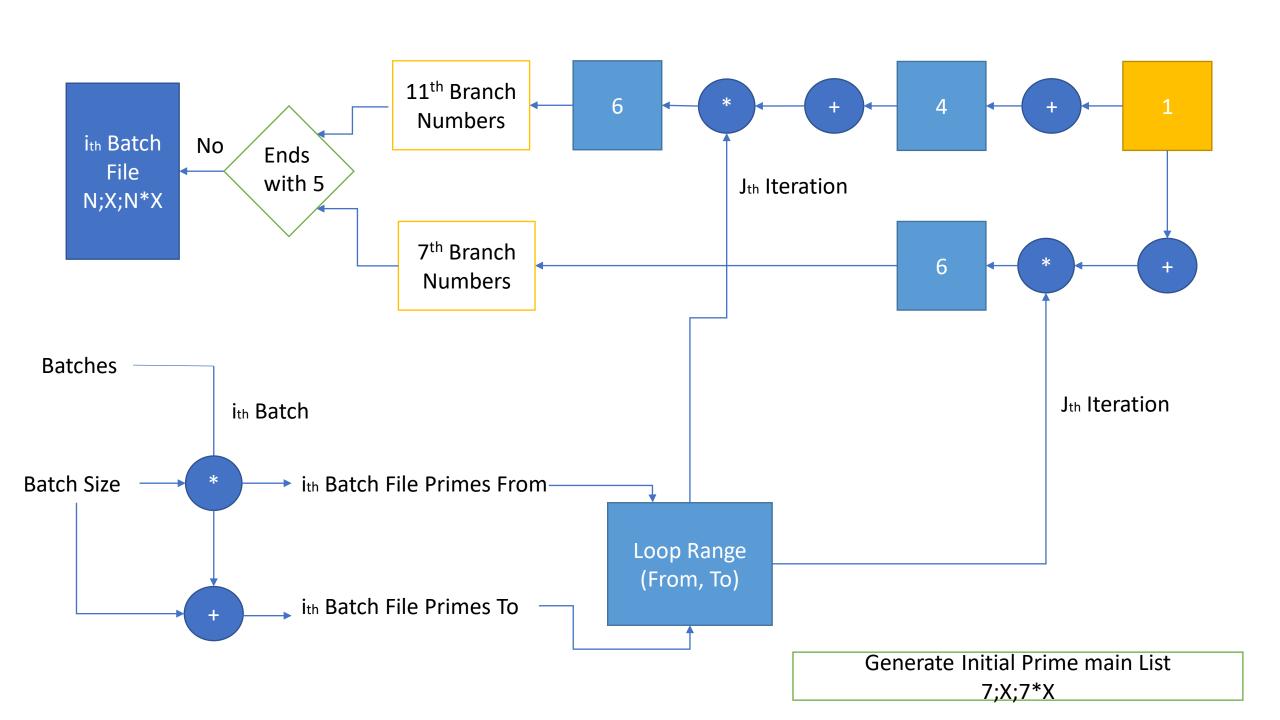# LLM Factorization

Using Addition and multiplication Only
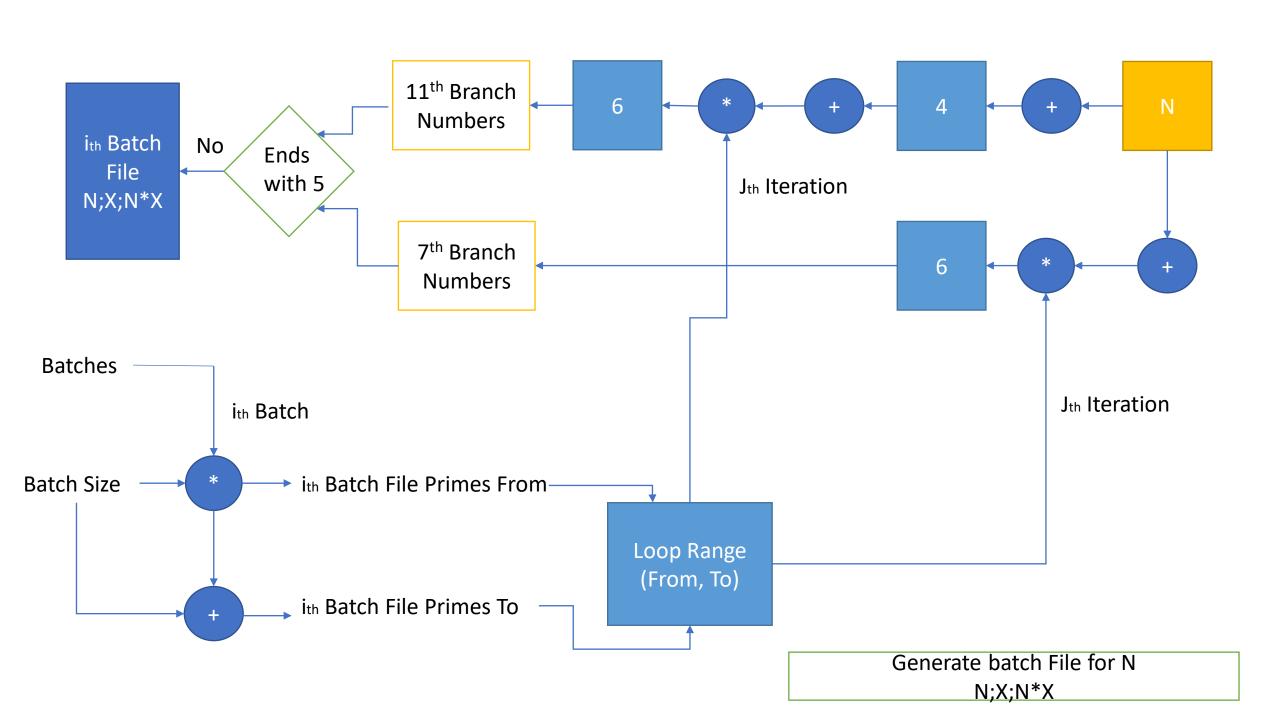
7th and 11th Branch Numbers are Prime numbers and composite Primes and perfect Nth powers
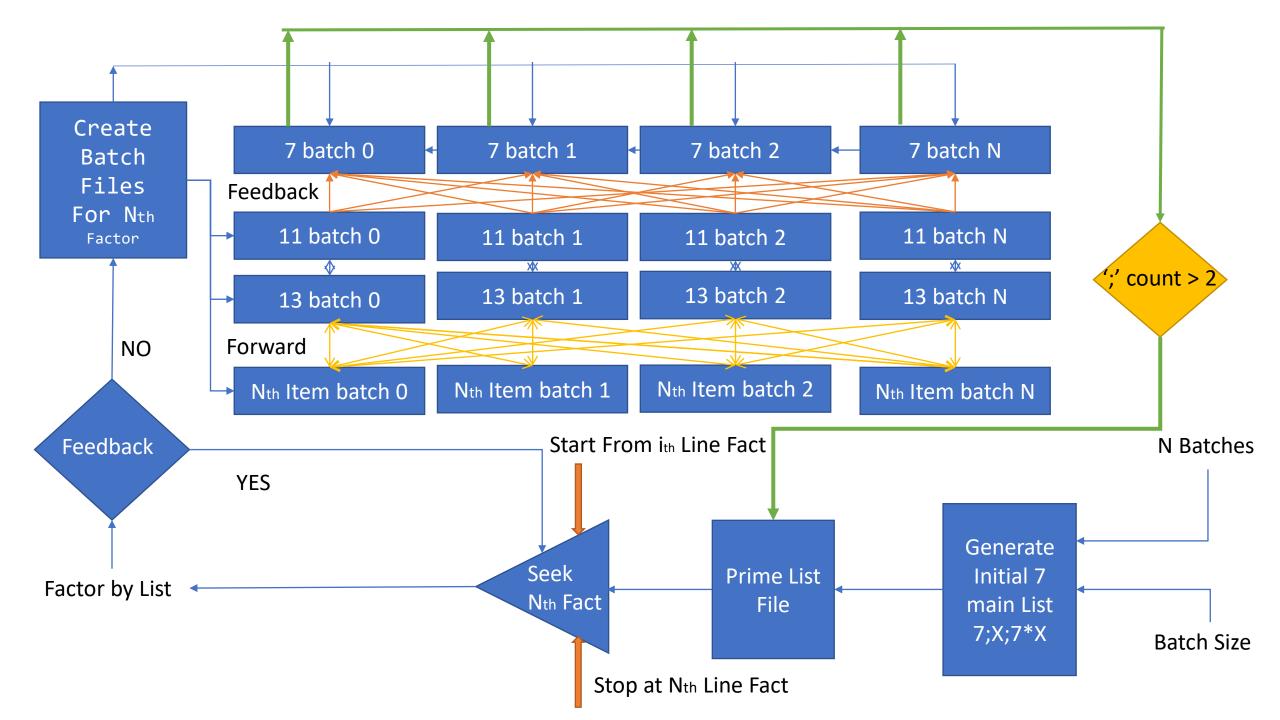
