

Pensieve header: Computing an approximation to the set of fusible numbers.

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FN = {0};
Fuse[a_, b_] := If[Abs[a - b] ≤ 1, (a + b + 1) / 2, 0];
Do[
  FN = FN ∪ (Fuse @@@ Tuples[FN, 2]),
  {10}
];
FN

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$\{0, \frac{1}{2}, \frac{3}{4}, \frac{7}{8}, \frac{15}{16}, \frac{31}{32}, \frac{63}{64}, \frac{127}{128}, \frac{255}{256}, \frac{511}{512}, \frac{1023}{1024}, 1, \frac{9}{8}, \frac{19}{16}, \frac{39}{32}, \frac{79}{64}, \frac{159}{128}, \frac{319}{256}, \frac{639}{512},$   
 $\frac{1279}{1024}, \frac{5}{23}, \frac{21}{93}, \frac{43}{187}, \frac{87}{375}, \frac{175}{751}, \frac{351}{1503}, \frac{703}{47}, \frac{1407}{189}, \frac{11}{379}, \frac{45}{759}, \frac{91}{1519}, \frac{183}{95}, \frac{367}{381}, \frac{735}{763}, \frac{1471}{1527},$   
 $\frac{16}{191}, \frac{64}{765}, \frac{128}{1531}, \frac{256}{383}, \frac{512}{1533}, \frac{1024}{767}, \frac{2048}{1535}, \frac{4096}{3}, \frac{8192}{49}, \frac{16384}{99}, \frac{32768}{199}, \frac{65536}{399}, \frac{131072}{799}, \frac{262144}{1599}, \frac{524288}{25},$   
 $\frac{128}{101}, \frac{512}{203}, \frac{1024}{407}, \frac{256}{815}, \frac{512}{1631}, \frac{1024}{51}, \frac{2048}{205}, \frac{4096}{411}, \frac{8192}{823}, \frac{16384}{1647}, \frac{32768}{103}, \frac{65536}{413}, \frac{131072}{827}, \frac{262144}{1655},$   
 $\frac{64}{207}, \frac{128}{829}, \frac{256}{1659}, \frac{512}{415}, \frac{1024}{1661}, \frac{2048}{831}, \frac{4096}{1663}, \frac{8192}{13}, \frac{16384}{105}, \frac{32768}{211}, \frac{65536}{423}, \frac{131072}{847}, \frac{262144}{1695}, \frac{524288}{53},$   
 $\frac{128}{213}, \frac{512}{427}, \frac{1024}{855}, \frac{256}{1711}, \frac{512}{107}, \frac{1024}{429}, \frac{2048}{859}, \frac{4096}{1719}, \frac{8192}{215}, \frac{16384}{861}, \frac{32768}{1723}, \frac{65536}{431}, \frac{131072}{1725}, \frac{262144}{863},$   
 $\frac{128}{1727}, \frac{256}{27}, \frac{512}{217}, \frac{1024}{435}, \frac{2048}{871}, \frac{4096}{1743}, \frac{8192}{109}, \frac{16384}{437}, \frac{32768}{875}, \frac{65536}{1751}, \frac{131072}{219}, \frac{262144}{877}, \frac{524288}{1755}, \frac{1048576}{439},$   
 $\frac{1024}{1757}, \frac{2048}{879}, \frac{4096}{1759}, \frac{8192}{55}, \frac{16384}{441}, \frac{32768}{883}, \frac{65536}{1767}, \frac{131072}{221}, \frac{262144}{885}, \frac{524288}{1771}, \frac{1048576}{443}, \frac{2097152}{1773}, \frac{4194304}{887}, \frac{8388608}{1775},$   
 $\frac{1024}{111}, \frac{2048}{889}, \frac{4096}{1779}, \frac{8192}{445}, \frac{16384}{1781}, \frac{32768}{891}, \frac{65536}{1783}, \frac{131072}{223}, \frac{262144}{1785}, \frac{524288}{893}, \frac{1048576}{1787}, \frac{2097152}{447}, \frac{4194304}{1789},$   
 $\frac{64}{895}, \frac{128}{1791}, \frac{256}{7}, \frac{512}{225}, \frac{1024}{451}, \frac{2048}{903}, \frac{4096}{1807}, \frac{8192}{113}, \frac{16384}{453}, \frac{32768}{907}, \frac{65536}{1815}, \frac{131072}{227}, \frac{262144}{909}, \frac{524288}{1819},$   
