

MODEL:

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! Traveling Salesman Problem variation,
  Given N cities, and a parameter NUM_STOPS <= N,
  Find the shortest tour that
    visits NUM_STOPS cities exactly once.
! This implementation uses the subtour elimination method, i.e.,
  Solve initially with just the assignment constraints.
  WHILE( solution has subtours:
    Add cut(s) to cut off subtours.
    Solve the new problem with new subtour cuts.
  );

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!For prize-collecting TSP mode, set NUM_STOPS to the number of cities
you want the salesperson to visit. A real-world example is Chicago's
Independent Bookstore Crawl, where participants only need to visit 10
out of 80+ bookstores to earn a 10% discount for the entire year.;

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! Ref: Dantzig, G., R. Fulkerson, and S. Johnson (1954),
  "Solution of a Large-Scale Traveling-Salesman Problem",
  Journal of the Operations Research Society of America,
  Vol. 2, No. 4, November, pp. 393-410;

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! Keywords: CALC, @INSERT, @NULL, Dantzig, Great circle, LINGO, Prize collecting,
Optional stop,
  Routing, Sequencing, Subtour, Tour, Traveling sales person, TSP ;

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SETS:

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CITY: TOURORDER, ! To contain the optimal tour order;
  RUNTIME, INFLAG, ISREALLY, SFLAG,
  Q, QOVER, ZIN, ZINTEMP,
  XCORD, YCORD;
CITYBGN( CITY); ! Identify city at which tour begins;
CXC( CITY, CITY):
  CMBDIST, ! The distance matrix;
  DISTANCE, ! Changeover time, excluding runtime;
  Y; ! Y( I, J) = 1 if link I, J is in tour;
SUBCUT: TOURSIZE;
SSXC( SUBCUT, CITY); ! Sparse set of cities in each tour;
TOUR( CITY): DISTACC;
SYS/1..1/; ! A set of size 1 is handy for excluding selected code segments, CALC or
SUBMODEL.
  Use as follows:
  @FOR( SYS | 0:
    code to be excluded..
  );

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ENDSETS

DATA:

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  SUBCUT = 1..1000; ! Number subtour cuts we allow;

! Case Xueyu min distance = 1610;
!CaseXueyu TRANSPOSE= 0; ! = 1 if distance matrix is from column to row;
! = 0 if distance matrix is from row to column;
!CaseXueyu FIRST = 1; ! First task or city in the tour is 1;
!CaseXueyu BACK21ST = 1 ;! > 0 means must do a changeover back to first at end;
!CaseXueyu CITY = 1..29;
!CaseXueyu NUM_STOPS = 29; ! Number of stops to make;
!CaseXueyu INFLAG = 1; ! INFLAG(j) = 0 if city j is not to be included in tour. All
are in ;
!CaseXueyu RUNTIME= 0; ! RUNTIME(j) = time spent at city j. Run times are 0,;
! DISTMTYP = -1: x-y coordinates, Manhattan/L1 metric,
  0: x-y coordinates, Euclidean distance,
  1: latitude-longitude, use Great Circle distances,
  2: explicit distance matrix;
!CaseXueyu DISTMTYP = 2;
!CaseXueyu DISTANCE=
1000 97 205 139 86 60 220 65 111 115 227 95 82 225 168
103 266 205 149 120 58 257 152 52 180 136 82 34 145

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97	1000	129	103	71	105	258	154	112	65	204	150	87	176	137
	142	204	148	148	49	41	211	226	116	197	89	153	124	74
205	129	1000	219	125	175	386	269	134	184	313	201	215	267	248
	271	274	236	272	160	151	300	350	239	322	78	276	220	60
139	103	219	1000	167	182	180	162	208	39	102	227	60	86	34
	96	129	69	58	60	120	119	192	114	110	192	136	173	173
86	71	125	167	1000	51	296	150	42	131	268	88	131	245	201
	175	275	218	202	119	50	281	238	131	244	51	166	95	69
60	105	175	182	51	1000	279	114	56	150	278	46	133	266	214
	162	302	242	203	146	67	300	205	111	238	98	139	52	120
220	258	386	180	296	279	1000	178	328	206	147	308	172	203	165
	121	251	216	122	231	249	209	111	169	72	338	144	237	331
65	154	269	162	150	114	178	1000	169	151	227	133	104	242	182
	84	290	230	146	165	121	270	91	48	158	200	39	64	210
111	112	134	208	42	56	328	169	1000	172	309	68	169	286	242
	208	315	259	240	160	90	322	260	160	281	57	192	107	90
115	65	184	39	131	150	206	151	172	1000	140	195	51	117	72
	104	153	93	88	25	85	152	200	104	139	154	134	149	135
227	204	313	102	268	278	147	227	309	140	1000	320	146	64	68
	143	106	88	81	159	219	63	216	187	88	293	191	258	272
95	150	201	227	88	46	308	133	68	195	320	1000	174	311	258
	196	347	288	243	192	113	345	222	144	274	124	165	71	153
82	87	215	60	131	133	172	104	169	51	146	174	1000	144	86
	57	189	128	71	71	82	176	150	56	114	168	83	115	160
225	176	267	86	245	266	203	242	286	117	64	311	144	1000	61
	165	51	32	105	127	201	36	254	196	136	260	212	258	234
168	137	248	34	201	214	165	182	242	72	68	258	86	61	1000
	106	110	56	49	91	153	91	197	136	94	225	151	201	205
103	142	271	96	175	162	121	84	208	104	143	196	57	165	106
	1000	215	159	64	126	128	190	98	53	78	218	48	127	214
266	204	274	129	275	302	251	290	315	153	106	347	189	51	110
	215	1000	61	155	157	235	47	305	243	186	282	261	300	252
205	148	236	69	218	242	216	230	259	93	88	288	128	32	56
	159	61	1000	105	100	176	66	253	183	146	231	203	239	204
149	148	272	58	202	203	122	146	240	88	81	243	71	105	49
	64	155	105	1000	113	152	127	150	106	52	235	112	179	221
120	49	160	60	119	146	231	165	160	25	159	192	71	127	91
	126	157	100	113	1000	79	163	220	119	164	135	152	153	114
58	41	151	120	50	67	249	121	90	85	219	113	82	201	153
	128	235	176	152	79	1000	236	201	90	195	90	127	84	91
257	211	300	119	281	300	209	270	322	152	63	345	176	36	91
	190	47	66	127	163	236	1000	273	226	148	296	238	291	269
152	226	350	192	238	205	111	91	260	200	216	222	150	254	197
	98	305	253	150	220	201	273	1000	112	130	286	74	155	291
52	116	239	114	131	111	169	48	160	104	187	144	56	196	136
	53	243	183	106	119	90	226	112	1000	130	178	38	75	180
180	197	322	110	244	238	72	158	281	139	88	274	114	136	94
	78	186	146	52	164	195	148	130	130	1000	281	120	205	270
136	89	78	192	51	98	338	200	57	154	293	124	168	260	225
	218	282	231	235	135	90	296	286	178	281	1000	213	145	36
82	153	276	136	166	139	144	39	192	134	191	165	83	212	151
	48	261	203	112	152	127	238	74	38	120	213	1000	94	217
34	124	220	173	95	52	237	64	107	149	258	71	115	258	201
	127	300	239	179	153	84	291	155	75	205	145	94	1000	162
145	74	60	173	69	120	331	210	90	135	272	153	160	234	205
	214	252	204	221	114	91	269	291	180	270	36	217	162	1000;

! Case 1 Obj= 3721.94000;

! Options;

!Case1 TRANSPOSE = 0; ! = 1 if distance matrix is from column to row;

! = 0 if distance matrix is from row to column;

!Case1 BACK21ST = 1 ;! > 0 means must do a changeover back to first at end;

! DISTMTYP = -1: x-y coordinates, Manhattan/L1 metric,

0: x-y coordinates, Euclidean distance,

1: latitude-longitude, use Great Circle distances,

2: explicit distance matrix;

!Case1 DISTMTYP = 2;

