Thread No. 1 Number: 826 Square: 218000
Sum is 311593
Thread No. 2 Number: 830 Square: 218100
Sum is 312917
Thread No. 3 Number: 834 Square: 218200
Sum is 314291
Thread No. 0 Number: 838 Square: 307936
Sum is 315665
Thread No. 1 Number: 842 Square: 206000
Sum is 316977
Thread No. 2 Number: 846 Square: 206000
Sum is 318301
Thread No. 3 Number: 850 Square: 206000
Sum is 319675
Thread No. 0 Number: 854 Square: 307400
Sum is 321049
Thread No. 1 Number: 858 Square: 194000
Sum is 322363
Thread No. 2 Number: 862 Square: 193800
Sum is 323687
Thread No. 3 Number: 866 Square: 193600
Sum is 325061
Thread No. 0 Number: 870 Square: 306816
Sum is 326435
Thread No. 1 Number: 874 Square: 181600
Sum is 327753
Thread No. 2 Number: 878 Square: 181300
Sum is 329077
Thread No. 3 Number: 882 Square: 181000
Sum is 330451
Thread No. 0 Number: 886 Square: 306176
Sum is 331825
Thread No. 1 Number: 890 Square: 169000
Sum is 333137
Thread No. 2 Number: 894 Square: 168600
Sum is 334461
Thread No. 3 Number: 898 Square: 168200
Sum is 335835
Thread No. 0 Number: 902 Square: 305480
Sum is 337201
Thread No. 1 Number: 906 Square: 156000
Sum is 338517
Thread No. 2 Number: 910 Square: 155400
Sum is 339841
Thread No. 3 Number: 914 Square: 154800
Sum is 341215
Thread No. 0 Number: 918 Square: 304728
Sum is 342589
Thread No. 1 Number: 922 Square: 143600
Sum is 343841
Thread No. 2 Number: 926 Square: 142900
Sum is 345165
Thread No. 3 Number: 930 Square: 142200
Sum is 346539
Thread No. 0 Number: 934 Square: 303920
Sum is 347913
Thread No. 1 Number: 938 Square: 131200
Sum is 349217
Thread No. 2 Number: 942 Square: 130400
Sum is 350541
Thread No. 3 Number: 946 Square: 129600
Sum is 351915
Thread No. 0 Number: 950 Square: 303056
Sum is 353289
Thread No. 1 Number: 954 Square: 119000
Sum is 354563
Thread No. 2 Number: 958 Square: 118100
Sum is 355887
Thread No. 3 Number: 962 Square: 117200
Sum is 357261
Thread No. 0 Number: 966 Square: 302128
Sum is 358645
Thread No. 1 Number: 970 Square: 106400
Sum is 359941
Thread No. 2 Number: 974 Square: 105400
Sum is 361265
Thread No. 3 Number: 978 Square: 104400
Sum is 362639
Thread No. 0 Number: 982 Square: 301136
Sum is 364013
Thread No. 1 Number: 986 Square: 95200
Sum is 365317
Thread No. 2 Number: 990 Square: 94000
Sum is 366641
Thread No. 3 Number: 994 Square: 92800
Sum is 367965
Thread No. 0 Number: 998 Square: 300080
Sum is 369289
Thread No. 1 Number: 1002 Square: 84000
Sum is 370593
Thread No. 2 Number: 1006 Square: 82800
Sum is 371917
Thread No. 3 Number: 1010 Square: 81400
Sum is 373291
Thread No. 0 Number: 1014 Square: 298960
Sum is 374665
