
```

output = '##p: 5\n##id: yw\n';
% Q1
f = ones(1, 22);
for t = 3:22
    f(t) = f(t - 1) + f(t - 2);
end
f
output = [output '##1: ' mat2str(f) '\n'];
% Q2
f = ones(26, 26);
for s = 3:26
    for t = 2:(s - 1)
        f(s, t) = f(s - 1, t) + f(s - 1, t - 1);
    end
end
f = tril(f)
output = [output '##2: ' mat2str(f) '\n'];
% Q3
f = [];
n = 0;
while n < 1
    u = rand();
    x = floor(u * 8) + 1;
    f = [f [u; x]];
    n = n + (x == 2);
end
f
output = [output '##3: ' mat2str(f) '\n'];
% Q4
f = [];
n = 0;
while n < 12
    u = rand();
    x = floor(u * 8) + 1;
    f = [f [u; x]];
    n = n + (x == 5);
end
f
output = [output '##4: ' mat2str(f) '\n'];
% Q5
pdf = [0.1429 0.0536 0.1607 0.1429 0.0536 0.0714 0.1607 0.0536 0.0714 0.0893];
cdf = cumsum(pdf);
f = [];
n = 0;
while n < 1
    u = rand();
    x = sum(cdf < u) + 1;
    f = [f [u; x]];
    n = n + (x == 6);
end
f
output = [output '##5: ' mat2str(f) '\n'];

```

```

% Q6
pdf = [0.0612 0.1837 0.1633 0.0612 0.0816 0.1837 0.0612 0.0816 0.102 0.0204];
cdf = cumsum(pdf);
f = [];
n = 0;
while n < 16
    u = rand();
    x = sum(cdf < u) + 1;
    f = [f [u; x]];
    n = n + (x == 8);
end
f
output = [output '##6: ' mat2str(f) '\n'];
% Q7
f = ones(1, 59);
f = mod(f + (mod(1:59, 6) == 0), 2);
output = [output '##7: ' mat2str(f) '\n'];
% Q8
f = ones(1, 79);
for m = [4 5 6 8 9]
    f = mod(f + (mod(1:79, m) == 0), 2);
end
f
output = [output '##8: ' mat2str(f) '\n'];
% Q9
f = ones(1, 56);
for m = 1:56
    f = mod(f + (mod(1:56, m) == 0), 2);
end
f
output = [output '##9: ' mat2str(f) '\n'];
% Q10 and write to file
output = [output '##10: None'];
file = fopen('P5.txt', 'wt');
fprintf(file, output);
fclose(file);

```

f =

Columns 1 through 6

1	1	2	3	5	8
---	---	---	---	---	---

Columns 7 through 12

13	21	34	55	89	144
----	----	----	----	----	-----

Columns 13 through 18

233	377	610	987	1597	2584
-----	-----	-----	-----	------	------

Columns 19 through 22

4181 6765 10946 17711

$f =$

Columns 1 through 6

1	0	0	0	0	0
1	1	0	0	0	0
1	2	1	0	0	0
1	3	3	1	0	0
1	4	6	4	1	0
1	5	10	10	5	1
1	6	15	20	15	6
1	7	21	35	35	21
1	8	28	56	70	56
1	9	36	84	126	126
1	10	45	120	210	252
1	11	55	165	330	462
1	12	66	220	495	792
1	13	78	286	715	1287
1	14	91	364	1001	2002
1	15	105	455	1365	3003
1	16	120	560	1820	4368
1	17	136	680	2380	6188
1	18	153	816	3060	8568
1	19	171	969	3876	11628
1	20	190	1140	4845	15504
1	21	210	1330	5985	20349
1	22	231	1540	7315	26334
1	23	253	1771	8855	33649
1	24	276	2024	10626	42504
1	25	300	2300	12650	53130

Columns 7 through 12

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
1	0	0	0	0	0
7	1	0	0	0	0
28	8	1	0	0	0
84	36	9	1	0	0
210	120	45	10	1	0
462	330	165	55	11	1
924	792	495	220	66	12
1716	1716	1287	715	286	78
3003	3432	3003	2002	1001	364
5005	6435	6435	5005	3003	1365
8008	11440	12870	11440	8008	4368
12376	19448	24310	24310	19448	12376