	255.22		224.04		135.4	79.06	77.5	155.08		180.4	180.88		92.5	151
	261.14		77.24	101.14		113.82		86.72	176.3	183.1	67.78	112.48		186.52
	192.18		170.6	159.84		95.34	60.44	197.42		119.88		139.54		272.4
	129.78		194.7	63.24	102.74		139.04		133.2	144.96		168.26		146.4
	156.7	211.02		168.44		132.6	209.46		119.22		107.28		77.6	181.84
	99.56	94.08	201.74		34.08	65.04	226.88		166.44		222	44.68	82.92	152.24
	66.24	207.04		126.14		95.74	53.44	151.44		95.24	230.98		78.32	57.38
	172.78		195.4	195.46		44.28	48.9	144.6	78.94	155.62		137.8	36.02	126.38
	96.04	158.06		81.82	137.88		176.52		167.08		148.38		201.48	
	156	142.14		105.28		72.26								
89.22	69.16	73.08	162.84		108.74		231.92		9999	193.48		105.52		109.88
	115.98		121.66		148.74		153.52		168.28		121	228.6	143.32	
	131.72		50.86	219.1	75.48	68.5	124.24		169.6	119.52		178.3	133.64	
	62.42	117.88		96.12	32.44	117.5	172.96		48.5	277.2	109.4	161.14		99.52
	234.5	154.42		186.42		62.3	129.4	269.08		113.62		52.08	206.16	
	41.94	50.5	121.34		57.46	251.28		66.94	118.1	91.54	115.76		209.5	97.82
	119.1	37.58	170.36		86.28	49.02	153.12		108.06		75.3	90.94	208.04	
	116.44		209.08		79.54	162.04		141.24		126.26		117.2	173.74	
	252.46		220.16		187.28		144.82		128	40.38	144.2	80.48	89.9	143.24
	160.08		66.8	110.36		175.7	63.46	160.18		175.96		143.76		148.56
	282.04		100.94		146.08		182.1							
186.98		174.72		71.06	201.28		148.4	64.62	193.48		9999	154.74		40.66
	56.78	116.14		190.6	91.38	227.74		97.68	207.04		100.2	107.48		166.4
	33.06	263.06		103.78		99.96	63.52	90.88	78.44	51.98	59.4	192.04		156.48
	120.48		65.9	207.2	170.5	177.3	90.82	83.62	118.42		76.26	129.36		91.64
	187.28		137.34		80.2	51.14	159.26		35.68	107.18		154.66		145.46
	78.62	203.4	70.72	83.64	182.84		135.76		143.06		93.42	163.74		87.12
	211.2	196.3	120.06		181.5	171.1	129.54		237.5	39.22	246	50.24	130.58	
	136.74		117.16		175.18		175.1	193.6	46.62	206.14		178.58		47.34
	144.96		83.88	87.64	152.46		88.88	45.68	190.04		57.92	102.96		96.68
	74.32	246.9	67.4	113.14		66.42	135.96		230.16		120.74		90.46	
209.28		158.76		94.68	58.36	194.24		128.96		105.52		154.74		9999
	139.28		76.68	33.36	51.12	132.66		41.38	73.28	194.04		76.34	150.24	
	192.28		242.82		140.96		82.94	152.82		44.2	99.9	74.74	94.62	61.56
	91.92	244.98		193.82		110.72		108.52		65.82	123.94		83.4	68.46
	136.5	192.5	193.92		70.84	44.86	209.1	234.5	124.5	85.86	82.7	123.12		180.44
	154.56		54.22	61.64	166.16		167.78		131.38		217.04		212.18	
	209.44		180.7	90	172.54		41.58	140.68		236.78		45.7	112.2	162.3
	161.04		174.8	172.94		237.64		89.9	77.7	58.5	90.36	78.36	196.68	
	83.24	170.86		258.88		179.64		52.6	177.92		138.1	200.78		229.06
	129.72		65	142.24		238.72		67.4	232.34		64.3	175.36		68.14
	243.2	99.28	151.34		152.92									
97.54	56.56	118.22		74.66	84.96	255.22		109.88		40.66	139.28		9999	30.76
	80.48	59.58	120.94		150.16		236.6	170.24		148	56.14	155.5	94.34	196.26
	93.38	84.16	199.66		170.78		68.84	168.92		134.4	173.66		101.94	
	108.64		184.38		158.7	145.5	228.04		147.76		55.36	105.98		75.72
	158.3	154.84		179.98		76.86	34.4	127.58		135.32		149.88		168.68
	118.6	98.46	141.84		62.9	80	127	43.56	67.5	213.2	123.22		60.12	137.92
	171.68		70.16	124.28		75.04	140.4	86.72	94.42	37.78	165.72		101.26	
	177.58		86.48	40.36	83.74	169.14		139.84		56.36	137.92		195.02	
	72.32	181.52		109.28		159.42		87.02	61.48	134.26		216.16		227.72
	60.88	44.32	65.12	102.28		110.14		75.38	128.96		98.36	189.68		82.98
	141.3													
201.16		132.82		142.92		145.88		49.34	224.04		115.98		56.78	76.68
	30.76	9999	138.8	100.94		146.26		86.16	169.32		272.42		60.98	80.9
	46.34	107.44		176.98		165.6	69.42	88.66	166.84		137.9	104.64		166.82
	184.92		63.52	32	159.22		104.82		231.14		67.68	266.3	129.9	158.98
	139.92		262.48		141.36		78.94	123.04		253.7	188.24		108.76	
	162.48		197.8	208.28		291.84		52.46	122.16		205.74		146.76	
	101.7	32.96	124.52		28.16	155.66		125.02		58.26	171.6	167.92		106.3
	273.84		131.96		68.9	129.96		102.42		133.98		77.98	149.86	
	132.08		118.18		142.3	60.86	199.04		98.7	243.44		179.76		82.8
	259.26		121.5	93.22	262.44		101.1	249.32		82.62	220.88		77.36	131.08
	43.5	182.54		44.38	146.14		212.12		44.86	85.94	110.24			
72.58	161.48		65.52	117.02		79.24	135.4	121.66		116.14		33.36	80.48	138.8
	9999	113.3	237.84		175.2	57.24	136.06		180.7	162.5	66.42	211.82		72.82
	230.2	113.4	65.06	139.98		204.58		176.6	36.46	226.48		96.74	83.94	73.2
	144.32		66.7	189.28		167.1	225.52		150.1	171.62		54.78	157.08	

	223.96		109.58		226.04		79.86	31.14	109.1	73.92	106.62		63.4	216.2
	116.96		166.7	287	123.9	151.6	241.28		177.88		75.44	94.48	159.72	
	58.62	56.2	113.96		45.68	142.26		236.86		147.86		83.66	158.8	142.64
	187.2	87.98	99.64	141.54		170.98		183.84		195.04		110.02		133.06
	33.92	48.22	106.72		187.06		74.16	192.06		156.18		158.52		145.7
	228.58		74.48	128.46		138.26		52.8	79.22	179.64		38.88	165.84	
	178.54													
50.8	133.16		113.7	159.54		153.98		79.06	148.74		190.6	51.12	59.58	100.94
	113.3	9999	137.54		127.54		63.9	82.32	53.4	85.42	111.52		234.26	
	77.14	53.1	125.9	43.94	62.28	72.76	185.86		28.72	47.02	232.5	80.74	40.44	66.76
	45.72	71.7	135.18		110.46		168.26		288	58.96	177.22		162.2	176.8
	145.44		76.46	153.2	54.18	44.32	208.24		92.08	201.02		61.1	113.7	85.76
	164.66		187.32		135.24		192.3	69.48	163.28		159.14		129.68	
	294.86		113.04		94.82	179.46		62.78	204.92		158.82		87.72	90.28
	78.54	64.94	101.34		120.1	51.9	40.64	200.06		148.1	153	152.06		95.86
	229.06		203.02		57.54	151.38		116.62		49.7	190.1	104.42		160
	159.98		94.28	145.48		198.16		132.22		155.34		167.8	53.9	
54.72	128.7	206.78		76.44	69.44	77.5	153.52		91.38	132.66		120.94		146.26
	237.84		137.54		9999	86.36	175.56		196.4	127.24		100.44		146.2
	112.74		60.48	201.82		274.98		250.18		100.5	242.06		44.12	248.54
	90.06	162.48		153.78		168.48		146.12		65.78	116.08		85.74	99.58
	178.92		159.74		205.24		109.46		151.62		129.1	111.7	162.84	
	187.48		87.8	114.86		88.24	256.94		89.34	237.9	139.6	30.36	209.26	
	204.78		143.4	173.74		94.1	164.68		238.72		189.72		184.48	
	47.74	62.26	43.36	228.9	101.92		147.54		192.82		61.14	152.92		142.94
	96.04	160.04		54.84	205.24		245.2	110.78		238.52		106.18		45.58
	52.68	39.64	86.5	182.82		88.08	143.22		177	200.08		142.9	90.28	102.8
	35.58	245.14		259.88		144.98		188.34		81.28				
116.18		192.96		264.56		121.06		112.34		155.08		168.28		227.74
	41.38	150.16		86.16	175.2	127.54		86.36	9999	269.02		120.68		97.26
	47.22	89.82	150.78		91.96	171.54		139.16		184.08		166.46		68
	191.72		187.4	158.6	134.62		65.96	224.08		135.62		82.42	107.12	
	193.62		95.86	77.66	178.42		265.54		153.84		107.34		73.1	188.28
	191.2	234.8	132.74		199.48		59.3	61.2	50.42	54.66	176.66		68.38	140.44
	237.68		163.2	202.54		101.52		202.16		41.9	173.18		171.46	
	167.8	126.46		148.58		84.62	119.38		113.8	234.5	48.3	113.96		132.1
	225.6	111.56		185.44		68.7	179.78		164.46		59.78	189.06		41
	58.68	233.52		147.06		125.9	83.06	209.08		106.42		104.52		190.88
	67.4	181.94		79.9	97.16	54.2	190.14		76.98	64.44				
177.04		137	178.88		147.72		102.04		180.4	121	97.68	73.28	236.6	169.32
	57.24	63.9	175.56		269.02		9999	61.36	69.98	195.54		51.14	116.34	
	56.04	55.28	111.44		244.28		82.56	58.66	113	155.5	213.9	220.2	56.44	92.78
	228.08		130.34		87.94	57.38	109.64		115.1	276.02		70.86	145.54	
	65.02	72.2	182.9	61.42	216.48		108.62		65.72	40.94	65.24	40.26	153.72	
	118.44		86.52	127.46		161.94		105.88		163.38		117.84		50.62
	66.72	156.64		140.86		161.32		81.22	126.3	127.64		39.64	92.46	82.46
	158.28		149.52		170.16		54.06	199.12		48.84	55.42	44.58	177.6	130.34
	235.86		37.34	89.82	85.44	179.9	177.68		182.6	198.86		206.22		129.62
	30.5	156.56		54.12	117.26		98.44	190.96		112.08		193.16		65.46
168.64		146.58		117.36		156.86		90.96	180.88		228.6	207.04		194.04
	170.24		272.42		136.06		82.32	196.4	120.68		61.36	9999	170.42	
	44.5	93.2	67	127.56		70.96	113.76		174.32		95.18	88.22	58.88	91.92
	229.8	169.14		147.8	152.4	69.84	159.16		236.42		166.8	218.6	131.12	
	52.6	85.78	79.06	145	168.58		181.2	61.86	103.38		68.5	143.52		55.66
	69.12	208.58		138.88		68.16	129.5	78.64	39.94	151.32		159.36		167
	186.34		41.98	76.72	101.76		72.1	43.66	154.74		88.96	57.3	105.1	106.16
	82.22	255.98		143.88		90.76	92.24	225.84		193.74		168.28		60.42
	127.3	159.76		92.76	158.84		92.1	129.54		176.88		84.7	166.5	132.94
	98.12	147.34		201.64		43.96	31.88	113.1	102.1	107	44.76	134.06		
179.6	206.5	115	164.18		60.36	92.5	143.32		100.2	76.34	148	60.98	180.7	53.4
	127.24		97.26	69.98	170.42		9999	172.52		126.64		182.94		200.68
	60.04	93.28	205.14		208.02		183.6	55.12	133.18		148.54		150.4	213.68
	118.92		116.06		156.76		72.48	139.64		225.52		186.74		194.34
	226.16		105.9	80.68	125.42		56.48	173.08		183.72		54.88	130.98	
	158.6	226.02		101.98		119.7	229.28		76.26	31.74	253.94		134.1	133.5
	136.72		56.6	59.96	246.46		77.86	49.9	120.62		176.52		78.7	124.88
	86.12	300.06		176.86		55.02	131.04		54.24	145.82		97.56	37.36	206.48
	36.2	75.72	211.52		50.02	107.28		207.78		230.18		225.38		52.16