Thread No. 1 Number: 1018 Square: 73600
Sum is 375977
Thread No. 2 Number: 1022 Square: 72200
Sum is 377301
Thread No. 3 Number: 1026 Square: 70800
Sum is 378675
Thread No. 0 Number: 1030 Square: 297776
Sum is 380049
Thread No. 1 Number: 1034 Square: 65200
Sum is 381363
Thread No. 2 Number: 1038 Square: 63600
Sum is 382687
Thread No. 3 Number: 1042 Square: 62000
Sum is 384061
Thread No. 0 Number: 1046 Square: 296528
Sum is 385435
Thread No. 1 Number: 1050 Square: 59200
Sum is 386753
Thread No. 2 Number: 1054 Square: 57400
Sum is 388077
Thread No. 3 Number: 1058 Square: 55600
Sum is 389451
Thread No. 0 Number: 1062 Square: 295216
Sum is 390825
Thread No. 1 Number: 1066 Square: 52800
Sum is 392137
Thread No. 2 Number: 1070 Square: 50800
Sum is 393461
Thread No. 3 Number: 1074 Square: 48800
Sum is 394835
Thread No. 0 Number: 1078 Square: 293840
Sum is 396201
Thread No. 1 Number: 1082 Square: 46400
Sum is 397517
Thread No. 2 Number: 1086 Square: 44200
Sum is 398841
Thread No. 3 Number: 1090 Square: 42000
Sum is 400215
Thread No. 0 Number: 1094 Square: 292392
Sum is 401589
Thread No. 1 Number: 1098 Square: 40000
Sum is 402841
Thread No. 2 Number: 1102 Square: 37600
Sum is 404165
Thread No. 3 Number: 1106 Square: 35200
Sum is 405539
Thread No. 0 Number: 1110 Square: 290872
Sum is 406913
Thread No. 1 Number: 1114 Square: 36800
Sum is 408217
Thread No. 2 Number: 1118 Square: 34000
Sum is 409541
Thread No. 3 Number: 1122 Square: 31600
Sum is 410915
Thread No. 0 Number: 1126 Square: 289280
Sum is 412289
Thread No. 1 Number: 1130 Square: 33600
Sum is 413593
Thread No. 2 Number: 1134 Square: 30400
Sum is 414917
Thread No. 3 Number: 1138 Square: 28000
Sum is 416291
Thread No. 0 Number: 1142 Square: 287616
Sum is 417665
Thread No. 1 Number: 1146 Square: 29600
Sum is 418977
Thread No. 2 Number: 1150 Square: 26800
Sum is 420301
Thread No. 3 Number: 1154 Square: 24000
Sum is 421675
Thread No. 0 Number: 1158 Square: 285872
Sum is 423049
Thread No. 1 Number: 1162 Square: 26400
Sum is 424363
Thread No. 2 Number: 1166 Square: 23200
Sum is 425687
Thread No. 3 Number: 1170 Square: 20400
Sum is 427061
Thread No. 0 Number: 1174 Square: 284048
Sum is 428435
Thread No. 1 Number: 1178 Square: 23200
Sum is 429753
Thread No. 2 Number: 1182 Square: 19600
Sum is 431077
Thread No. 3 Number: 1186 Square: 16800
Sum is 432451
Thread No. 0 Number: 1190 Square: 282144
Sum is 433825
Thread No. 1 Number: 1194 Square: 20800
Sum is 435137
Thread No. 2 Number: 1198 Square: 16800
Sum is 436461
Thread No. 3 Number: 1202 Square: 13600
Sum is 437835
Thread No. 0 Number: 1206 Square: 280160
Sum is 439201