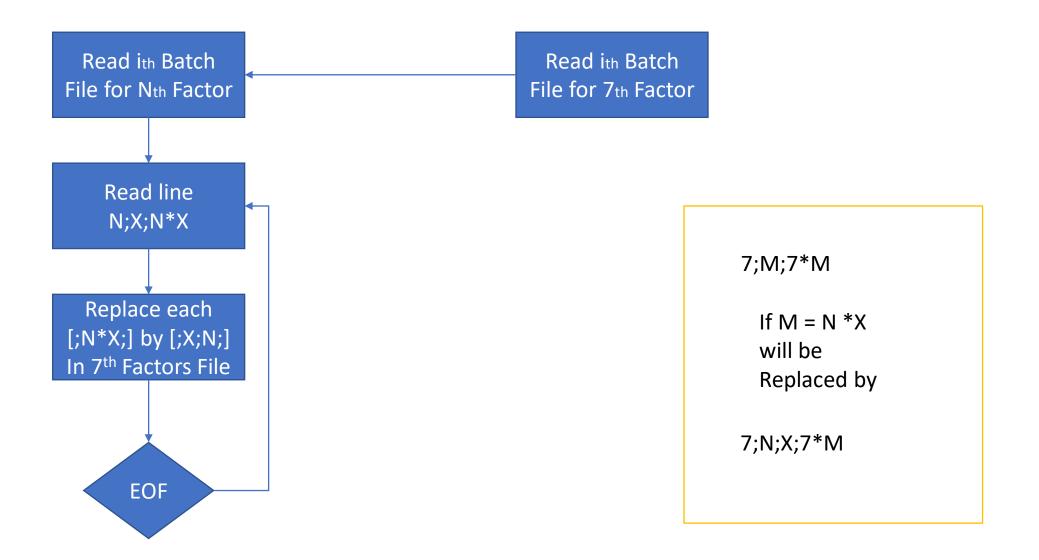| 7th Branch Numbers		11th Branch Numbers
1	1+10 =	11
7	7+10 =	17
13	13+10 =	23
19	19+10 =	29
25	25+10 =	35
31	31+10 =	41
37	37+10 =	47
43	43+10 =	53
49	49+10 =	59
55	55+10 =	65
61	61+10 =	71
67	67+10 =	77
73	73+10 =	83
79	79+10 =	89
85	85+10 =	95
...		....