	144.7	87.78	196.08		51.76	9999	66.72	171.32		119.86	174.54	83.88		
	99.72	141.28		81.5	154.56		56.62	145.68		165.7	211.38	93.58	173.24	
	129.34		145.98		142.3	171.36		35.72	93.28	132.46		57.16	99.56	115.78
	45.78	77.9	155.54		201.68		135.48		262.12		64.56	45.3	66.8	84.16
	174.44		110.08		188.72		91.9	191.62		156.92		183.82		190.6
	97.66	84.54	144.4	66.1	130.18		143.34		203.32		107.4	163.3	173.86	
	154.9	227.16		192.9	104.12		68.56	53.72	193.74		45.48	110.3	77.24	88.86
	34.26	181.44		257.04		182.08		83.2	113.3	154.4	230.22		91.9	53.3
	198.6													
82.34	130.5	70.78	169.1	76.98	183.1	119.52		90.88	99.9	170.78		166.84		139.98
	62.28	100.5	166.46		82.56	95.18	208.02		180.7	211.1	185	205.62		46.74
	48.14	66.72	9999	91.58	143.54		40.3	74.66	68.02	101.1	158.58		136.1	170.48
	156.92		186.44		283.48		175.7	127.96		41.42	86.5	261.62		32.22
	92.48	57.18	186.54		44.52	164.7	165.24		266.64		40.94	254.38		136.76
	155.3	202.94		83.9	172.88		106.18		105.22		154.64		56.34	156.88
	129.3	171.06		127.18		105.72		95.38	64	116.78		101.54		77.78
	225	283.84		265.04		172.06		158.22		154.44		41.6	149.64	
	113.82		64.42	151.3	58.56	164.48		47.3	160.52		199.36		43.82	110.08
	150.74		79.6	82.56	246.38		85.52	98.9	180.22		46.92	45.52	82.88	
133.82		170.92		155.84		246.62		175.48		67.78	178.3	78.44	74.74	68.84
	137.9	204.58		72.76	242.06		68	58.66	88.22	183.6	158.02		247.74	
	140.22		131.72		92.3	147.68		171.32		91.58	9999	105.22		189.6
	53.64	62.54	46.98	182.94		164.34		52.68	89.2	33.7	144.08		121.56	
	51.94	55.12	184.4	74.94	198.06		206.88		185.62		91.78	222.38		147.86
	54.06	131.56		87.08	199.16		133.06		116.78		144.48		56.74	46.98
	109.12		118.72		187.54		172.24		95.54	232.86		123.5	164.26	
	138.52		41.66	142.44		81.68	276.62		81.46	68.84	46.54	132.94		158.9
	169.32		143.24		60.96	105.6	53.74	74.56	132.58		96.74	47.92	184.74	
	216.84		116.94		172.82		167.88		190.84		130.88		154.74	
	91.64	61.24	202.22		170.86		83.04	109.52		175.22				
91.86	206.42		278.6	137.3	52.52	112.48		133.64		51.98	94.62	168.92		104.64
	176.6	185.86		44.12	191.72		113	58.88	55.12	124.08		60.4	99.28	39.86
	104.8	147.52		119.86		143.54		105.22		9999	114.3	171.3	129.28	
	44.64	129.3	286.02		86.04	213.02		131.18		144.9	42.88	198.32		217.96
	215.72		186.16		144.64		154.92		88.64	96.6	136.32		118.84	
	74.9	126.46		127.38		61.88	117.46		246.14		142.46		75.96	157.46
	102.32		201.82		174.84		89.06	138.02		35.22	203.06		254.2	88.3
	153.56		178.54		73.56	106.06		169.62		166.84		150.44		275.1
	233.6	54.9	228	43.92	110.2	50.06	202.62		109.34		226.82		44.76	296.38
	203.9	206.94		177.84		50.6	63.28	72.78	179.7	210.7	68.44	61.9	231.18	
	189.94		30.82	225.68										
159.88		81.7	128.6	62.7	245.18		186.52		62.42	59.4	61.56	134.4	166.82	
	36.46	28.72	248.54		187.4	155.5	91.92	133.18		146.58		163.32		96.72
	145.68		62.3	86.52	174.54		40.3	189.6	114.3	9999	111.28		127.24	
	157.28		108.36		74.22	209.74		138.54		60.7	64.32	139.72		86.78
	71.52	157.34		157.44		171.38		63.18	152.82		89.34	164.5	43.52	88.94
	249.4	190.74		163.84		68.08	99.44	179.38		158.84		113.66		169.84
	45.64	74.72	152.64		169.12		170.54		85.94	134.18		145.48		165.78
	190.72		60.14	112.66		110.06		172.62		247.34		167.78		114.08
	137.14		137.58		116.64		106.22		238.72		70.94	111.82		43.36
	89.18	133.72		180.92		62.92	129	265.94		39.3	137.16		166.42	
	165.88		65.78	155.52		56.12	70.82	231.74		68.8				
211.08		171.44		112.58		121.2	84.34	192.18		117.88		192.04		91.92
	173.66		184.92		226.48		47.02	90.06	158.6	213.9	229.8	148.54		40.56
	129.84		135.14		194.32		162.42		188.02		83.88	74.66	53.64	171.3
	111.28		9999	48.08	60.56	183.02		58.92	200.66		248.32		129.74	
	66.66	158.84		60.08	135.76		168.42		130.72		214.9	212.94		138.72
	84.26	46.3	130.42		183.22		183.26		80.54	31.74	258.88		119.9	45.36
	54.54	43.02	115.6	252.22		55.4	79.3	99.44	187.52		55.4	44.54	76.56	120.68
	139.88		78.66	178.44		232.24		133.98		45.6	249.02		72.02	37.22
	237.46		112.86		178.22		60.6	104.86		39.7	108.7	214.16		105.16
	56.78	198.34		97.58	66.94	231.92		153.66		54.92	109.2	185.68		36.46
	151.84		44.82	91.22	52.5									
90.46	185.94		51.22	132.78		249.18		170.6	96.12	156.48		244.98		101.94
	63.52	96.74	232.5	162.48		134.62		220.2	169.14		150.4	44.82	156.74	
	193.62		250.1	203.02		140.14		99.72	68.02	62.54	129.28		127.24	
	48.08	9999	158.78		139.28		129.68		145.9	76.78	160.02		53.7	139.84
	51.52	181.38		133	210.36		165.36		114.98		80.18	127.16		159.66