 $\frac{512}{455}, \frac{1024}{1821}, \frac{2048}{911}, \frac{4096}{1823}, \frac{8192}{57}, \frac{16384}{457}, \frac{32768}{915}, \frac{65536}{1831}, \frac{131072}{229}, \frac{262144}{917}, \frac{524288}{1835}, \frac{1048576}{459}, \frac{2097152}{1837}, \frac{4194304}{919},$   
 $\frac{256}{1839}, \frac{512}{115}, \frac{1024}{921}, \frac{2048}{1843}, \frac{4096}{461}, \frac{8192}{1845}, \frac{16384}{923}, \frac{32768}{1847}, \frac{65536}{231}, \frac{131072}{1849}, \frac{262144}{925}, \frac{524288}{1851}, \frac{1048576}{463},$   
 $\frac{1024}{1853}, \frac{2048}{927}, \frac{4096}{1855}, \frac{8192}{29}, \frac{16384}{465}, \frac{32768}{931}, \frac{65536}{1863}, \frac{131072}{233}, \frac{262144}{933}, \frac{524288}{1867}, \frac{1048576}{467}, \frac{2097152}{1869}, \frac{4194304}{935},$   
 $\frac{1024}{1871}, \frac{2048}{117}, \frac{4096}{937}, \frac{8192}{1875}, \frac{16384}{469}, \frac{32768}{1877}, \frac{65536}{939}, \frac{131072}{1879}, \frac{262144}{235}, \frac{524288}{1881}, \frac{1048576}{941}, \frac{2097152}{1883}, \frac{4194304}{471},$   
 $\frac{1024}{1885}, \frac{2048}{943}, \frac{4096}{1887}, \frac{8192}{59}, \frac{16384}{945}, \frac{32768}{1891}, \frac{65536}{473}, \frac{131072}{1893}, \frac{262144}{947}, \frac{524288}{1895}, \frac{1048576}{237}, \frac{2097152}{1897}, \frac{4194304}{949},$   
 $\frac{1024}{1899}, \frac{2048}{475}, \frac{4096}{1901}, \frac{8192}{951}, \frac{16384}{1903}, \frac{32768}{119}, \frac{65536}{1905}, \frac{131072}{953}, \frac{262144}{1907}, \frac{524288}{477}, \frac{1048576}{1909}, \frac{2097152}{955}, \frac{4194304}{1911},$   
 $\frac{1024}{239}, \frac{2048}{1913}, \frac{4096}{957}, \frac{8192}{1915}, \frac{16384}{479}, \frac{32768}{1917}, \frac{65536}{959}, \frac{131072}{1919}, \frac{262144}{15}, \frac{524288}{961}, \frac{1048576}{1923}, \frac{2097152}{481}, \frac{4194304}{1925},$   
 $\frac{128}{963}, \frac{512}{1927}, \frac{1024}{241}, \frac{2048}{1929}, \frac{4096}{965}, \frac{8192}{1931}, \frac{16384}{483}, \frac{32768}{1933}, \frac{65536}{967}, \frac{131072}{1935}, \frac{262144}{121}, \frac{524288}{1937}, \frac{1048576}{969},$   
 $\frac{512}{1939}, \frac{1024}{485}, \frac{2048}{1941}, \frac{4096}{971}, \frac{8192}{1943}, \frac{16384}{243}, \frac{32768}{1945}, \frac{65536}{973}, \frac{131072}{1947}, \frac{262144}{487}, \frac{524288}{1949}, \frac{1048576}{975}, \frac{2097152}{1951},$   
 $\frac{1024}{1024}, \frac{256}{256}, \frac{64}{64}, \frac{16}{16}, \frac{4}{4}, \frac{1}{1}, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32}, \frac{1}{64}, \frac{1}{128}, \frac{1}{256}, \frac{1}{512}, \frac{1}{1024}, \frac{1}{2048}, \frac{1}{4096}, \frac{1}{8192}, \frac{1}{16384}, \frac{1}{32768}, \frac{1}{65536}, \frac{1}{131072}, \frac{1}{262144}, \frac{1}{524288}, \frac{1}{1048576},$