LLM Factorization algorithm

- Generate primary list for Prime numbers and its composites using only natural number (1, 4, 6) and operations (+ , *)

- Using files in this algorithm gave us the ability to do Factorization in batches

- Final prime number files can be generated from the factor files using simple filter condition (count of ";")

- The algorithm can be executed based on Start and End conditions for an execution range.

- The algorithm execution time is liner based only on the batch size which is based on number of digits in the numbers and not based on any operations complexity.

- The algorithm not only calculating the factors between two ranges but also getting the unique prime numbers in between this range

- The algorithm can be executed using none consequence ranges or factors. Ex.[7,11,53,101]

- The algorithm include statistical output log categorized by each factor and each batch file.

- Algorithm execution time includes getting the full factorization for all numbers between Start and End condition and including an statistical execution run log and final prime number list and final statistical log output.

- All Nth Prime files are not changed only 7th Prime files will have the factors.

i_th Batch File N;X;N*X

No

Ends with 5

11th Branch Numbers

6

*

+

4

+

1

J_th Iteration

7th Branch Numbers

6

*

+

Batches

i_th Batch

Batch Size

*

i_th Batch File Primes From

J_th Iteration

Loop Range (From, To)

+

i_th Batch File Primes To

Generate Initial Prime main List 7;X;7*X

```
                                                        ┌──────────────┐                  ┌───┐        ┌───┐
                                           ┌──────────┐ │ 11ᵗʰ Branch  │ ┌───┐   ( * )   ( + )  ┌───┐  ( + )  ┌───┐
                                           │          │ │   Numbers    │ │ 6 │ ←       ←        │ 4 │ ←       │ N │
┌──────────┐            ◇            No  ←─┤          │ └──────────────┘ └───┘            └───┘        └───┘
│ iₜₕ Batch│       ◇  Ends   ◇ ←──────────┘          │
│   File   │ ←─── ◇  with 5  ◇                        │                                    Jₜₕ Iteration
│  N;X;N*X │       ◇         ◇
└──────────┘            ◇                 ┌──────────────┐                  ┌───┐   ( * )          ( + )
                                          │  7ᵗʰ Branch  │                  │ 6 │ ←              ←
                                          │   Numbers    │ ←────────────────└───┘
                                          └──────────────┘
```