	117.8	47.92	191.24		254.94		171.02		137.58		217.26		149.76	
	164.7	94.94	66.4	156.2	96.96	200.68		97.36	86.46	240.74		63.92	100.2	166.8
	78.88	83.84	99.26	81.66	253.2	244.34		52.72	190.78		136.88		102.24	
	198.58		108.94		135.66		114.32		214.74		135.46		199.84	
	122.44		173.8	122.46		145.42		77.6	94.7	181.1	88.44	157.58		51.64
	155.4	140.32		115.32		66.7	210.44							
155.58		185.44		248.08		224.16		257.84		159.84		32.44	120.48	
	193.82		108.64		32	83.94	80.74	153.78		65.96	56.44	147.8	213.68	
	59.78	122.4	101.5	72.54	62.82	106.58		141.28		101.1	46.98	44.64	157.28	
	60.56	158.78		9999	141.88		94.86	85.62	198.18		117.88		237.64	
	86.04	121.28		64.9	73.32	171.1	47.72	129.54		141.3	47.78	80.38	106.02	
	121.32		69.9	105.02		155.02		52.7	180.02		158.08		73.4	123.3
	100.14		211.06		75.72	129.44		108.24		65.12	173.04		149.56	
	169.64		100.2	159.7	33.06	256.58		102.22		146.64		122.2	172.04	
	51.62	112.22		186.06		51	105.28		199.92		122.86		183.3	201.36
	115.28		189.04		57.72	124.62		76.66	122.36		36.84	215.54		112.62
	168.48		32.72	154.92		133	186.94		167.4	147.32				
162.82		105.82		111.48		76.82	185.82		95.34	117.5	65.9	110.72		184.38
	159.22		73.2	40.44	168.48		224.08		92.78	152.4	118.92		46.92	207.26
	32.78	80.6	171.74		144.7	81.5	158.58		182.94		129.3	108.36		183.02
	139.28		141.88		9999	75.06	36.24	201.92		176.34		113.28		234.96
	269.08		190.46		113.82		93.5	120.72		176.06		115.58		89.66
	93.78	189.28		158.18		42.06	143.38		89.68	131.26		119.06		54.92
	234.3	261.8	129.08		127.24		226.94		177.44		168.3	128.4	93.74	156.98
	258.68		141	40.46	39.94	123.6	188.24		117.54		134.88		56.98	212.76
	162.3	156.08		89.6	133.12		118.32		60.06	141.38		117.16		239.3
	146.92		164.72		99.12	209.52		153.76		141.26		92.8	255.54	
	37.9	172.5	190.04		190.96		166.84		191.12		66.94			
93.6	46.58	47.6	45.8	268.1	60.44	172.96		207.2	108.52		158.7	104.82		144.32
	66.76	146.12		135.62		228.08		69.84	116.06		127.72		88.98	43.64
	89.5	52.88	189.42		154.56		136.1	164.34		286.02		74.22	58.92	129.68
	94.86	75.06	9999	212.76		212.8	35.22	158.8	163.14		154.16		110.7	161.72
	180.14		117.54		75.06	108.28		133.14		54.26	252.34		148.96	
	91.58	112.56		136.3	135.86		98.62	151.02		138.4	145.76		97.08	215.32
	47.42	88.52	117.82		65.4	225.24		136.74		124.26		93.82	47.04	85.48
	190.98		96.76	170.6	177.74		193.22		238.4	78.46	228.68		162.12	
	194.92		122.2	139.52		136.78		51.3	77.46	128.92		164.52		38.5
	95.36	65.34	146.28		249.54		112.7	84.62	201.96		48.24	162.48		202.64
	82.58	152.62												
61.4	176.92		71.54	50.54	145.54		197.42		48.5	170.5	65.82	145.5	231.14	
	66.7	45.72	65.78	82.42	130.34		159.16		156.76		88.86	145.54		184.26
	189.78		40.26	234.38		56.62	170.48		52.68	86.04	209.74		200.66	
	145.9	85.62	36.24	212.76		9999	133.72		99.48	141.66		168.66		165.42
	162.24		76.32	47.34	75.24	135.06		181.9	45.38	87.02	217.06		61.78	97.38
	194.32		66.52	68.54	211.64		66.9	139.16		78.82	162.7	70.04	30.26	223.08
	70.3	110.4	157.64		194.68		100.24		151.62		65.54	219.36		221.72
	133.5	243.04		90.7	109.02		152.54		201.94		146.54		59.68	75.06
	44.82	104.6	268.28		161.9	43.3	175.92		79.52	99.06	71.94	34.5	211.5	92.86
	146.62		203.46		169.76		126.18		118.28		285.38		126.62	
	144.58													
39.68	84.54	49.12	58.86	142.44		119.88		277.2	177.3	123.94		228.04		67.68
	189.28		71.7	116.08		107.12		87.94	236.42		72.48	106.96		144.66
	155.2	184.62		148.26		95.08	145.68		156.92		89.2	213.02		138.54
	248.32		76.78	198.18		201.92		212.8	133.72		9999	74.78	121.44	
	124.88		93.76	206.34		138.76		68.4	132.04		219.92		81.1	116.9
	154.82		182.44		68.92	176.02		171.68		68.34	154.4	158.84		52.64
	134.54		67.02	146.74		75.58	113.3	167.64		292.38		98.98	101.12	
	92.1	75.42	158.5	180.76		56.16	94.58	122.26		115.1	150.94		86.62	238.82
	56.98	232.26		131.1	167.6	37.96	170.76		158.52		95.82	111.06		123.48
	190.02		169.12		229.18		181.22		126.82		217.38		88.74	174.84
	102.98		145.26		111.3	117.7	187.06		199.26					
81.26	177.3	180.52		236.84		178.1	139.54		109.4	90.82	83.4	147.76		266.3
	167.1	135.18		85.74	193.62		57.38	166.8	139.64		167.88		101.42	
	76.9	228.32		104.42		140.64		165.7	186.44		33.7	131.18		60.7
	129.74		160.02		117.88		176.34		35.22	99.48	74.78	9999	103.1	141.96
	168.24		81.08	33.76	187.46		135.8	117.76		47.9	118.76		173.24	
	180.92		216.78		86.48	62.3	111.62		147.38		77.46	59.34	125.04	
	34.82	119.28		213.68		144.02		161.78		129.22		146.06		104.18

	141.72	29.36	162.88		30.58	155.38		138.42	61.48	165.68		193.44
	46.64	211	162.5	66.96	234.28		163.42	133.64		104.36		175.98
	48.64	173.5	238.4	79.28	235.78		57.34	61.32	78.5	166.28		181.74
	116.92		205.5	70.52	183.08		104.3	148.88				152.24
141.96	95.58	69.02	155.06		53.02	272.4	161.14		83.62	68.46	55.36	129.9
	110.46		99.58	95.86	109.64		218.6	225.52		71.18	122.58	105.24
	231.16		264.92		45.86	211.38		283.48		144.08	144.9	64.32
	53.7	237.64		113.28		158.8	141.66		121.44	103.1	9999	43.06
	52.14	149.4	139.74		70.98	183.58		197.8	94.54	29.12	171.24	260.78
	261.74		51.12	126.7	70.12	93.52	126.7	63.98	50.06	117.44		146.48
	163.38		278.64		222.42		79.88	164.2	138.54		228.78	126.7
	156.78		146.6	242.76		109.88		34.24	82.36	86.22	173.82	190.84
	117.1	129.4	33.7	32.8	191.3	243.74		241.38		155.2	81.2	159.48
	165.94		34.46	152.1	64.04	40.48	45.48	169.9	175.4	109.18		65.9
52.92	187.04		193.2	163.1	208.84		129.78		99.52	118.42		136.5
	158.98		150.1	168.26		178.92		77.66	115.1	131.12		186.74
	187.52		119.18		103.98		124.38		46.86	93.58	175.7	121.56
	139.72		158.84		139.84		86.04	234.96		163.14		168.66
	141.96		43.06	9999	46.76	122.46		288.26		88.26	174.08	61.26
	65.04	139.16		63.98	143.76		85.96	65.54	89.2	81.74	159.68	204.38
	169.2	186.16		158.48		157.06		141.66		39.34	102.08	53
	126.76		123.72		126.52		131.56		154.08		113.26	173.4
	80.26	194.68		224.24		131.86		178.72		103.22		67.74
	67.64	219.94		201.18		47.06	181.68		87.82	39.44	190.98	191.16
	121.2	141.3	127.96		179.72		188.72		186.44		83.6	54.88
95.94	82.48	55.02	73.7	129.96		194.7	234.5	76.26	192.5	75.72	139.92	171.62
	288	159.74		178.42		276.02		52.6	194.34		115.64	119.96
	208.52		131.02		180.96		71.24	173.24		127.96		51.94
	86.78	60.08	51.52	121.28		269.08		154.16		165.42		93.76
	209.26		46.76	9999	146.74		294.48		107.36		149.78	172.7
	57.02	83.52	106.08		119.98		157.9	94.02	49.18	174.44		167.3
	97.38	121.22		32.5	117.24		142.4	171.22		44.62	163.6	143.28
	220.94		226.66		129.82		65	67.28	169.14		176.82	51.82
	79.52	215.4	148.3	172.88		146.18		148.3	204.5	37.98	191.62	211.26
	295.04		239.88		123.1	50.4	169.78		183.84		214.5	96.76
	193.3	114	110.16		203.92		67.06	40.64				195.72
145.44	98	46.48	131.64		58.42	63.24	154.42		129.36		193.92	158.3
	262.48		54.78	58.96	205.24		265.54		70.86	85.78	226.16	113.9
	239.36		265.84		106.4	53.84	129.34		41.42	55.12	217.96	71.52
	181.38		64.9	190.46		110.7	162.24		206.34		81.08	52.14
	146.74		9999	183.08		227.96		92.82	126.44		161.96	251.1
	169	89.66	123.2	37.72	94.94	92.84	76.36	232.12		244.54		135.44
	61.88	163.46		48.24	45.34	83.56	46.82	109.06		216.88		237.12
	161.02		125.58		106.44		67.14	141.9	177.32		199.22	71.34
	125.94		156.98		84.6	63.78	219.82		83.2	54.54	205.76	105.54
	189.52		147.88		111.86		37.02	179.36		202.86		220.68
	47.42	152.14		79.68	127.2	195.94						77.8
141.78	153.12		125.1	92.92	37.62	102.74		186.42		91.64	70.84	154.84
	141.36		157.08		177.22		109.46		153.84		145.54	79.06
	84.76	225.5	146.44		37.46	264.14		185.22		145.98		86.5
	157.34		168.42		133	73.32	113.82		161.72		76.32	138.76
	149.4	288.26		294.48		183.08		9999	113.6	128.24		149.86
	252.02		59.78	71.54	197.86		190.92		231.16		126.68	163.16
	223.68		51.86	62.36	199.06		209.92		128.6	43.7	186.56	40.52
	106.86		265.88		262.52		119.62		86.88	145.2	178.44	137.68
	111.92		73.14	79.86	231.58		126	190.26		189.7	45.74	69.9
	205.12		115.06		77.28	179.04		147.14		212.56		69.88
	47.22	73.22	47.9	46.84	71.1	194.78		50.06	180.48		155.26	136.24
171.46	69.54	158.58		90.84	87.02	139.04		62.3	187.28		44.86	179.98
	78.94	223.96		162.2	151.62		107.34		65.02	145	80.68	240.2
	78.68	144.8	102.84		142.3	261.62		74.94	186.16		157.44	130.72
	210.36		171.1	93.5	180.14		47.34	68.4	187.46		139.74	88.26
	227.96		113.6	9999	147.66		133.38		149.92		212.92	193.8
	119.1	177.56		133.5	113.58		33.42	198.82		225.14		85.32
	50.22	102.44		78.48	153.92		146.84		88.98	136.36		181.08
	129.8	128.32		76.42	65.74	77.54	53.1	38.54	190.9	51.34	144.92	155.04
	90.34	151.18		97.54	71.9	120.1	93.52	180.94		99.12	84.7	151.32
	105.52		155.82		71.54	82.24	123.98		52.4	73.82	80.22	213.16

