Workshop 01
Distributed Systems and Cloud Computing
5CS022
Naomi Thing
L5CG4

1. The following is a simple program that looks for prime numbers between 1 to 10000:

```c
#include <stdio.h>

int main(int argc, char **argv)

{

int i, c;

int nstart=1, nfinish=10000;

printf("%s : Prime numbers between %d and %d are :\n",

argv[0], nstart, nfinish);

for(i=nstart; i<=nfinish; i++)

{

for(c=2; c<=i-1; c++)

{

if ( i%c==0 )

break;

}

if ( c==i )

printf("%s : %d\n",argv[0], i);

}

return 0;

}
```

Convert it to MPI so that it can run with different numbers of processes including just

one process.

## Code:

```c
#include <stdio.h>


#include <mpi.h>
```

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```c
int main(int argc, char ** argv) {

 int i, c;

 MPI_Init(NULL, NULL);

 int rank, size, chunkSize, start, end, rem;

 MPI_Comm_rank(MPI_COMM_WORLD, & rank);

 MPI_Comm_size(MPI_COMM_WORLD, & size);


 rem = 10000 % size;

 chunkSize = 10000 / size;

 start = chunkSize * rank + 1;

 end = (rank + 1) * chunkSize;

 if (rank == size - 1) {

  if (rem > 0) {

    end += rem;

  }

 }

 for (i = start; i <= end; i++) {

  for (c = 2; c <= i - 1; c++) {

    if (i % c == 0)

      break;

  }

  if (c == i)

    printf("The processor %d is printing number: %d\n", rank, i);

 }

 MPI_Finalize();

}
```

## Output:

```
root@DESKTOP-1377DP0:~/DistributedSystem# vim six.c
root@DESKTOP-1377DP0:~/DistributedSystem# mpicc six.c -o six
root@DESKTOP-1377DP0:~/DistributedSystem# mpiexec -n 4 ./six
The processor 0 is printing number: 2
The processor 0 is printing number: 3
The processor 0 is printing number: 5
The processor 0 is printing number: 7
The processor 0 is printing number: 11
The processor 0 is printing number: 13
The processor 0 is printing number: 17
The processor 0 is printing number: 19
The processor 0 is printing number: 23
The processor 0 is printing number: 29
The processor 0 is printing number: 31
The processor 0 is printing number: 37
The processor 0 is printing number: 41
The processor 0 is printing number: 43
The processor 0 is printing number: 47
The processor 0 is printing number: 53
The processor 0 is printing number: 59
The processor 0 is printing number: 61
The processor 0 is printing number: 67
The processor 0 is printing number: 71
The processor 0 is printing number: 73
The processor 0 is printing number: 79
The processor 0 is printing number: 83
The processor 0 is printing number: 89
The processor 0 is printing number: 97
The processor 0 is printing number: 101
The processor 0 is printing number: 103
The processor 0 is printing number: 107
```

```
The processor 0 is printing number: 109
The processor 0 is printing number: 113
The processor 0 is printing number: 127
The processor 0 is printing number: 131
The processor 0 is printing number: 137
The processor 0 is printing number: 139
The processor 0 is printing number: 149
The processor 0 is printing number: 151
The processor 0 is printing number: 157
The processor 0 is printing number: 163
The processor 0 is printing number: 167
The processor 0 is printing number: 173
The processor 0 is printing number: 179
The processor 0 is printing number: 181
The processor 0 is printing number: 191
The processor 0 is printing number: 193
The processor 0 is printing number: 197
The processor 0 is printing number: 199
The processor 0 is printing number: 211
The processor 0 is printing number: 223
The processor 0 is printing number: 227
The processor 0 is printing number: 229
The processor 0 is printing number: 233
The processor 0 is printing number: 239
The processor 0 is printing number: 241
The processor 0 is printing number: 251
The processor 0 is printing number: 257
The processor 0 is printing number: 263
The processor 0 is printing number: 269
The processor 0 is printing number: 271
The processor 0 is printing number: 277
```

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```
The processor 0 is printing number: 281
The processor 0 is printing number: 283
The processor 0 is printing number: 293
The processor 0 is printing number: 307
The processor 0 is printing number: 311
The processor 0 is printing number: 313
The processor 0 is printing number: 317
The processor 0 is printing number: 331
The processor 0 is printing number: 337
The processor 0 is printing number: 347
The processor 0 is printing number: 349
The processor 0 is printing number: 353
The processor 0 is printing number: 359
The processor 0 is printing number: 367
The processor 0 is printing number: 373
The processor 0 is printing number: 379
The processor 0 is printing number: 383
The processor 0 is printing number: 389
The processor 0 is printing number: 397
The processor 0 is printing number: 401
The processor 0 is printing number: 409
The processor 0 is printing number: 419
The processor 0 is printing number: 421
The processor 0 is printing number: 431
The processor 0 is printing number: 433
The processor 0 is printing number: 439
The processor 0 is printing number: 443
The processor 0 is printing number: 449
The processor 0 is printing number: 457
The processor 0 is printing number: 461
The processor 0 is printing number: 463
```