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2339	4679	585	4681	2341	4683	1171	4685	2343	4687	293	4689
512	1024	128	1024	512	1024	256	1024	512	1024	64	1024
2345	4691	1173	4693	2347	4695	587	4697	2349	4699	1175	4701
512	1024	256	1024	512	1024	128	1024	512	1024	256	1024
2351	4703	147	4705	2353	4707	1177	4709	2355	4711	589	4713
512	1024	32	1024	512	1024	256	1024	512	1024	128	1024

2357	4715	1179	4717	2359	4719	295	4721	2361	4723	1181	4725
512	1024	256	1024	512	1024	64	1024	512	1024	256	1024
2363	4727	591	4729	2365	4731	1183	4733	2367	4735	37	4737
512	1024	128	1024	512	1024	256	1024	512	1024	8	1024
2369	4739	1185	4741	2371	4743	593	4745	2373	4747	1187	4749
512	1024	256	1024	512	1024	128	1024	512	1024	256	1024
2375	4751	297	4753	2377	4755	1189	4757	2379	4759	595	4761
512	1024	64	1024	512	1024	256	1024	512	1024	128	1024
2381	4763	1191	4765	2383	4767	149	4769	2385	4771	1193	4773
512	1024	256	1024	512	1024	32	1024	512	1024	256	1024
2387	4775	597	4777	2389	4779	1195	4781	2391	4783	299	4785
512	1024	128	1024	512	1024	256	1024	512	1024	64	1024
2393	4787	1197	4789	2395	4791	599	4793	2397	4795	1199	4797
512	1024	256	1024	512	1024	128	1024	512	1024	256	1024
2399	4799	75	4801	2401	4803	1201	4805	2403	4807	601	4809
512	1024	16	1024	512	1024	256	1024	512	1024	128	1024
2405	4811	1203	4813	2407	4815	301	4817	2409	4819	1205	4821
512	1024	256	1024	512	1024	64	1024	512	1024	256	1024
2411	4823	603	4825	2413	4827	1207	4829	2415	4831	151	4833
512	1024	128	1024	512	1024	256	1024	512	1024	32	1024
2417	4835	1209	4837	2419	4839	605	4841	2421	4843	1211	4845
512	1024	256	1024	512	1024	128	1024	512	1024	256	1024
2423	4847	303	4849	2425	4851	1213	4853	2427	4855	607	4857
512	1024	64	1024	512	1024	256	1024	512	1024	128	1024
2429	4859	1215	4861	2431	4863	19	4865	2433	4867	1217	4869
512	1024	256	1024	512	1024	4	1024	512	1024	256	1024
2435	4871	609	4873	2437	4875	1219	4877	2439	4879	305	4881
512	1024	128	1024	512	1024	256	1024	512	1024	64	1024
2441	4883	1221	4885	2443	4887	611	4889	2445	4891	1223	4893
512	1024	256	1024	512	1024	128	1024	512	1024	256	1024
2447	4895	153	4897	2449	4899	1225	4901	2451	4903	613	4905
512	1024	32	1024	512	1024	256	1024	512	1024	128	1024
2453	4907	1227	4909	2455	4911	307	4913	2457	4915	1229	4917
512	1024	256	1024	512	1024	64	1024	512	1024	256	1024
2459	4919	615	4921	2461	4923	1231	4925	2463	4927	77	4929
512	1024	128	1024	512	1024	256	1024	512	1024	16	1024
2465	4931	1233	4933	2467	4935	617	4937	2469	4939	1235	4941
512	1024	256	1024	512	1024	128	1024	512	1024	256	1024
2471	4943	309	4945	2473	4947	1237	4949	2475	4951	619	4953
512	1024	64	1024	512	1024	256	1024	512	1024	128	1024
2477	4955	1239	4957	2479	4959	155	4961	2481	4963	1241	4965
512	1024	256	1024	512	1024	32	1024	512	1024	256	1024
2483	4967	621	4969	2485	4971	1243	4973	2487	4975	311	4977
512	1024	128	1024	512	1024	256	1024	512	1024	64	1024
2489	4979	1245	4981	2491	4983	623	4985	2493	4987	1247	4989
512	1024	256	1024	512	1024	128	1024	512	1024	256	1024
2495	4991	39	4993	2497	4995	1249	4997	2499	4999	625	5001
512	1024	8	1024	512	1024	256	1024	512	1024	128	1024
2501	5003	1251	5005	2503	5007	313	5009	2505	5011	1253	5013
512	1024	256	1024	512	1024	64	1024	512	1024	256	1024

```

2507 5015 627 5017 2509 5019 1255 5021 2511 5023 157 5025
512 1024 128 1024 512 1024 256 1024 512 1024 32 1024
2513 5027 1257 5029 2515 5031 629 5033 2517 5035 1259 5037
512 1024 256 1024 512 1024 128 1024 512 1024 256 1024
2519 5039 315 5041 2521 5043 1261 5045 2523 5047 631 5049
512 1024 64 1024 512 1024 256 1024 512 1024 128 1024
2525 5051 1263 5053 2527 5055 79 5057 2529 5059 1265 5061
512 1024 256 1024 512 1024 16 1024 512 1024 256 1024
2531 5063 633 5065 2533 5067 1267 5069 2535 5071 317 5073
512 1024 128 1024 512 1024 256 1024 512 1024 64 1024
2537 5075 1269 5077 2539 5079 635 5081 2541 5083 1271 5085
512 1024 256 1024 512 1024 128 1024 512 1024 256 1024
2543 5087 159 5089 2545 5091 1273 5093 2547 5095 637 5097
512 1024 32 1024 512 1024 256 1024 512 1024 128 1024
2549 5099 1275 5101 2551 5103 319 5105 2553 5107 1277
512 1024 256 1024 512 1024 64 1024 512 1024 256
5109 2555 5111 639 5113 2557 5115 1279 5117 2559 5119
1024 512 1024 128 1024 512 1024 256 1024 512 1024 5}
    
```