	88.94	183.22		47.92	121.32		158.18		148.96		61.78	68.92	216.78		
	260.78		143.76		119.98		89.66	197.86		119.1	150.82		217.36		
	73.3	42.48	138.36		135.92		9999	112.98		42.68	159.6	99.46	97.16	53.56	
	116.64		103.12		121.36		56.7	88.16	188.4	117.44		148.18		203.22	
	80.42	73.12	36.7	90.46	40.46	106.22		132.12		139.62		100.74		90.68	
	41.26	88.8	40.2	89.02	44.42	140.16		207.82		208.18		93	129.68		
	53.7	64.06	69.94	200.64		193.6	147.16		192.72		175.3	94.28	62.12	120.68	
	52.96	50.44	222.28		62.7										
264.08		92.7	135.8	141.3	165.82		132.6	121.34		145.46		154.56		98.46	
	291.84		63.4	92.08	256.94		61.2	65.24	69.12	226.02		125.02		210.34	
	249.4	161.94		71.96	67.76	45.78	266.64		131.56		126.46		249.4	183.26	
	191.24		69.9	42.06	91.58	97.38	176.02		86.48	261.74		85.96	157.9	123.2	
	190.92		177.56		88.18	121.8	105.26		259.14		128.4	81.28	112.98		
	9999	64.9	32.78	64.84	96.2	64.64	141.58		155.36		142.18		107	152.1	
	82.9	214.04		68.4	108	157.26		70.88	202.24		64.74	197.9	196.94		
	183.32		245.3	142.54		96.4	172.28		70.82	63.36	207.56		267.52		
	154.44		126.72		81.58	59.28	141.2	116.78		74.92	209.02		108.84		
	73.22	187.88		79.46	188.98		228.38		203.4	209.44		133.3	147.64		
	155.6	91.78													
129.86		207.64		190.78		161.08		55.78	209.46		57.46	78.62	54.22	141.84	
	52.46	216.2	201.02		89.34	50.42	40.26	208.58		101.98		203.96		225.36	
	48.22	140.28		51.6	108.28		77.9	40.94	87.08	127.38		190.74		80.54	
	254.94		105.02		143.38		112.56		194.32		171.68		62.3	51.12	
	65.54	94.02	37.72	231.16		133.5	87.26	225.5	127.4	243.06		199.52		135.18	
	42.68	64.9	9999	199.62		148.26		166.02	34.2	141.3	77.06	83.3	210.36		
	104.62		246.98		195.44		159.1	172.86		109.8	173.04		141.1	153	
	135.72		57.2	64.22	140.86		201.64		109.56		74.94	170.62		112.92	
	129.36		207.88		70.16	103.14		161.08		145.2	128.9	163.6	165.02		
	79.26	43.54	123.24		180.74		88.94	236.5	68.36	195.62		101.98		204.56	
	69.18	145.2	48.9												
136.32		111.9	47.7	156.76		221.9	119.22		251.28		203.4	61.64	62.9	122.16	
	116.96		61.1	237.9	54.66	153.72		138.88		119.7	40.36	176.5	56.82	201.78	
	154.32		78.2	155.54		254.38		199.16		61.88	163.84		31.74	171.02	
	155.02		89.68	136.3	66.52	68.34	111.62		126.7	89.2	49.18	94.94	126.68		
	113.58		68.18	143.52		45.32	167.06		139.5	41.52	159.6	32.78	199.62		
	9999	242.84		238.36		152.7	152.52		58.92	55.76	82.02	33.9	133.92		
	149.62		103.58		48.4	155.66		56.8	96.54	117.08		56.86	209.9	57.38	
	84.58	178.7	129.84		65.46	77.8	178.98		93.16	156.54		170.9	101.46		
	79.22	112.04		36.32	141.32		117.36		100.72		95.74	86.48	68.22	133.72	
	87.52	51.06	108.5	242.84		93.38	150	65.22	63.74						
157.4		184.02		92	172.5	196.86		107.28		66.94	70.72	166.16		80	205.74
	166.7	113.7	139.6	176.66		118.44		68.16	229.28		232.6	48.9	32.3	38	
	123.9	73.3	201.68		136.76		133.06		117.46		68.08	258.88		137.58	
	52.7	131.26		135.86		68.54	154.4	147.38		70.12	81.74	174.44		92.84	
	163.16		33.42	123.76		112.34		44.44	126.48		101.8	244.42		99.46	
	64.84	148.26		242.84		9999	172.82		219.58		59.82	102.82		182.66	
	125.4	244.78		103.22		88.16	137.22		176.8	157.02		158.68		88.82	
	77.48	191.06		80.98	227.3	117.66		70.44	144.92		148.1	48.5	68	44.96	
	55	93.36	70.96	175.84		117.78		145.96		158.34		57.2	182.82		
	62.46	73.66	184.66		185.88		38.5	115.4	100.1	131.24		148.3	173.06		
	74.44	268.38													
105.14		95.08	76.74	49.4	86.14	77.6	118.1	83.64	167.78		127	146.76		287	
	85.76	30.36	68.38	86.52	129.5	76.26	127.34		121.38		58.62	216.4	76.26	169.6	
	135.48		155.3	116.78		246.14		99.44	119.9	217.26		180.02		119.06	
	98.62	211.64		158.84		77.46	93.52	159.68		167.3	76.36	223.68		198.82	
	48.5	87.52	214.64		171.86		250.24		139.44		97.16	96.2	166.02		
	238.36		172.82		9999	92.96	71.72	240.96		143.22		91.36	182.66		
	147.8	120.46		160.96		38.58	169.72		160.48		103.78		49.14	250.06	
	81.22	211.2	157.2	35.76	100.4	185.94		171.24		142.34		74.12	76.94	57.04	
	159.3	85.26	90.5	221.86		111.14		171.08		249.56		113.52		175.18	
	192.68		125.54		111.84		57.78	188.16		78.86	86.1	122.74		85	
	54.84														
112.68		71.52	93.42	72.48	91.92	181.84		91.54	182.84		131.38		43.56	101.7	
	123.9	164.66		209.26		140.44		127.46		78.64	31.74	36.24	95.7	167.36	
	181.06		59.04	192.88		262.12		202.94		144.48		142.46		179.38	
	45.36	149.76		158.08		54.92	151.02		66.9	52.64	59.34	126.7	204.38		
	129.84		232.12		51.86	225.14		87.66	145.48		63.64	82.46	181	114.2	
	53.56	64.64	34.2	152.7	219.58		92.96	9999	128.68		69.7	32.52	53.68	98.98	

	125.66	110.86	85.72	53.16	187.98	89.78	74.88	87.96	188.4	101.82	
	76.06	82.44	201.8	78.2	50.42	46.16	154.48	124.72	119.78	81.86	128.54
	49.64	229.2	71.7	146.18		221.34	186.98	40.84	71.54	81.5	172.9
	172.4	68.28	249.72		103.62	38.54	126.66	52.72			
52.9	228.24		89.76	111.32		127.5	99.56	115.76	135.76	217.04	67.5
	32.96	151.6	187.32		204.78	237.68	161.94		39.94	253.94	151.38
	114.76		113.98	64.38	50.76	139.04	64.56	83.9	56.74	75.96	158.84
	54.54	164.7	73.4	234.3	138.4	139.16	134.54	125.04		63.98	169.2
	244.54		62.36	85.32	87.9	66.96	220.8	151.36	196.8	258.1	116.64
	141.3	152.52		59.82	71.72	128.68	9999	81.1	65.84	176.76	142.44
	146.64		71.36	179.6	202.46		79.64	198.28	46.8	139.62	156.4
	82.46	66.88	67.62	296.6	257.36		90.7	105.22	198.64	139.24	171.48
	33.64	170.78		151.34		136.66	99.26	49.08	262.68	66.54	203.38
	80.06	109.92		142.84		67.44	148.32	179.72	171.72		109.74
	220.22		195.92								
208.42		169.24		166.2	68.36	167.88	94.08	209.5	143.06	212.18	213.2
	124.52		241.28		135.24		143.4	163.2	105.88	151.32	134.1
	47.6	136.74		81.7	168.08		175.8	45.3	172.88	46.98	157.46
	43.02	94.94	123.3	261.8	145.76		78.82	67.02	34.82	50.06	186.16
	135.44		199.06		146.78		266.38		163.64	195.68	83.54
	186.78		103.12		155.36		77.06	58.92	102.82	240.96	69.7
	9999	136.1	114.52		182.34		87.86	162.38		75.72	91.06
	170.64		82.98	106.2	120.58		221.18		141.88	126.32	39.88
	174.92		145.84		185.54		244.46		143.1	75.98	196.76
	50.56	60.88	154.94		86.34	151.16		154.02	193.76	151.64	119.28
	69.28	241.28		246.82		183.92		186.62	92.7	87.24	
215.24		59.68	132.24		162.1	243.66		201.74	97.82	93.42	209.44
	28.16	177.88		192.3	173.74		202.54		163.38	159.36	133.5
	46.12	174.12		151.7	49.64	174.1	66.8	106.18	109.12	102.32	169.84
	115.6	66.4	100.14		129.08		97.08	162.7	146.74	119.28	117.44
	158.48		32.5	48.74	209.92		50.22	108.5	151.54	62.68	279.22
	261.52		121.36		142.18		83.3	55.76	182.66	143.22	32.52
	136.1	9999	47.26	178.8	154.04		59.98	235.56		78.46	84.72
	164.7	101.22		103.54		117.48		132.18	213.08	232.46	174.98
	123.84		64.3	178.46		131.66		60.36	148.8	41.58	216.08
	147.28		108.6	156.74		92.12	121.04		181.18	91.22	146.94
	124	109.52		214.4	210.04		234.44		39.72		
95.98		52.66	45.98	185.3	184.08		34.08	119.1	163.74	180.7	60.12
		69.48	94.1	101.52		117.84		167	136.72	95	42.24
		89.28	107.94		84.16	105.22		118.72		201.82	45.64
		211.06		127.24		215.32		70.04	75.58	213.68	146.48
		117.24		61.88	128.6	102.44		34.78	203.92	106.78	139.88
		186.94		56.7	107	210.36		82.02	125.4	91.36	53.68
		47.26	9999	74.4	52.74	217.8	69.96	251.5	74.26	164.18	125.4
		171.56		49.96	147.76		74.64	149.38		171.64	118.84
		170.44		184.38		119.38		170.74		179.98	100.34
		63.34	128.62		73.32	136.96		78.72	145.72	138.88	70.16
		175.98		58.82	88.38	190.16		153.62			131.02
74.8		112.2	60.6	201.04		117.88		65.04	37.58	87.12	90
		94.48	163.28		164.68		202.16		50.62	186.34	56.6
		110.16		62.04	116.86		174.44		154.64	187.54	174.84
		55.4	96.96	75.72	226.94		47.42	30.26	113.3	144.02	162.7
		163.46		43.7	78.48	199	217.7	32.52	112.32	62.16	194.16
		104.62		33.9	244.78		182.66		98.98	142.44	182.34
		9999	253.92		139.86		263.38		136.02	140.92	176.48
		105.64		33.04	170.1	205.22		195.3	74.2	104.16	141.46
		62.7	165.5	68.42	204.56		188.62		153.68	189.56	240.54
		142.02		105.28		105	101.54		187.4	39.5	160.02
		127.46		55.3	247.02		146.38		106.22		38.36
204.24		33.68	122.62		114.46		170.18		226.88	170.36	211.2
		171.68		58.26	159.72		159.14		238.72	41.9	66.72
		153.28		202.66		37.1	112.28		214.16	110.08	56.34
		89.06	152.64		79.3	200.68		129.44		177.44	88.52
		161.78		163.38		39.34	171.22		48.24	186.56	153.92
		79.08	110.46		93.78	76.26	167.9	188.4	82.9	246.98	133.92
		147.8	125.66		146.64		87.86	154.04		52.74	253.92
		86.5	90.26	228.14		39.88	174.64		131.14	153.52	169.58
		84.62	43.24	140.6	155.84		197.54		170.26	113.02	164.2