18564	31824	43758	48620	43758	31824
27132	50388	75582	92378	92378	75582
38760	77520	125970	167960	184756	167960
54264	116280	203490	293930	352716	352716
74613	170544	319770	497420	646646	705432
100947	245157	490314	817190	1144066	1352078
134596	346104	735471	1307504	1961256	2496144
177100	480700	1081575	2042975	3268760	4457400

Columns 13 through 18

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
1	0	0	0	0	0
13	1	0	0	0	0
91	14	1	0	0	0
455	105	15	1	0	0
1820	560	120	16	1	0
6188	2380	680	136	17	1
18564	8568	3060	816	153	18
50388	27132	11628	3876	969	171
125970	77520	38760	15504	4845	1140
293930	203490	116280	54264	20349	5985
646646	497420	319770	170544	74613	26334
1352078	1144066	817190	490314	245157	100947
2704156	2496144	1961256	1307504	735471	346104
5200300	5200300	4457400	3268760	2042975	1081575

Columns 19 through 24

0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
1	0	0	0	0	0	0
19	1	0	0	0	0	0
190	20	1	0	0	0	0
1330	210	21	1	0	0	0
7315	1540	231	22	1	0	0
33649	8855	1771	253	23	1	1
134596	42504	10626	2024	276	24	24
480700	177100	53130	12650	2300	300	300

Columns 25 through 26

0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
1	0
25	1

$f =$

0.8147	0.9058	0.1270
7.0000	8.0000	2.0000

$f =$

Columns 1 through 7

0.9134	0.6324	0.0975	0.2785	0.5469	0.9575	0.9649
--------	--------	--------	--------	--------	--------	--------

8.0000	6.0000	1.0000	3.0000	5.0000	8.0000	8.0000
<i>Columns 8 through 14</i>						
0.1576	0.9706	0.9572	0.4854	0.8003	0.1419	0.4218
2.0000	8.0000	8.0000	4.0000	7.0000	2.0000	4.0000
<i>Columns 15 through 21</i>						
0.9157	0.7922	0.9595	0.6557	0.0357	0.8491	0.9340
8.0000	7.0000	8.0000	6.0000	1.0000	7.0000	8.0000
<i>Columns 22 through 28</i>						
0.6787	0.7577	0.7431	0.3922	0.6555	0.1712	0.7060
6.0000	7.0000	6.0000	4.0000	6.0000	2.0000	6.0000
<i>Columns 29 through 35</i>						
0.0318	0.2769	0.0462	0.0971	0.8235	0.6948	0.3171
1.0000	3.0000	1.0000	1.0000	7.0000	6.0000	3.0000
<i>Columns 36 through 42</i>						
0.9502	0.0344	0.4387	0.3816	0.7655	0.7952	0.1869
8.0000	1.0000	4.0000	4.0000	7.0000	7.0000	2.0000
<i>Columns 43 through 49</i>						
0.4898	0.4456	0.6463	0.7094	0.7547	0.2760	0.6797
4.0000	4.0000	6.0000	6.0000	7.0000	3.0000	6.0000
<i>Columns 50 through 56</i>						
0.6551	0.1626	0.1190	0.4984	0.9597	0.3404	0.5853
6.0000	2.0000	1.0000	4.0000	8.0000	3.0000	5.0000
<i>Columns 57 through 63</i>						
0.2238	0.7513	0.2551	0.5060	0.6991	0.8909	0.9593
2.0000	7.0000	3.0000	5.0000	6.0000	8.0000	8.0000
<i>Columns 64 through 70</i>						
0.5472	0.1386	0.1493	0.2575	0.8407	0.2543	0.8143
5.0000	2.0000	2.0000	3.0000	7.0000	3.0000	7.0000
<i>Columns 71 through 77</i>						
0.2435	0.9293	0.3500	0.1966	0.2511	0.6160	0.4733
2.0000	8.0000	3.0000	2.0000	3.0000	5.0000	4.0000
<i>Columns 78 through 84</i>						

0.3517	0.8308	0.5853	0.5497	0.9172	0.2858	0.7572
3.0000	7.0000	5.0000	5.0000	8.0000	3.0000	7.0000