11ᵗʰ Branch Numbers

7ᵗʰ Branch Numbers

Ends with 5 — No

iₜₕ Batch File N;X;N*X

N

Jₜₕ Iteration

Batches

iₜₕ Batch

Batch Size → (*) → iₜₕ Batch File Primes From

(+) → iₜₕ Batch File Primes To

Loop Range (From, To)

Jₜₕ Iteration

Generate batch File for N
N;X;N*X

```
┌─────────────────────┐                    ┌─────────────────────┐
│   Read ith Batch    │ ←───────────────── │   Read ith Batch    │
│  File for Nth Factor │                    │ File for 7th Factor  │
└─────────────────────┘                    └─────────────────────┘
          │
          ▼
┌─────────────────────┐
│     Read line       │ ←────────────┐
│     N;X;N*X         │              │
└─────────────────────┘              │
          │                          │
          ▼                          │
┌─────────────────────┐              │
│   Replace each      │              │
│  [;N*X;] by [;X;N;] │              │
│  In 7th Factors File│              │
└─────────────────────┘              │
          │                          │
          ▼                          │
        ╱────╲                       │
       ╱      ╲                      │
      ╱  EOF   ╲ ─────────────────────┘
       ╲      ╱
        ╲────╱
```

┌──────────────────────────────┐
│   │
│   7;M;7*M   │
│   │
│   If M = N *X   │
│   will be   │
│   Replaced by   │
│   │
│   7;N;X;7*M   │
│   │
└──────────────────────────────┘