Thread No. 1 Number: 1210 Square: 18400
Sum is 440517
Thread No. 2 Number: 1214 Square: 13600
Sum is 441841
Thread No. 3 Number: 1218 Square: 10400
Sum is 443215
Thread No. 0 Number: 1222 Square: 278096
Sum is 444589
Thread No. 1 Number: 1226 Square: 15200
Sum is 445941
Thread No. 2 Number: 1230 Square: 9600
Sum is 447265
Thread No. 3 Number: 1234 Square: 6400
Sum is 448639
Thread No. 0 Number: 1238 Square: 275944
Sum is 450013
Thread No. 1 Number: 1242 Square: 11200
Sum is 451337
Thread No. 2 Number: 1246 Square: 5600
Sum is 452661
Thread No. 3 Number: 1250 Square: 2800
Sum is 454035
Thread No. 0 Number: 1254 Square: 273704
Sum is 455409
Thread No. 1 Number: 1258 Square: 8000
Sum is 456725
Thread No. 2 Number: 1262 Square: 0
Sum is 458049
Thread No. 3 Number: 1266 Square: 0
Sum is 459423
Thread No. 0 Number: 1270 Square: 271376
Sum is 460797
Thread No. 1 Number: 1274 Square: 2800
Sum is 462101
Thread No. 2 Number: 1278 Square: 0
Sum is 463425
Thread No. 3 Number: 1282 Square: 0
Sum is 464799
Thread No. 0 Number: 1286 Square: 268960
Sum is 466173
Thread No. 1 Number: 1290 Square: 0
Sum is 467497
Thread No. 2 Number: 1294 Square: 0
Sum is 468821
Thread No. 3 Number: 1298 Square: 0
Sum is 470195
Thread No. 0 Number: 1302 Square: 266464
Sum is 471569
Thread No. 1 Number: 1306 Square: 0
Sum is 472893
Thread No. 2 Number: 1310 Square: 0
Sum is 474217
Thread No. 3 Number: 1314 Square: 0
Sum is 475591
Thread No. 0 Number: 1318 Square: 263888
Sum is 476965
Thread No. 1 Number: 1322 Square: 0
Sum is 478289
Thread No. 2 Number: 1326 Square: 0
Sum is 479613
Thread No. 3 Number: 1330 Square: 0
Sum is 480987
Thread No. 0 Number: 1334 Square: 261232
Sum is 482361
Thread No. 1 Number: 1338 Square: 0
Sum is 483685
Thread No. 2 Number: 1342 Square: 0
Sum is 485009
Thread No. 3 Number: 1346 Square: 0
Sum is 486383
Thread No. 0 Number: 1350 Square: 258496
Sum is 487757
Thread No. 1 Number: 1354 Square: 0
Sum is 489081
Thread No. 2 Number: 1358 Square: 0
Sum is 490405
Thread No. 3 Number: 1362 Square: 0
Sum is 491779
Thread No. 0 Number: 1366 Square: 255680
Sum is 493153
Thread No. 1 Number: 1370 Square: 0
Sum is 494477
Thread No. 2 Number: 1374 Square: 0
Sum is 495801
Thread No. 3 Number: 1378 Square: 0
Sum is 497175
Thread No. 0 Number: 1382 Square: 252784
Sum is 498549
Thread No. 1 Number: 1386 Square: 0
Sum is 499873
Thread No. 2 Number: 1390 Square: 0
Sum is 501197
Thread No. 3 Number: 1394 Square: 0
Sum is 502571
Thread No. 0 Number: 1398 Square: 249808
Sum is 503945
Thread No. 1 Number: 1402 Square: 0
Sum is 505269
Thread No. 2 Number: 1406 Square: 0