	207.08	133.92	217.96	48.64	163.44	151.42	175.42	177.56				
	74.06	87.94	152.68	80.92	83.9	104.96	267.02	147.38	139.5	36.4		
	196.34											
93.78	141.08	181.46	44.08	243.3	166.44	86.28	196.3	41.58	70.16	171.6	58.62	
	129.68	189.72	173.18		156.64	76.72	246.46		79.28	154.6	72.38	
	123	140.26	86.82	188.72	156.88	95.54	138.02		169.12		99.44	
	97.36	108.24	168.3	117.82	70.3	292.38		129.22	278.64		102.08	
	44.62	45.34	40.52	146.84	249.16	203.5	211	211.06	157.4	175.14		
	117.44	214.04	195.44		149.62	88.16	120.46		110.86		71.36	
	162.38	59.98	217.8	139.86	229.42	9999	162.34		91.04	94.22	167.84	
	178.46	192.02	224.08		121.42	161.52	214.86		52.3		252.92	
	80.14	87.64	95.54	215.76	72.06	66.56	176.42	135.78	158.38		162.36	
	127.92	181.86	118.42		201	130.76		155.78	221.42		204.98	
	35.2	214.44	265.36	152.62	86.7	101.34		108.24				
128.36		145.04	49.86	212.36	98.48	222	49.02	120.06	140.68		124.28	
	167.92	56.2	294.86	184.48		171.46	140.86		101.76		77.86	
	100.46	53.02	40.38	112.64	121.78	126.14	91.9	129.3	232.86			
	35.22	170.54	187.52	86.46	65.12	128.4	65.4	110.4	98.98	146.06	222.42	
	53	163.6	83.56	55.48	88.98	82.5	146.12	66.74	44.76	172.28	59	148.18
	68.4	159.1	103.58		137.22	160.96	85.72	179.6	75.72	235.56		69.96
	263.38	86.5	162.34		9999	166.18	118.8	136.86	59.14	76.4	137.28	
	75.78	138.68	171.22	125.16	118	72.76	33.46	244.86	64.56	85.22		
	151.24	163.86	158.14	85	173.48		104.3	139.34	74.12	126.32		
	42.24	67.66	143.74	149.52	162.74	200.26	91.48	223.28	139.68			
	174.44	126.74										
50.96	205.32	206.3	119.4	184.46	44.68	153.12	181.5	236.78	75.04	106.3		
	113.96	113.04	47.74	167.8	161.32	72.1	49.9	105.44	106.92			
	166.18	78.66	55.84	179.5	191.62	171.06	123.5	203.06	85.94	55.4		
	240.74	173.04	93.74	225.24	157.64		101.12	104.18		79.88		
	41.14	143.28	46.82	106.86	136.36	192.72	48.58	45.06	42.54	220.3		
	112.02	203.22	108	172.86	48.4	176.8	38.58	53.16	202.46	91.06		
	78.46	251.5	136.02	90.26	91.04	166.18	9999	83.22	84.66	159.92	176.64	
	192.04	69.7	51.82	258.74	186.82	72.88	126.7	65.38	61.04	182.16		
	85.8	59.56	61.46	67.02	83.9	168.72	164.36	83.88	41.14	178.52	150.26	
	101.32	170.24	90.84	85.2	142.28	200.16	74.22	109.92	257.54			
	154.72											
94.88	61.82	65.66	165.54	135.42	82.92	108.06	171.1	45.7	140.4	273.84		
	45.68	94.82	62.26	126.46	81.22	43.66	120.62	81.92	106.8	99.96	180.38	
	48.92	161.82	156.92	127.18	164.26		254.2	134.18	44.54	63.92		
	149.56	156.98	136.74	194.68	92.1	141.72	164.2	126.76				
	113.96	109.06	265.88	181.08	93.52	106.56	76.8	188.06				
	34.44	181.2	80.42	157.26	109.8	155.66	157.02	169.72	187.98			
	79.64	99.34	84.72	74.26	140.92	228.14	94.22	118.8	83.22	9999	263.02	
	174.22	106.58	165.68	134.76	93.98	206.32	129.66	172.58				
	256.5	76.24	58.3	110.2	159.54	137.06	47.3	274.82	170.72	262.22		
	100.2	45.02	107.06	223.78	227.28	98.18	58	45.02	121.76	90.9		
	58.22	110.82	184.88	101.48	136.18							
41.08	86.72	59.16	224.18	151.86	152.24	75.3	129.54	112.2	86.72	131.96		
	142.26	179.46	43.36	148.58	126.3	154.74	176.52	102.54				
	50.52	68.26	227.6	87.18	178.48	183.82	105.72	138.52	88.3	145.48		
	76.56	100.2	169.64	258.68	124.26	100.24	75.42	29.36	138.54			
	123.72	220.94	216.88	262.52	70.6	59.44	120.18	59.74	159.44			
	59.12	62.18	73.12	70.88	173.04	56.8	158.68	160.48	89.78	198.28		
	165.28	158.88	164.18	176.48	39.88	167.84	136.86	84.66				
	263.02	9999	83.26	91.8	141.54	148.44	98	161.22	134.42			
	149.44	144.68	53.4	147.32	183.44	65.5	54.08	208.92	86.52			
	186	101.06	250.5	84.16	220.22	43.12	213.4	108.1	138.18	206.4	99.6	
	61.3	94.1	102.94	153.42	75.04	85.98						
178.28		162.04	171.32	47.1	113.18	66.24	90.94	237.5	162.3	94.42	68.9	
	236.86	62.78	228.9	84.62	127.64	88.96	78.7	38.4	159.64	56.74	101.86	
	108.62	170.14	190.6	95.38	41.66	153.56	165.78	120.68	166.8			
	100.2	141	93.82	151.62	158.5	162.88	228.78	126.52	226.66			
	237.12	119.62	129.8	199.42	141.48		160.5	70.86	206.78	79.5		
	36.7	202.24	141.1	96.54	88.82	103.78	74.88	46.8	170.64	177	125.4	
	115.68	174.64	178.46	59.14	159.92	174.22	83.26	9999	94.52			
	123.7	104.46	170.72	38.04	157.36	228.46	205.1	115.7	86.22	119.44		
	90.54	101.74	137.64	58.22	198.16	70.84	149.3	70.82	95.02	118.5	189.32	
	99.34	121.98	42.68	107.22	69.52	160.74	110.22	35.36	233.24			