Columns 85 through 91

0.7537	0.3804	0.5678	0.0759	0.0540	0.5308	0.7792
7.0000	4.0000	5.0000	1.0000	1.0000	5.0000	7.0000

Columns 92 through 98

0.9340	0.1299	0.5688	0.4694	0.0119	0.3371	0.1622
8.0000	2.0000	5.0000	4.0000	1.0000	3.0000	2.0000

Columns 99 through 103

0.7943	0.3112	0.5285	0.1656	0.6020		
7.0000	3.0000	5.0000	2.0000	5.0000		

$f =$

Columns 1 through 7

0.2630	0.6541	0.6892	0.7482	0.4505	0.0838	0.2290
3.0000	7.0000	7.0000	7.0000	4.0000	1.0000	3.0000

Columns 8 through 14

0.9133	0.1524	0.8258	0.5383	0.9961	0.0782	0.4427
10.0000	2.0000	8.0000	5.0000	10.0000	1.0000	4.0000

Columns 15 through 21

0.1067	0.9619	0.0046	0.7749	0.8173	0.8687	0.0844
1.0000	10.0000	1.0000	7.0000	8.0000	9.0000	1.0000

Columns 22 through 28

0.3998	0.2599	0.8001	0.4314	0.9106	0.1818	0.2638
4.0000	3.0000	8.0000	4.0000	9.0000	2.0000	3.0000

Columns 29 through 32

0.1455	0.1361	0.8693	0.5797			
2.0000	1.0000	9.0000	6.0000			

$f =$

Columns 1 through 7

0.5499	0.1450	0.8530	0.6221	0.3510	0.5132	0.4018
5.0000	2.0000	8.0000	6.0000	3.0000	5.0000	3.0000

Columns 8 through 14

0.0760	0.2399	0.1233	0.1839	0.2400	0.4173	0.0497
2.0000	2.0000	2.0000	2.0000	2.0000	4.0000	1.0000

Columns 15 through 21

0.9027	0.9448	0.4909	0.4893	0.3377	0.9001	0.3692
9.0000	9.0000	5.0000	5.0000	3.0000	9.0000	3.0000

Columns 22 through 28

0.1112	0.7803	0.3897	0.2417	0.4039	0.0965	0.1320
2.0000	7.0000	3.0000	2.0000	3.0000	2.0000	2.0000

Columns 29 through 35

0.9421	0.9561	0.5752	0.0598	0.2348	0.3532	0.8212
9.0000	9.0000	6.0000	1.0000	2.0000	3.0000	8.0000

Columns 36 through 42

0.0154	0.0430	0.1690	0.6491	0.7317	0.6477	0.4509
1.0000	1.0000	2.0000	6.0000	6.0000	6.0000	4.0000

Columns 43 through 49

0.5470	0.2963	0.7447	0.1890	0.6868	0.1835	0.3685
5.0000	3.0000	7.0000	2.0000	6.0000	2.0000	3.0000

Columns 50 through 56

0.6256	0.7802	0.0811	0.9294	0.7757	0.4868	0.4359
6.0000	7.0000	2.0000	9.0000	7.0000	5.0000	4.0000

Columns 57 through 63

0.4468	0.3063	0.5085	0.5108	0.8176	0.7948	0.6443
4.0000	3.0000	5.0000	5.0000	8.0000	7.0000	6.0000

Columns 64 through 70

0.3786	0.8116	0.5328	0.3507	0.9390	0.8759	0.5502
3.0000	8.0000	5.0000	3.0000	9.0000	8.0000	5.0000

Columns 71 through 77

0.6225	0.5870	0.2077	0.3012	0.4709	0.2305	0.8443
6.0000	6.0000	2.0000	3.0000	5.0000	2.0000	8.0000

Columns 78 through 84

0.1948	0.2259	0.1707	0.2277	0.4357	0.3111	0.9234
2.0000	2.0000	2.0000	2.0000	4.0000	3.0000	9.0000

Columns 85 through 91

0.4302	0.1848	0.9049	0.9797	0.4389	0.1111	0.2581
4.0000	2.0000	9.0000	10.0000	4.0000	2.0000	3.0000