Sum is 506593
Thread No. 3 Number: 1410 Square: 0
Sum is 507967
Thread No. 0 Number: 1414 Square: 246752
Sum is 509341
Thread No. 1 Number: 1418 Square: 0
Sum is 510665
Thread No. 2 Number: 1422 Square: 0
Sum is 511989
Thread No. 3 Number: 1426 Square: 0
Sum is 513363
Thread No. 0 Number: 1430 Square: 243616
Sum is 514737
Thread No. 1 Number: 1434 Square: 0
Sum is 516061
Thread No. 2 Number: 1438 Square: 0
Sum is 517385
Thread No. 3 Number: 1442 Square: 0
Sum is 518759
Thread No. 0 Number: 1446 Square: 240400
Sum is 520133
Thread No. 1 Number: 1450 Square: 0
Sum is 521457
Thread No. 2 Number: 1454 Square: 0
Sum is 522781
Thread No. 3 Number: 1458 Square: 0
Sum is 524155
Thread No. 0 Number: 1462 Square: 237104
Sum is 525529
Thread No. 1 Number: 1466 Square: 0
Sum is 526853
Thread No. 2 Number: 1470 Square: 0
Sum is 528177
Thread No. 3 Number: 1474 Square: 0
Sum is 529551
Thread No. 0 Number: 1478 Square: 233728
Sum is 530925
Thread No. 1 Number: 1482 Square: 0
Sum is 532249
Thread No. 2 Number: 1486 Square: 0
Sum is 533573
Thread No. 3 Number: 1490 Square: 0
Sum is 534947
Thread No. 0 Number: 1494 Square: 230272
Sum is 536321
Thread No. 1 Number: 1498 Square: 0
Sum is 537645
Thread No. 2 Number: 1502 Square: 0
Sum is 538969
Thread No. 3 Number: 1506 Square: 0
Sum is 540343
Thread No. 0 Number: 1510 Square: 226736
Sum is 541717
Thread No. 1 Number: 1514 Square: 0
Sum is 543041
Thread No. 2 Number: 1518 Square: 0
Sum is 544365
Thread No. 3 Number: 1522 Square: 0
Sum is 545739
Thread No. 0 Number: 1526 Square: 223120
Sum is 547113
Thread No. 1 Number: 1530 Square: 0
Sum is 548437
Thread No. 2 Number: 1534 Square: 0
Sum is 549761
Thread No. 3 Number: 1538 Square: 0
Sum is 551135
Thread No. 0 Number: 1542 Square: 219424
Sum is 552509
Thread No. 1 Number: 1546 Square: 0
Sum is 553833
Thread No. 2 Number: 1550 Square: 0
Sum is 555157
Thread No. 3 Number: 1554 Square: 0
Sum is 556531
Thread No. 0 Number: 1558 Square: 215648
Sum is 557905
Thread No. 1 Number: 1562 Square: 0
Sum is 559229
Thread No. 2 Number: 1566 Square: 0
Sum is 560553
Thread No. 3 Number: 1570 Square: 0
Sum is 561927
Thread No. 0 Number: 1574 Square: 211792
Sum is 563301
Thread No. 1 Number: 1578 Square: 0
Sum is 564625
Thread No. 2 Number: 1582 Square: 0
Sum is 565949
Thread No. 3 Number: 1586 Square: 0
Sum is 567323
Thread No. 0 Number: 1590 Square: 207856
Sum is 568697
Thread No. 1 Number: 1594 Square: 0
Sum is 570021
Thread No. 2 Number: 1598 Square: 0
Sum is 571345
Thread No. 3 Number: 1602 Square: 0
Sum is 572719
Thread No. 0 Number: 1606 Square: 203840
Sum is 574093
Thread No. 1 Number: 1610 Square: 0