┌──┐
│   Feedback from Nth Files Into 7th files   │
└──┘

A;B;C;D;E = A*B*C*D = E

```
1   7;7;49
2   7;11;77
3   7;13;91
4   7;17;119
5   7;19;133
6   7;23;161
7   7;29;203
8   7;31;217
9   7;37;259
10  7;41;287
11  7;43;301
12  7;47;329
13  7;7;7;343
14  7;53;371
15  7;59;413
16  7;61;427
17  7;67;469
18  7;71;497
19  7;73;511
20  7;7;11;539
21  7;79;553
22  7;83;581
23  7;89;623
24  7;7;13;637
25  7;97;679
26  7;101;707
27  7;103;721
28  7;107;749
29  7;109;763
30  7;113;791
31  7;7;17;833
32  7;11;11;847
33  7;127;889
34  7;131;917
35  7;7;19;931
36  7;137;959
37  7;139;973
38  7;11;13;1001
39  7;149;1043
40  7;151;1057
41  7;157;1099
42  7;7;23;1127
```

```
785  11;26947;296417
786  11;26951;296461
787  11;26953;296483
788  11;7;3851;296527
789  11;26959;296549
790  11;26963;296593
791  11;26969;296659
792  11;7;3853;296681
793  11;26977;296747
794  11;26981;296791
795  11;26983;296813
796  11;26987;296857
797  11;26989;296879
798  11;26993;296923
799  11;7;7;551;296989
800  11;27001;297011
801  11;27007;297077
802  11;27011;297121
803  11;7;3859;297143
804  11;27017;297187
805  11;27019;297209
806  11;27023;297253
807  11;27029;297319
808  11;27031;297341
809  11;27037;297407
810  11;7;3863;297451
811  11;27043;297473
812  11;27047;297517
813  11;27049;297539
814  11;27053;297583
815  11;27059;297649
816  11;27061;297671
817  11;27067;297737
818  11;27071;297781
819  11;27073;297803
820  11;27077;297847
821  11;27079;297869
822  11;7;3869;297913
823  11;27089;297979
824  11;27091;298001
825  11;7;7;7;79;298067
826  11;27101;298111
```

```
1171  17;28393;482681
1172  17;28397;482749
1173  17;7;4057;482783
1174  17;28403;482851
1175  17;28409;482953
1176  17;28411;482987
1177  17;28417;483089
1178  17;28421;483157
1179  17;28423;483191
1180  17;7;4061;483259
1181  17;28429;483293
1182  17;28433;483361
1183  17;28439;483463
1184  17;7;17;239;483497
1185  17;28447;483599
1186  17;28451;483667
1187  17;28453;483701
1188  17;28457;483769
1189  17;28459;483803
1190  17;28463;483871
1191  17;7;7;7;83;483973
1192  17;28471;484007
1193  17;28477;484109
1194  17;28481;484177
1195  17;7;13;313;484211
1196  17;28487;484279
1197  17;28489;484313
1198  17;28493;484381
1199  17;28499;484483
1200  17;28501;484517
1201  17;28507;484619
1202  17;7;4073;484687
1203  17;28513;484721
1204  17;28517;484789
1205  17;28519;484823
1206  17;28523;484891
1207  17;28529;484993
```

```
9   151;60037;9065587
10  151;60041;9066191
11  151;60043;9066493
12  151;60047;9067097
13  151;60049;9067399
14  151;7;23;373;9068003
15  151;60059;9068909
16  151;60061;9069211
17  151;7;8581;9070117
18  151;60071;9070721
19  151;60073;9071023
20  151;60077;9071627
21  151;60079;9071929
22  151;60083;9072533
23  151;60089;9073439
24  151;60091;9073741
25  151;60097;9074647
26  151;60101;9075251
27  151;60103;9075553
28  151;60107;9076157
29  151;7;31;277;9076459
30  151;60113;9077063
31  151;60119;9077969
32  151;60121;9078271
33  151;60127;9079177
34  151;60131;9079781
35  151;60133;9080083
36  151;7;11;71;11;9080687
37  151;60139;9080989
38  151;60143;9081593
39  151;60149;9082499
40  151;7;13;661;9082801
41  151;60157;9083707
42  151;60161;9084311
43  151;60163;9084613
44  151;60167;9085217
45  151;60169;9085519
46  151;60173;9086123
47  151;7;8597;9087029
48  151;60181;9087331
49  151;60187;9088237
50  151;60191;9088841
```

```
1565  377;119869;45190613
1566  377;119873;45192121
1567  377;119879;45194383
1568  377;119881;45195137
1569  377;119887;45197399
1570  377;119891;45198907
1571  377;119893;45199661
1572  377;119897;45201169
1573  377;119899;45201923
1574  377;7;7;2447;45203431
1575  377;119909;45205693
1576  377;119911;45206447
1577  377;7;37;463;45208709
1578  377;119921;45210217
1579  377;119923;45210971
1580  377;119927;45212479
1581  377;119929;45213233
1582  377;119933;45214741
1583  377;119939;45217003
1584  377;119941;45217757
1585  377;119947;45220019
1586  377;119951;45221527
1587  377;119953;45222281
1588  377;119957;45223789
1589  377;7;17137;45224543
1590  377;119963;45226051
1591  377;119969;45228313
1592  377;119971;45229067
1593  377;119977;45231329
1594  377;119981;45232837
1595  377;119989;45233591
1596  377;7;61;281;45235099
1597  377;119989;45235853
1598  377;119993;45237361
1599  377;119999;45239623
1600  377;7;7;31;79;45240377
1601
```

```
1    ================================================
2    Start Time 1683681552.585305 2023-05-09 21:19:12.585305
3    ================================================
```

```
26387   working : BatchA =19 ; BatchB = 3 ; Factors For = 127 .....
26388   working : BatchA =19 ; BatchB = 4 ; Factors For = 127 .....
26389   working : BatchA =19 ; BatchB = 5 ; Factors For = 127 .....
26390   working : BatchA =19 ; BatchB = 6 ; Factors For = 127 .....
26391   working : BatchA =19 ; BatchB = 7 ; Factors For = 127 .....
26392   working : BatchA =19 ; BatchB = 8 ; Factors For = 127 .....
26393   working : BatchA =19 ; BatchB = 9 ; Factors For = 127 .....
26394   working : BatchA =19 ; BatchB = 10 ; Factors For = 127 .....
26395   working : BatchA =19 ; BatchB = 11 ; Factors For = 127 .....
26396   working : BatchA =19 ; BatchB = 12 ; Factors For = 127 .....
26397   working : BatchA =19 ; BatchB = 13 ; Factors For = 127 .....
26398   working : BatchA =19 ; BatchB = 14 ; Factors For = 127 .....
26399   working : BatchA =19 ; BatchB = 15 ; Factors For = 127 .....
26400   working : BatchA =19 ; BatchB = 16 ; Factors For = 127 .....
26401   working : BatchA =19 ; BatchB = 17 ; Factors For = 127 .....
26402   working : BatchA =19 ; BatchB = 18 ; Factors For = 127 .....
26403   working : BatchA =19 ; BatchB = 19 ; Factors For = 127 .....
26404   working : BatchA =0 ; BatchB = 0 ; Factors For = 131 .....
26405   working : BatchA =0 ; BatchB = 1 ; Factors For = 131 .....
26406   working : BatchA =0 ; BatchB = 2 ; Factors For = 131 .....
26407   working : BatchA =0 ; BatchB = 3 ; Factors For = 131 .....
26408   working : BatchA =0 ; BatchB = 4 ; Factors For = 131 .....
26409   working : BatchA =0 ; BatchB = 5 ; Factors For = 131 .....
26410   working : BatchA =0 ; BatchB = 6 ; Factors For = 131 .....
26411   working : BatchA =0 ; BatchB = 7 ; Factors For = 131 .....
26412   working : BatchA =0 ; BatchB = 8 ; Factors For = 131 .....
26413   working : BatchA =0 ; BatchB = 9 ; Factors For = 131 .....
26414   working : BatchA =0 ; BatchB = 10 ; Factors For = 131 .....
26415   working : BatchA =0 ; BatchB = 11 ; Factors For = 131 .....
26416   working : BatchA =0 ; BatchB = 12 ; Factors For = 131 .....
26417   working : BatchA =0 ; BatchB = 13 ; Factors For = 131 .....
26418   working : BatchA =0 ; BatchB = 14 ; Factors For = 131 .....
26419   working : BatchA =0 ; BatchB = 15 ; Factors For = 131 .....
26420   working : BatchA =0 ; BatchB = 16 ; Factors For = 131 .....
26421   working : BatchA =0 ; BatchB = 17 ; Factors For = 131 .....
26422   working : BatchA =0 ; BatchB = 18 ; Factors For = 131 .....
26423   working : BatchA =0 ; BatchB = 19 ; Factors For = 131 .....
26424   working : BatchA =1 ; BatchB = 0 ; Factors For = 131 .....
26425   working : BatchA =1 ; BatchB = 1 ; Factors For = 131 .....
26426   working : BatchA =1 ; BatchB = 2 ; Factors For = 131 .....
26427   working : BatchA =1 ; BatchB = 3 ; Factors For = 131 .....
26428   working : BatchA =1 ; BatchB = 4 ; Factors For = 131 .....
```

```
80001   working : BatchA =19 ; BatchB = 17 ; Factors For = 377 .....
80002   working : BatchA =19 ; BatchB = 18 ; Factors For = 377 .....
80003   working : BatchA =19 ; BatchB = 19 ; Factors For = 377 .....
80004   Batch File = 0; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 229
80005   Batch File = 1; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 228