**? Tuples**

Tuples[list, n] generates a list of all possible n-tuples of elements from list.  
 Tuples[{list1, list2, ...}] generates a list of all possible tuples whose i<sup>th</sup> element is from list<sub>i</sub>. >>

**f @@@ Tuples [Range [5] , 2]**

```

{f[1, 1], f[1, 2], f[1, 3], f[1, 4], f[1, 5], f[2, 1], f[2, 2], f[2, 3],
 f[2, 4], f[2, 5], f[3, 1], f[3, 2], f[3, 3], f[3, 4], f[3, 5], f[4, 1],
 f[4, 2], f[4, 3], f[4, 4], f[4, 5], f[5, 1], f[5, 2], f[5, 3], f[5, 4], f[5, 5]}
    
```

**? /@**

Map[f, expr] or f /@ expr applies f to each element on the first level in expr.  
 Map[f, expr, levelspec] applies f to parts of expr specified by levelspec.  
 Map[f] represents an operator form of Map that can be applied to an expression. >>

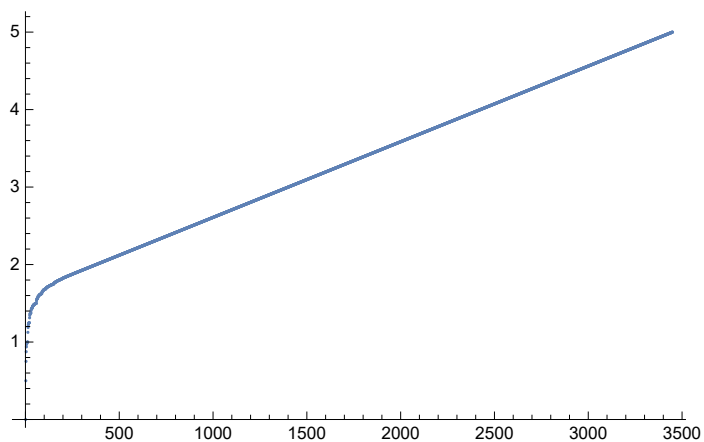
**? @@@**

Information::nomatch : No symbol matching @@@ found. >>

**? ListPlot**

ListPlot[{y1, y2, ...}] plots points corresponding to a list of values, assumed to correspond to x coordinates 1, 2, ...  
 ListPlot[{{x1, y1}, {x2, y2}, ...}] plots a list of points with specified x and y coordinates.  
 ListPlot[{list1, list2, ...}] plots several lists of points. >>

ListPlot[FN]



NumberLinePlot[FN]