Sum is 575417
Thread No. 2 Number: 1614 Square: 0
Sum is 576741
Thread No. 3 Number: 1618 Square: 0
Sum is 578115
Thread No. 0 Number: 1622 Square: 199744
Sum is 579489
Thread No. 1 Number: 1626 Square: 0
Sum is 580803
Thread No. 2 Number: 1630 Square: 0
Sum is 582127
Thread No. 3 Number: 1634 Square: 0
Sum is 583501
Thread No. 0 Number: 1638 Square: 195568
Sum is 584875
Thread No. 1 Number: 1642 Square: 0
Sum is 586197
Thread No. 2 Number: 1646 Square: 0
Sum is 587521
Thread No. 3 Number: 1650 Square: 0
Sum is 588895
Thread No. 0 Number: 1654 Square: 191312
Sum is 590269
Thread No. 1 Number: 1658 Square: 0
Sum is 591593
Thread No. 2 Number: 1662 Square: 0
Sum is 592917
Thread No. 3 Number: 1666 Square: 0
Sum is 594291
Thread No. 0 Number: 1670 Square: 186976
Sum is 595665
Thread No. 1 Number: 1674
```

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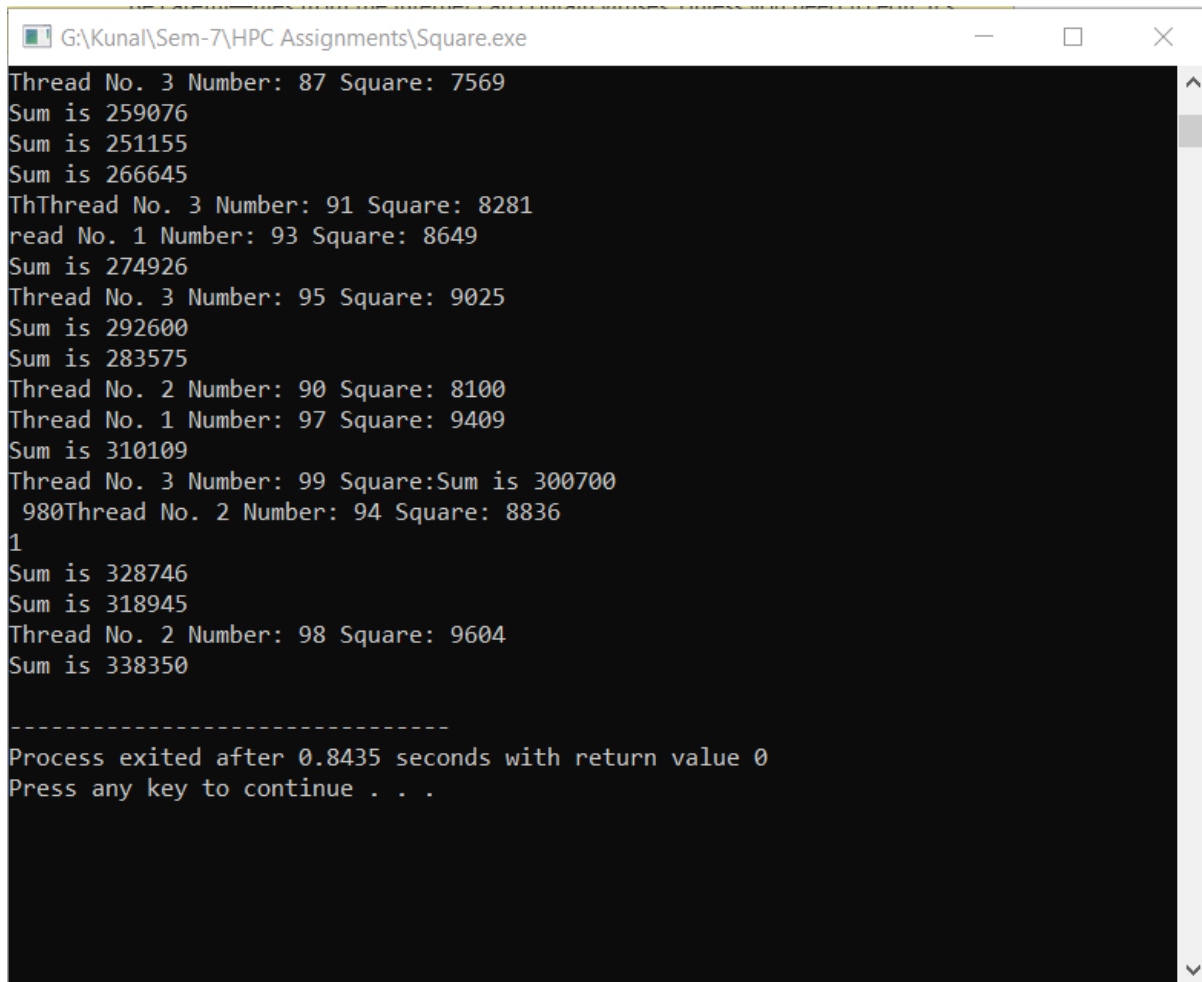
```
G:\Kunal\Sem-7\HPC Assignments\Square.exe
Sum is 80869
Thread No. 0 Number: 76 Square: 5776
Thread No. 2 Number: 58 Square: 3364
Sum is 90009
Thread No. 1 Number: 61 SqThread No. 3 Number: 59 Square: 3481
Thread No. 2 Number: 62 Square: 3844
Sum is 86645
quare: 3721
Thread No. 0 Number: 80 Square: 6400
SumSum is 97334
Sum is 101055
Thread No. 2 Number: 66 Square: 4356
Sum is 107455
Sum is 111811
Thread No. 0 Number: 84 Square: 7056
is 93490Sum is 118867
Thread No. 1 Number: 65 Square: 4225
Thread No. 2 Number: 70 Square: 4Sum is 123092
Thread No. 3 Number: 63 Square: 3969
Thread No. 0 Number: 88 Square: 7744
900
Thread No. 1 Number: 69 Square: 4761
Sum is 127061
Sum is 144466
Thread No. 3 Number: 67 SSSum is 134805
um is 139705
quare: 4489
ThreaThread No. 2 Number: 74 Square: 5476
```

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```
G:\Kunal\Sem-7\HPC Assignments\Square.exe
Thread No. 1 Number: 73 Square: 5329
Sum is 148955
Sum is 159760
Thread No. 3 Number: 71 Square: 5041
d No. 0 Number: 92 Square: 8464
SThread No. 1 Number: 77 Square: 5929
Sum is 173265
Sum is 154431
Thread No. 0 Number: 96 Square: 9216
um is 164801
Sum is 179194
Thread No. 3 Number: 75 Square: 5625
Thread No. 2 Number: 78 Square: 6084
Sum is 188410
Sum is 200119
Thread No. 0 Number: 100 Square: 10000
Sum is 210119
Thread No. 2 Number: 82 Square: 6724
Thread No. 1 Number: 81 Square: 6561
Sum is 223404
Sum is 194035
Thread No. 3 Number: 79 Square: 6241
Sum is 229645
Thread No. 1 Number: 85 Square: 7225
Thread No. 3 Number: 83 Square: 6889
Sum is 236870
Sum is 216843
Sum is 243759
ThrThread No. 2 Number: 86 Square: 7396
ead No. 1 Number: 89 Square: 7921
```