80006   Batch File = 2; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 229
80007   Batch File = 3; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 228
80008   Batch File = 4; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 229
80009   Batch File = 5; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 229
80010   Batch File = 6; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 228
80011   Batch File = 7; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 229
80012   Batch File = 8; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 228
80013   Batch File = 9; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 229
80014   Batch File = 10; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 228
80015   Batch File = 11; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 229
80016   Batch File = 12; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 229
80017   Batch File = 13; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 228
80018   Batch File = 14; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 229
80019   Batch File = 15; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 228
80020   Batch File = 16; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 229
80021   Batch File = 17; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 228
80022   Batch File = 18; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 229
80023   Batch File = 19; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =7 ; count of Factor by = 229
80024   Total Factor by = 7;count of Factor by = 4572
80025   Batch File = 0; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =11 ; count of Factor by = 145
80026   Batch File = 1; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =11 ; count of Factor by = 146
80027   Batch File = 2; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =11 ; count of Factor by = 145
80028   Batch File = 3; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =11 ; count of Factor by = 146
80029   Batch File = 4; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =11 ; count of Factor by = 145
80030   Batch File = 5; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =11 ; count of Factor by = 146
80031   Batch File = 6; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =11 ; count of Factor by = 145
80032   Batch File = 7; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =11 ; count of Factor by = 146
80033   Batch File = 8; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =11 ; count of Factor by = 146
80034   Batch File = 9; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =11 ; count of Factor by = 145
80035   Batch File = 10; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =11 ; count of Factor by = 145
80036   Batch File = 11; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =11 ; count of Factor by = 145
80037   Batch File = 12; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =11 ; count of Factor by = 146
80038   Batch File = 13; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =11 ; count of Factor by = 145
80039   Batch File = 14; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =11 ; count of Factor by = 146
80040   Batch File = 15; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =11 ; count of Factor by = 145
80041   Batch File = 16; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =11 ; count of Factor by = 146
80042   Batch File = 17; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =11 ; count of Factor by = 145
```

```
Batch File = 11; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =373 ; count of Factor by = 5
Batch File = 12; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =373 ; count of Factor by = 4
Batch File = 13; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =373 ; count of Factor by = 4
Batch File = 14; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =373 ; count of Factor by = 5
Batch File = 15; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =373 ; count of Factor by = 4
Batch File = 16; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =373 ; count of Factor by = 4
Batch File = 17; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =373 ; count of Factor by = 5
Batch File = 18; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =373 ; count of Factor by = 3
Batch File = 19; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =373 ; count of Factor by = 5
Total Factor by = 373;count of Factor by = 86
Batch File = 0; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Batch File = 1; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Batch File = 2; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Batch File = 3; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Batch File = 4; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Batch File = 5; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Batch File = 6; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Batch File = 7; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Batch File = 8; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Batch File = 9; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Batch File = 10; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Batch File = 11; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Batch File = 12; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Batch File = 13; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Batch File = 14; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Batch File = 15; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Batch File = 16; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Batch File = 17; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Batch File = 18; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Batch File = 19; File Line Count = 1600 ; Composites = 1089 ; None Composite = 511 ; Factor by =377 ; count of Factor by = 0
Total Factor by = 377;count of Factor by = 0
=========================================
End Time 1683684131.8672688 2023-05-09 22:02:11.867268
 Duration in sec 2579.281963825226 ; Duration in minutes 42.98803273042043
=========================================
```

```
1    7;7;49
2    7;11;77
3    7;13;91
4    7;17;119
5    7;19;133
6    7;23;161
7    7;29;203
8    7;31;217
9    7;37;259
10   7;41;287
11   7;43;301
12   7;47;329
13   7;53;371
14   7;59;413
15   7;61;427
16   7;67;469
17   7;71;497
18   7;73;511
19   7;79;553
20   7;83;581
21   7;89;623
22   7;97;679
23   7;101;707
24   7;103;721
25   7;107;749
26   7;109;763
27   7;113;791
28   7;127;889
29   7;131;917
30   7;137;959
31   7;139;973
32   7;149;1043
33   7;151;1057
34   7;157;1099
35   7;163;1141
36   7;167;1169
37   7;173;1211
38   7;179;1253
39   7;181;1267
40   7;191;1337
41   7;193;1351
```

```
11259   7;119611;837277
11260   7;119617;837319
11261   7;119627;837389
11262   7;119633;837431
11263   7;119653;837571
11264   7;119657;837599
11265   7;119659;837613
11266   7;119671;837697
11267   7;119677;837739
11268   7;119687;837809
11269   7;119689;837823
11270   7;119699;837893
11271   7;119701;837907
11272   7;119723;838061
11273   7;119737;838159
11274   7;119747;838229
11275   7;119759;838313
11276   7;119771;838397
11277   7;119773;838411
11278   7;119783;838481
11279   7;119797;838579
11280   7;119809;838663
11281   7;119813;838691
11282   7;119827;838789
11283   7;119831;838817
11284   7;119839;838873
11285   7;119849;838943
11286   7;119851;838957
11287   7;119869;839083
11288   7;119881;839167
11289   7;119891;839237
11290   7;119921;839447
11291   7;119923;839461
11292   7;119929;839503
11293   7;119953;839671
11294   7;119963;839741
11295   7;119971;839797
11296   7;119981;839867
11297   7;119983;839881
11298   7;119993;839951
11299
```