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```
The processor 0 is printing number: 673
The processor 0 is printing number: 677
The processor 0 is printing number: 683
The processor 0 is printing number: 691
The processor 0 is printing number: 701
The processor 0 is printing number: 709
The processor 0 is printing number: 719
The processor 0 is printing number: 727
The processor 0 is printing number: 733
The processor 0 is printing number: 739
The processor 0 is printing number: 743
The processor 0 is printing number: 751
The processor 0 is printing number: 757
The processor 0 is printing number: 761
The processor 0 is printing number: 769
The processor 0 is printing number: 773
The processor 0 is printing number: 787
The processor 0 is printing number: 797
The processor 0 is printing number: 809
The processor 0 is printing number: 811
The processor 0 is printing number: 821
The processor 0 is printing number: 823
The processor 0 is printing number: 827
The processor 0 is printing number: 829
The processor 0 is printing number: 839
The processor 0 is printing number: 853
The processor 0 is printing number: 857
The processor 0 is printing number: 859
The processor 0 is printing number: 863
The processor 0 is printing number: 877
The processor 0 is printing number: 881
```

```
The processor 3 is printing number: 7639
The processor 3 is printing number: 7643
The processor 3 is printing number: 7649
The processor 3 is printing number: 7669
The processor 3 is printing number: 7673
The processor 3 is printing number: 7681
The processor 3 is printing number: 7687
The processor 3 is printing number: 7691
The processor 3 is printing number: 7699
The processor 3 is printing number: 7703
The processor 3 is printing number: 7717
The processor 1 is printing number: 3559
The processor 1 is printing number: 3571
The processor 1 is printing number: 3581
The processor 1 is printing number: 3583
The processor 1 is printing number: 3593
The processor 1 is printing number: 3607
The processor 2 is printing number: 5003
The processor 2 is printing number: 5009
The processor 2 is printing number: 5011
The processor 2 is printing number: 5021
The processor 2 is printing number: 5023
The processor 2 is printing number: 5039
The processor 2 is printing number: 5051
The processor 2 is printing number: 5059
The processor 2 is printing number: 5077
The processor 2 is printing number: 5081
The processor 2 is printing number: 5087
The processor 2 is printing number: 5099
The processor 2 is printing number: 5101
The processor 2 is printing number: 5107
```

```
The processor 3 is printing number: 7907
The processor 3 is printing number: 7919
The processor 3 is printing number: 7927
The processor 3 is printing number: 7933
The processor 3 is printing number: 7937
The processor 3 is printing number: 7949
The processor 3 is printing number: 7951
The processor 3 is printing number: 7963
The processor 3 is printing number: 7993
The processor 3 is printing number: 8009
The processor 3 is printing number: 8011
The processor 3 is printing number: 8017
The processor 3 is printing number: 8039
The processor 3 is printing number: 8053
The processor 3 is printing number: 8059
The processor 3 is printing number: 8069
The processor 1 is printing number: 3851
The processor 2 is printing number: 6823
The processor 1 is printing number: 3853
The processor 1 is printing number: 3863
The processor 1 is printing number: 3877
The processor 1 is printing number: 3881
The processor 1 is printing number: 3889
The processor 1 is printing number: 3907
The processor 2 is printing number: 6827
The processor 2 is printing number: 6829
The processor 2 is printing number: 6833
The processor 2 is printing number: 6841
The processor 2 is printing number: 6857
The processor 2 is printing number: 6863
The processor 2 is printing number: 6869
```

```
The processor 3 is printing number: 9643
The processor 3 is printing number: 9649
The processor 3 is printing number: 9661
The processor 3 is printing number: 9677
The processor 3 is printing number: 9679
The processor 3 is printing number: 9689
The processor 3 is printing number: 9697
The processor 3 is printing number: 9719
The processor 3 is printing number: 9721
The processor 3 is printing number: 9733
The processor 3 is printing number: 9739
The processor 3 is printing number: 9743
The processor 3 is printing number: 9749
The processor 3 is printing number: 9767
The processor 3 is printing number: 9769
The processor 3 is printing number: 9781
The processor 3 is printing number: 9787
The processor 3 is printing number: 9791
The processor 3 is printing number: 9803
The processor 3 is printing number: 9811
The processor 3 is printing number: 9817
The processor 3 is printing number: 9829
The processor 3 is printing number: 9833
The processor 3 is printing number: 9839
The processor 3 is printing number: 9851
The processor 3 is printing number: 9857
The processor 3 is printing number: 9859
The processor 3 is printing number: 9871
The processor 3 is printing number: 9883
The processor 3 is printing number: 9887
The processor 3 is printing number: 9901
```