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```
G:\Kunal\Sem-7\HPC Assignments\Square.exe
Thread No. 3 Number: 87 Square: 7569
Sum is 259076
Sum is 251155
Sum is 266645
Thread No. 3 Number: 91 Square: 8281
read No. 1 Number: 93 Square: 8649
Sum is 274926
Thread No. 3 Number: 95 Square: 9025
Sum is 292600
Sum is 283575
Thread No. 2 Number: 90 Square: 8100
Thread No. 1 Number: 97 Square: 9409
Sum is 310109
Thread No. 3 Number: 99 Square: 9801
Sum is 300700
Thread No. 2 Number: 94 Square: 8836
Sum is 328746
Sum is 318945
Thread No. 2 Number: 98 Square: 9604
Sum is 338350

-----
Process exited after 0.8435 seconds with return value 0
Press any key to continue . . .
```

Information #:

```
#include<omp.h>
#include<bits/stdc++.h>

static int sum = 0;

int main()
{
    #pragma omp parallel
    {
        for(int i = 1;i <= 100;i++)
        {
            if(i % 4 == omp_get_thread_num())
```

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```
        {  
            printf("Thread No. %d Number: %d Square: %d  
\\n",omp_get_thread_num(), i , i*i);  
            sum += i*i;  
            printf("Sum is %d \\n" ,sum);  
        }  
    }  
}  
return 0;  
}
```

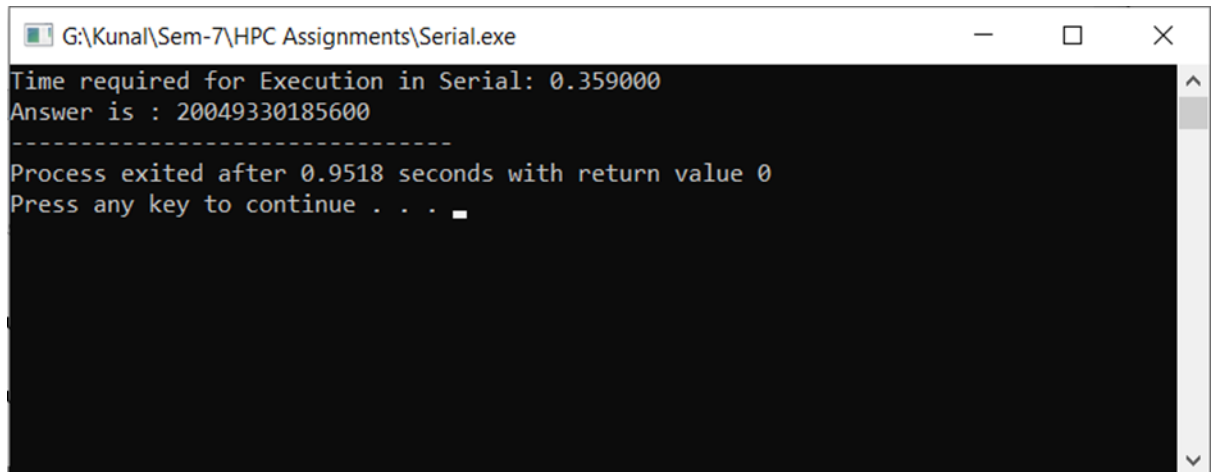
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Problem Statement 3:

Write a Serial and Parallel Program for Addition of Square and see the difference between the Speedup

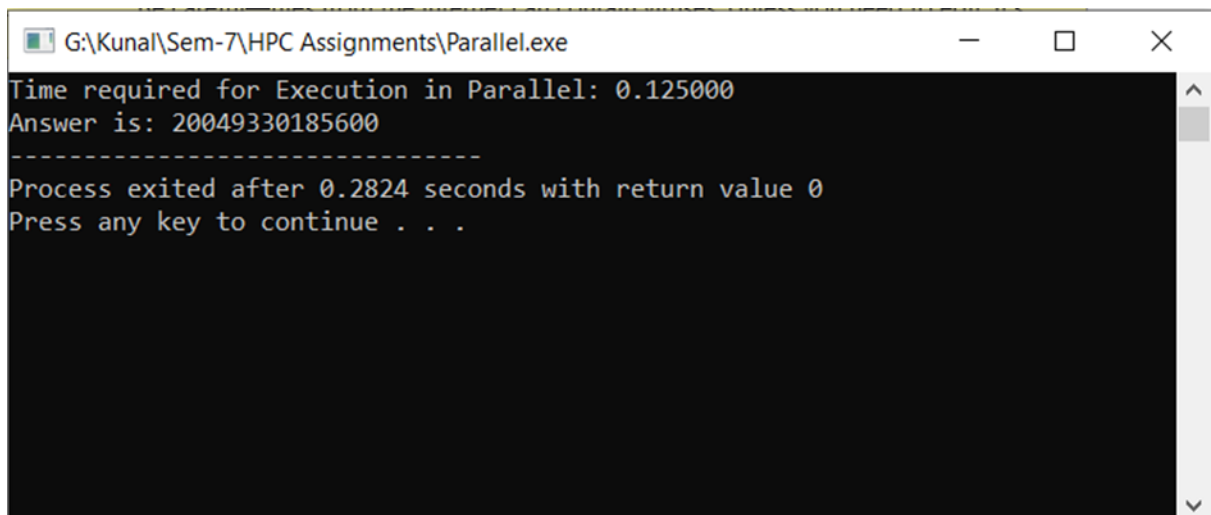
Screenshot #:

Serial Code:

A screenshot of a Windows command prompt window titled "G:\Kunal\Sem-7\HPC Assignments\Serial.exe". The output text is as follows:

```
Time required for Execution in Serial: 0.359000
Answer is : 20049330185600
-----
Process exited after 0.9518 seconds with return value 0
Press any key to continue . . .
```

Parallel Code:

A screenshot of a Windows command prompt window titled "G:\Kunal\Sem-7\HPC Assignments\Parallel.exe". The output text is as follows:

```
Time required for Execution in Parallel: 0.125000
Answer is: 20049330185600
-----
Process exited after 0.2824 seconds with return value 0
Press any key to continue . . .
```

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Information #:

Serial Code:

```
#include<bits/stdc++.h>
#include<omp.h>

int main()
{
    long long sum =0 ;

    double inTime = omp_get_wtime();

    int i;

    for(i=1;i <= 100000000;i++)
        sum += (i*i);

    double outTime = omp_get_wtime();

    double expcTime = outTime - inTime;

    printf("Time required for Execution in Serial: %f\n", expcTime);
    printf("Answer is : %lld",sum);

    return 0;
}
```

Parallel Code:

```
#include<bits/stdc++.h>
#include<omp.h>

int main()
{
    long long sum = 0;
```

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```
double getInTime = omp_get_wtime();

#pragma omp parallel for reduction(+ : sum)

for (int i=1; i <= 100000000; i++)
    sum += i*i;

double getOutTime = omp_get_wtime();

double exptTime= getOutTime - getInTime;

printf("Time required for Execution in Parallel: %f\n",
exptTime);

printf("Answer is: %lld", sum);

return 0;
}
```

Github Link:

<https://github.com/Kunalkadam179/HPC-Assignment/tree/main/Assignment%20-%201>