Factors for powers forward and backwards without any division

```
635   7;2389;16681
636   7;7;11;31;16709
637   7;2389;16723
638   7;2393;16751
639   7;2399;16793
640   7;7;7;7;7;16807
641   7;2407;16849
642   7;2411;16877
643   7;19;127;16891
644   7;2417;16919
645   7;2419;16933
646   7;2423;16961
647   7;7;347;17003
648   7;11;13;17;17017
649   7;2437;17059
650   7;2441;17087
651   7;7;349;17101
652   7;2447;17129
653   7;2449;17143
654   7;11;223;17171
655   7;2459;17213
656   7;23;107;17227
```

```
768   41;68881;2824121
769   41;7;13;757;2824367
770   41;68891;2824531
771   41;68893;2824613
772   41;68897;2824777
773   41;68899;2824859
774   41;68903;2825023
775   41;68909;2825269
776   41;68911;2825351
777   41;68917;2825597
778   41;41;41;41;2825761
779   41;68923;2825843
780   41;68927;2826007
781   41;7;9847;2826089
782   41;68933;2826253
783   41;68939;2826499
784   41;68941;2826581
785   41;68947;2826827
786   41;68951;2826991
787   41;68953;2827073
788   41;7;9851;2827237
789   41;68959;2827319
790   41;68963;2827483
791   41;68969;2827729
792   41;7;9853;2827811
793   41;68977;2828057
```