	118.18	99.64	101.34		96.04	225.6	54.06	90.76	54.24	78.26	161.46	75.56			
	213	164.42		112.18		203.32		265.04		132.94	275.1	167.78			
	249.02	52.72	172.04		56.98	193.22		109.02		86.62	46.64	34.24	194.68		
	91.78	177.32		79.86	190.9	150.72		57.46	73.14	100.26	222.36	97.74			
	90.68	96.4	109.56		129.84		144.92		100.4	78.2	296.6	39.88	232.46		
	149.38		104.16		140.6	252.92		118	72.88	172.58	149.44	228.46			
	52.56	50.32	185.72		101.86		137.56		121.2	9999	162.14	289.44			
	39.5	100.36		198.08		80.54	143.26		146.36		54.66	180.26	103.36		
	154.58		48.16	282.9	164.28		146.9	152.58		127.62		42.52	174.6	46.34	
	224.84		120.68		285.28		123.96								
210.54		147.96		184.46		156.16		175.78		78.32	117.2	175.1	90.36	169.14	
	142.3	141.54		120.1	160.04		111.56		199.12		92.24	145.82	181.5		
	176.7	171.08		150	88.88	61.76	107.4	172.06		158.9	233.6	114.08	72.02		
	190.78		51.62	212.76		238.4	152.54		238.82		211	82.36	224.24		
	79.52	199.22		231.58		51.34	45.94	143.84		220.5	110.34		96.06	123.88	
	41.26	172.28		74.94	65.46	148.1	185.94		50.42	257.36		91.62	174.98		
	171.64		141.46		155.84		80.14	72.76	126.7	256.5	144.68		205.1	64.7	
	62.56	80.64	134.06		76.46	168.06		162.14		9999	236.84		39.14	77.84	
	64.24	192.32		65.3	172.64		208.1	202.26		116.04		73.38	185.86		
	108.34		98.1	131.78		182.68		169.94		46.82	133.14		214.82		
	208.82		88.26	215.98		83.74									
69.18		127.48		126.08		95.5	85.96	57.38	173.74		193.6	78.36	139.84	60.86	
		170.98		51.9	54.84	185.44		48.84	225.84		97.56	137.96		64.58	79.52
		155.14		200.72		163.52		163.3	158.22		169.32		54.9	137.14	
		37.22	136.88		112.22		162.3	78.46	201.94		56.98	162.5	86.22	131.86	
		215.4	71.34	126	144.92		259.58		36.6	155.86		97.9	146.52	104.58	
		88.8	70.82	170.62		77.8	48.5	171.24		46.16	90.7	174.92		123.84	
		118.84		180.22		197.54		87.64	33.46	65.38	76.24	53.4	115.7	159.68	
		156.58		62.16	144.96		123.96		46.74	289.44		236.84		9999	157.02
		156.66		104.34		79.76	121.88		231.32		124.68		179.1	128.04	
		62.04	112.28		103.98		90.86	161.3	190.12		92.14	112.66		92.52	116.4
		176.38		62.14	97.16	31.92									
168.2		83.06	136.38		165.4	153.96		172.78		252.46		46.62	196.68	56.36	
		199.04		183.84		40.64	205.24		68.7	55.42	193.74		37.36	44.42	85.2
		147.92		66.42	144.1	59.64	173.86		154.44		143.24		228	137.58	
		237.46		102.24		186.06		156.08		228.68		146.54		232.26	
		66.96	173.82		178.72		148.3	175.7	190.26		155.04		204.06	123.46	
		102.94		167.42		219.52		70.26	40.2	63.36	112.92		178.98	68	
		142.34		154.48		105.22		145.84		64.3	64.88	62.7	170.26	95.54	
		244.86		61.04	58.3	147.32		86.22	183.52		142.04		54.18	161	84.3
		108.02		39.5	39.14	157.02		9999	169.96		59.76	107.62		160.88	
		97.56	75.2	151.48		220.48		77.36	161.18		71.16	190.92		46.36	176.8
		197.38		200.68		103.44		92.34	226.98		149.06		297.82	172.68	
81.84		124.5	60.32	116.1	110.02		195.4	220.16		206.14		83.24	137.92	98.7	
		195.04		200.06		245.2	179.78		44.58	168.28		206.48		64.02	193.96
		169.4	106.76		98.42	174.14		154.9	41.6	60.96	43.92	116.64		112.86	
		198.58		51	89.6	162.12		59.68	131.1	234.28		190.84		103.22	
		172.88		125.94		189.7	190.34	138.7	126.44		66.96	79.64	63.78	77.74	89.02
		207.56		129.36		93.16	44.96	74.12	124.72		198.64		185.54	178.46	
		190.7	165.5	113.02		215.76		64.56	182.16		110.2	183.44		119.44	
		83.54	128.14		145.02		164.6	148	216.34		100.36		77.84	156.66	
		169.96		9999	91.52	63.06	149.26		142.54		173.26		107.46	152.3	
		184.88		165.24		157.18		73.68	135.92		109.42		164.06	52.24	
		114.34		51.06	192.74		201.76		85.2	89.62					
177.18			37.8	183.14		83.42	134.04		195.46		187.28		178.58	170.86	
		195.02		243.44		110.02		148.1	110.78		164.46		177.6	60.42	36.2
		79.48	57.36	109.76		180.36		262.14		216	227.16		149.64	105.6	
		110.2	106.22		178.22		108.94		105.28		133.12		194.92	75.06	
		167.6	163.42		117.1	67.74	146.18		156.98		45.74	151.18		169.4	118.14
		107.98		183.18		181.36		100.98		44.42	267.52		207.88	156.54	
		55	76.94	119.78		139.24		244.46		131.66		170.44		68.42	164.2
		72.06	85.22	85.8	159.54		65.5	90.54	249.94		193.36		97.3	97.78	121.94
		174.68		198.08		64.24	104.34		59.76	91.52	9999	222.38		94.12	204.04
		63.52	159.9	160.94		107.84		205.84		157.16		248.54		207.46	
		78.68	193.64		99.06	53.48	121.7	88.36	72.14	86.54	195.06				
140.94			83	91.48	128.68		175.08		44.28	144.82		47.34	258.88	72.32	
		179.76		133.06		153	238.52		59.78	130.34		127.3	75.72	76.48	197.8
		90.96	100.52		181.54		112.1	192.9	113.82		53.74	50.06	238.72	60.6	

	135.66	199.92	118.32	122.2	44.82	37.96	133.64	129.4	75.64	148.3
	84.6	69.9	97.54	160.06	229.82	150.52	53.72	206.28	179.1	140.16
	154.44	70.16	170.9	93.36	57.04	81.86	171.48	143.1	60.36	184.38
	186.98	66.56	151.24	59.56	137.06	54.08	101.74	68.4	180.74	204.56
	178.02	74.38	123.1	63.88	80.54	192.32	79.76	107.62	63.06	222.38
	9999	251.54	80.7	230.98	45.34	75.46	77.04	40.54	100.4	193.82
	72.9	152.76	170.96	255.44	202.42	102.52	180.56	199.1		
	239.5									
187.78	174.94	77.86	92.76	77.64	48.9	128	144.96	179.64	181.52	
	82.8	33.92	152.06	106.18	189.06	235.86	159.76	211.52		
	194.86	181.02	101.68	187.5	90.8	85.64	104.12	64.42	74.56	202.62
	70.94	104.86	114.32	122.86	60.06	139.52	104.6	170.76	104.36	
	33.7	184.02	204.5	63.78	120.82	71.9	66.08	227.38	38.04	146.58
	110.78	195.64	207.82	126.72	103.14	101.46	70.96	159.3		
	128.54	33.64	75.98	148.8	119.38	188.62	207.08	176.42	163.86	
	61.46	47.3	208.92	137.64	191.14	111.72	233.68	39.76	116.32	
	228.32	143.26	65.3	121.88	160.88	149.26	94.12	251.54		
	9999	185.62	153.9	135.52	142.32	105.86	142.48	54.24	82.16	
	65.16	90.86	61.42	252.08	84.04	186.58	192.94	65.24	36.9	194.62
48.26	103.98	52.96	155.3	130.04	144.6	40.38	83.88	52.6	109.28	259.26
	48.22	95.86	45.58	41	37.34	92.76	176.38	84.84	54.36	161.96
	86.2	68.56	151.3	132.58	109.34	111.82	39.7	214.74	183.3	141.38
	136.78	268.28	158.52	175.98	32.8	67.64	37.98	219.82	205.12	
	120.1	46.28	179.32	89.34	117.04	79.64	181.02	208.18	81.58	161.08
	79.22	175.84	85.26	49.64	170.78	196.76	41.58	170.74	153.68	
	133.92	135.78	158.14	67.02	274.82	86.52	58.22	203.04	172	
	118.08	112.28	262.6	214.82	146.36	172.64	231.32	97.56		
	142.54	204.04	80.7	185.62	9999	170.84	123.5	214.92	232.46	
	29.18	121.96	84.6	219.8	108.94	124.3	37.78	161.66	145.08	63.42
	118.98	209.88	149.22							
187.58	102.8	142.52	139.18	43.92	78.94	144.2	87.64	177.92	159.42	
	121.5	106.72	229.06	52.68	58.68	89.82	158.84	107.28	214.86	
	61.76	185.64	79.94	80.66	116.64	53.72	58.56	96.74	226.82	43.36
	135.46	201.36	117.16	51.3	161.9	95.82	48.64	191.3	219.94	191.62
	83.2	115.06	93.52	91.2	68.18	106.18	228.04	56.36	74.84	93
	145.2	112.04	117.78	90.5	229.2	151.34	228.86	216.08	179.98	
	189.56	217.96	158.38	85	83.9	170.72	186	198.16	66.7	
	66.02	57.1	41.44	208.56	182.88	54.66	208.1	124.68	75.2	173.26
	63.52	230.98	153.9	170.84	9999	219.76	140.3	116.7	198.46	190.8
	204.78	197.82	101.04	91.84	197.7	146	240.34	110.12	168.66	
	133.84	183.48								
198.9	245.36	35.84	139.68	168	155.62	80.48	152.46	138.1	87.02	93.22
	187.06	203.02	39.64	233.52	85.44	92.1	207.78	187.16	61.2	
	141.34	39.64	154.92	163.42	193.74	164.48	47.92	44.76	89.18	
	214.16	199.84	115.28	239.3	77.46	43.3	111.06	173.5	243.74	
	201.18	211.26	54.54	77.28	180.94	175.32	167.08	203.1	48.18	
	124.82	206.58	129.68	141.2	128.9	36.32	145.96	221.86	71.7	
	136.66	50.56	209.96	100.34	240.54	48.64	162.36	173.48		
	168.72	262.22	101.06	70.84	136.06	82.44	78.44	195.18	73.12	
	97.68	180.26	202.26	179.1	151.48	107.46	159.9	45.34	135.52	
	123.5	219.76	9999	169.9	123.34	66.98	240.14	193.78	167.26	
	52.38	223.78	140.88	59.46	126.7	76.36	96.58	139.96	54.44	
73.04	133.54	96.28	136.76	150.08	137.8	89.9	88.88	200.78	61.48	262.44
	74.16	57.54	86.5	147.06	179.9	129.54	230.18	154.92	212.98	
	156.22	74.28	42.24	159.3	45.48	47.3	184.74	296.38	133.72	105.16
	122.44	189.04	146.92	128.92	175.92	123.48	238.4	241.38		
	47.06	295.04	205.76	179.04	99.12	98.5	190.52	162.1	161.9	161.76
	245.82	53.7	116.78	163.6	141.32	158.34	111.14	146.18		
	99.26	60.88	147.28	111.56	78.58	163.44	127.92	104.3	164.36	
	100.2	250.5	149.3	73.38	62.4	142.74	201.54	220.92	140.76	103.36
	116.04	128.04	220.48	152.3	160.94	75.46	142.32	214.92		
	140.3	169.9	9999	63.42	80.62	112.68	129.12	66.8	107.82	203.82
	125.68	187.92	66.36	166.76	215.58	136.66	42.02			
91.64	44.08	90.88	172.3	115.92	36.02	143.24	45.68	229.06	134.26	101.1
	192.06	151.38	182.82	125.9	177.68	176.88	225.38	84.32		
	53.24	49.12	225.24	86.7	105.64	110.3	160.52	216.84	203.9	180.92
	56.78	173.8	57.72	164.72	164.52	79.52	190.02	79.28	155.2	181.68
	239.88	105.54	147.14	84.7	104.94	112.46	155.38	57.58		