Columns 92 through 98

0.4087	0.5949	0.2622	0.6028	0.7112	0.2217	0.1174
4.0000	6.0000	3.0000	6.0000	6.0000	2.0000	2.0000

Columns 99 through 105

0.2967	0.3188	0.4242	0.5079	0.0855	0.2625	0.8010
3.0000	3.0000	4.0000	5.0000	2.0000	3.0000	8.0000

Columns 106 through 112

0.0292	0.9289	0.7303	0.4886	0.5785	0.2373	0.4588
1.0000	9.0000	6.0000	5.0000	6.0000	2.0000	4.0000

Columns 113 through 119

0.9631	0.5468	0.5211	0.2316	0.4889	0.6241	0.6791
9.0000	5.0000	5.0000	2.0000	5.0000	6.0000	6.0000

Columns 120 through 126

0.3955	0.3674	0.9880	0.0377	0.8852	0.9133	0.7962
3.0000	3.0000	10.0000	1.0000	9.0000	9.0000	8.0000

Columns 127 through 133

0.0987	0.2619	0.3354	0.6797	0.1366	0.7212	0.1068
2.0000	3.0000	3.0000	6.0000	2.0000	6.0000	2.0000

Columns 134 through 140

0.6538	0.4942	0.7791	0.7150	0.9037	0.8909	0.3342
6.0000	5.0000	7.0000	6.0000	9.0000	9.0000	3.0000

Columns 141 through 147

0.6987	0.1978	0.0305	0.7441	0.5000	0.4799	0.9047
6.0000	2.0000	1.0000	7.0000	5.0000	5.0000	9.0000

Columns 148 through 154

0.6099	0.6177	0.8594	0.8055	0.5767	0.1829	0.2399
6.0000	6.0000	8.0000	8.0000	6.0000	2.0000	2.0000

Columns 155 through 161

0.8865	0.0287	0.4899	0.1679	0.9787	0.7127	0.5005
--------	--------	--------	--------	--------	--------	--------

9.0000 1.0000 5.0000 2.0000 9.0000 6.0000 5.0000

Columns 162 through 168

0.4711 0.0596 0.6820 0.0424 0.0714 0.5216 0.0967
5.0000 1.0000 6.0000 1.0000 2.0000 5.0000 2.0000

Columns 169 through 175

0.8181 0.8175 0.7224 0.1499 0.6596 0.5186 0.9730
8.0000 8.0000 6.0000 2.0000 6.0000 5.0000 9.0000

Columns 176 through 182

0.6490 0.8003 0.4538 0.4324 0.8253 0.0835 0.1332
6.0000 8.0000 4.0000 4.0000 8.0000 2.0000 2.0000

Columns 183 through 186

0.1734 0.3909 0.8314 0.8034
2.0000 3.0000 8.0000 8.0000

$f =$

Columns 1 through 13

1 1 1 1 1 0 1 1 1 1 1 0 1

Columns 14 through 26

1 1 1 1 0 1 1 1 1 1 0 1 1

Columns 27 through 39

1 1 1 0 1 1 1 1 1 0 1 1 1

Columns 40 through 52

1 1 0 1 1 1 1 1 0 1 1 1 1

Columns 53 through 59

1 0 1 1 1 1 1

$f =$

Columns 1 through 13

1 1 1 0 0 0 1 1 0 0 1 1 1

Columns 14 through 26

1 0 1 1 1 1 1 1 1 1 0 0 1

Columns 27 through 39

0 0 1 1 1 1 1 1 0 0 1 1 1

Columns 40 through 52

0 1 0 1 0 1 1 1 0 1 0 1 0

Columns 53 through 65

1 1 0 1 1 1 1 0 1 1 0 1 0

Columns 66 through 78

0 1 0 1 0 1 1 1 1 0 0 1 0

Column 79

1

$f =$

Columns 1 through 13

0 1 1 0 1 1 1 1 0 1 1 1 1

Columns 14 through 26

1 1 0 1 1 1 1 1 1 1 1 0 1

Columns 27 through 39

1 1 1 1 1 1 1 1 1 0 1 1 1

Columns 40 through 52

1 1 1 1 1 1 1 1 1 0 1 1 1

Columns 53 through 56

1 1 1 1

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