Prime_counts > Feedback_Forward_20_1000 > ≡ Factor_19_8.lg

```
1    19;48007;912133
2    19;48011;912209
3    19;7;19;19;19;912247
4    19;48017;912323
5    19;48019;912361
6    19;48023;912437
7    19;48029;912551
8    19;48031;912589
9    19;48037;912703
10   19;7;6863;912779
11   19;48043;912817
12   19;48047;912893
13   19;48049;912931
14   19;48053;913007
15   19;48059;913121
16   19;48061;913159
17   19;48067;913273
18   19;48071;913349
19   19;48073;913387
20   19;48077;913463
21   19;48079;913501
22   19;7;6869;913577
23   19;48089;913691
24   19;48091;913729
25   19;7;6871;913843
```

```
1190   13;28463;370019
1191   13;7;7;7;83;370097
1192   13;28471;370123
1193   13;28477;370201
1194   13;28481;370253
1195   13;7;13;313;370279
1196   13;28487;370331
1197   13;28489;370357
1198   13;28493;370409
1199   13;28499;370487
1200   13;28501;370513
1201   13;28507;370591
1202   13;7;4073;370643
1203   13;28513;370669
1204   13;28517;370721
1205   13;28519;370747
1206   13;28523;370799
1207   13;28529;370877
1208   13;28531;370903
1209   13;28537;370981
1210   13;28541;371033
1211   13;28543;371059
1212   13;28547;371111
1213   13;28549;371137
1214   13;7;4079;371189
1215   13;28559;371267
1216   13;13;13;13;13;371293
1217   13;7;7;11;53;371371
1218   13;28571;371423
1219   13;28573;371449
1220   13;28577;371501
1221   13;28579;371527
1222   13;28583;371579
1223   13;28589;371657
1224   13;28591;371683
1225   13;28597;371761
1226   13;28601;371813
1227   13;28603;371839
1228   13;28607;371891
1229   13;7;4087;371917
1230   13;28613;371969
1231   13;28619;372047
```

```
Prime_counts > 🐍 neo2.py > ...
1    import logging
2    import time
       (function) def CreateBatchFactorFiles(
3    from datetime import datetime
                batches: Any,
4    from logging.handlers import MemoryHandler ,RotatingFileHandler
                batchSize: Any,
5           generate_file_List: Any
6  > def InitiateLogger(loggerName , FilePath): ···
       ) -> None
14
15 > def CreateBatchFactorFiles( batches , batchSize , generate_file_List): ···
31
32
33
34 > def InitiatePrimeList(Filefrom ,Fileto ): ···
45
46 > def FeedbackFactors(batches,FactorsList , power_depth): ···
76
77
78 > def ForwardFactors(batches,FactorsList , power_depth): ···
109
```

```python
import logging
import time
from datetime import datetime
from logging.handlers import MemoryHandler ,RotatingFileHandler

def InitiateLogger(LoggerName , FilePath): ···

def CreateBatchFactorFiles( batches , batchSize , generate_file_List): ···


def InitiatePrimeList(Filefrom ,Fileto ):
    lg , hnd = InitiateLogger("Initial_Stats" ,"Prime_Counts\Prime.lg")
    for i in range(Filefrom,Fileto):
        n1 = 7 + i * 6
        n2 = 7 + 4 + i * 6
        if n1 % 5 != 0 :
            lg.info("{};{};{}".format(str(7) , int(n1), int(n1)*int(7)) )
        if n2 % 5 != 0 :
            lg.info("{};{};{}".format(str(7) , int(n2), int(n2)*int(7)) )
    lg.removeHandler(hnd)
    hnd.close()

def FeedbackFactors(batches,FactorsList , power_depth): ···


def ForwardFactors(batches,FactorsList , power_depth): ···
```