	54	126.24	64.06	74.92	165.02	117.36	57.2	171.08	221.34	
	49.08	154.94	108.6	63.34	142.02	151.42	181.86	139.34	83.88	
	45.02	84.16	70.82	204.72	158.38	114.8	86.28	137.32	136.56	154.58
	73.38	62.04	77.36	184.88	107.84	77.04	105.86	232.46	116.7	123.34
	63.42	9999	187	206.9	46.84	101.68	116.72	137.68	229.88	96.12
	32.68	93.44	170.44	53.96	163.26					
83.2	91.82	114.66	62.52	189.18	126.38	160.08	190.04	129.72		
	216.16	249.32	156.18	116.62	88.08	83.06	182.6	84.7	52.16	182.84
	96.96	227.8	80.36	49.84	73.16	77.24	199.36	116.94	206.94	62.92
	122.46	124.62	99.12	38.5	99.06	169.12	235.78	81.2	87.82	123.1
	189.52	212.56	151.32	49.04	136.16	147.02	195.7	175.9	123.22	
	69.94	209.02	79.26	100.72	182.82	249.56	186.98	262.68		
	86.34	156.74	128.62	105.28	175.42	118.42	74.12	41.14	107.06	
	220.22	95.02	213.9	193.7	101.32	245.34	121.56	36.36	48.16	185.86
	112.28	161.18	165.24	205.84	40.54	142.48	29.18	198.46		
	66.98	80.62	187	9999	195.72	186.84	68.16	195.58	180	49.26
	131.56	69.28	115.64	136.88	138.7					
46.36	238.88	245.92	42.98	130.86	96.04	66.8	57.92	65	227.72	82.62
	158.52	49.7	143.22	209.08	198.86	166.5	107	35.92	114.26	
	255.16	68.32	89.2	51.5	88.86	43.82	172.82	177.84	129	97.58
	76.66	209.52	95.36	71.94	229.18	57.34	159.48	39.44	50.4	147.88
	69.88	206.24	143.52	182.98	93.12	40.8	60.9	95.08	200.64	108.84
	43.54	95.74	62.46	113.52	40.84	66.54	151.16	92.12	73.32	105
	201	126.32	178.52	223.78	43.12	118.5	52.82	100.54	74.38	267.06
	48.98	167.26	282.9	108.34	103.98	71.16	157.18	157.16	100.4	
	54.24	121.96	190.8	240.14	112.68	206.9	195.72	9999	125.18	
	121.86	76.02	82.6	99.42	212.42	57.3	201.48	146.94	271.76	
	257.32									
89.7	115.76	167.76	87.26	40.26	158.06	110.36	102.96	142.24		
	60.88	220.88	145.7	190.1	177	106.42	206.22	132.94	160.48	
	128.24	159.1	92.92	228.46	122.8	105.46	34.26	110.08	167.88	
	50.6	265.94	66.94	77.6	122.36	153.76	65.34	34.5	181.22	61.32
	291.78	190.98	169.78	111.86	143.34	105.52	57.32	78.26		
	49.88	166.64	233.02	89.62	193.6	73.22	123.24	86.48	73.66	175.18
	71.54	203.38	154.02	121.04	136.96	101.54	74.06	130.76		
	42.24	150.26	227.28	213.4	189.32	130.96	56.04	59.48	139.56	
	36.1	127.12	164.28	98.1	90.86	190.92	73.68	248.54	193.82	
	82.16	84.6	204.78	193.78	129.12	46.84	186.84	125.18	9999	
	44.88	110.04	177.04	108.28	156.66	83.22	137.38	140.2	159.06	
	39.6									
205.36	143.28	233.24	214.42	167.18	81.82	175.7	96.68	238.72		
	44.32	77.36	228.58	104.42	200.08	104.52	129.62	98.12	97.74	
	77.86	117	163.08	191.94	165.54	88.2	181.44	150.74	190.84	
	63.28	39.3	231.92	94.7	36.84	141.26	146.28	211.5	126.82	78.5
	165.94	191.16	183.84	37.02	47.22	155.82	157.18	68.64	67.74	
	98.14	99.62	190.86	147.16	187.88	180.74	68.22	184.66	192.68	
	81.5	80.06	193.76	181.18	78.72	187.4	87.94	155.78	67.66	101.32
	98.18	108.1	99.34	120.6	109.94	162.28	86.38	194.52	115.2	146.9
	161.3	46.36	135.92	207.46	161.44	65.16	219.8	197.82	167.26	
	66.8	101.68	68.16	121.86	44.88	9999	170.16	51.18	52.4	51.8
	229.52	190.6	177.26	61.92						
49.78	140.3	130.32	150.56	246.28	137.88	63.46	74.32	67.4	65.12	131.08
	74.48	160	142.9	190.88	30.5	147.34	263.96	169.74	128.72	
	83.04	242.8	202.88	199.4	257.04	79.6	130.88	72.78	137.16	153.66
	181.1	215.54	92.8	249.54	92.86	217.38	166.28	34.46	121.2	214.5
	179.36	73.22	71.54	104	97.8	157.44	207.4	87	118.76	192.72
	79.46	88.94	133.72	185.88	125.54	172.9	109.92	151.64	91.22	
	145.72	39.5	152.68	221.42	143.74	170.24	58	138.18		
	121.98	251.34	269.22	89.96	163.08	130.32	66.76	152.58		
	182.68	190.12	176.8	109.42	78.68	72.9	90.86	108.94	101.04	
	52.38	107.82	116.72	195.58	76.02	110.04	170.16	9999	227.38	
	167.52	268.04	180.6	133.86	68.6	121.72	86.7			
223.28	97.46	243.44	48.1	138.86	176.52	160.18	246.9	232.34		
	102.28	43.5	128.46	159.98	90.28	67.4	156.56	201.64	150.62	
	154.58	160.14	57.82	162.84	81.1	97.06	182.08	82.56	154.74	
	179.7	166.42	54.92	88.44	112.62	255.54	112.7	146.62	88.74	181.74
	152.1	141.3	96.76	202.86	47.9	82.24	153.68	213.64	195.58	59.12
	170.46	189.38	175.3	188.98	236.5	87.52	38.5	111.84	85.26	142.84

	119.28	146.94	138.88	160.02	80.92	204.98	149.52	90.84		
	45.02	206.4	42.68	66.66	153.2	90.8	120.06	151.68	146.68	127.62
	169.94	92.14	197.38		164.06	193.64	152.76	61.42	124.3	91.84
	223.78	203.82	137.68	180	82.6	177.04	51.18	227.38	9999	
	44.46	70.66	195.02	77.34	52.38	96.06	155.04			
54.42	109.92	151.68	89.48	48.96	167.08	175.96	67.4	64.3	110.14	
	182.54	138.26	94.28	102.8	181.94	54.12	43.96	66.86	136.14	132.08
	144.64	174.78	192.54	45.86	83.2	246.38	91.64	210.7	165.88	
	109.2	157.58	168.48	37.9	84.62	203.46	174.84	152.24	64.04	
	127.96	195.72	220.68	46.84	123.98	229.74	232.22	165.36		
	53.12	145.38	200.96	94.28	228.38	68.36	51.06	115.4	57.78	172.4
	69.28	114.36	70.16	38.36	83.9	35.2	162.74	85.2	121.76	99.6
	113.4	179.52	185.78	90.48	212.88	258.62	42.52	46.82	112.66	107.22
	200.68	52.24	99.06	170.96	252.08	37.78	197.7	140.88	125.68	
	229.88	49.26	99.42	108.28	52.4	167.52	44.46	9999	67.3	189.12
	142.38	174.88	191.76	89.16						
79.94	89.64	154.58	167.04	220.52	148.38	143.76	113.14	175.36		
	75.38	44.38	52.8	145.48	35.58	79.9	117.26	31.88	209.16	96.22
	103.1	180.36	39.56	162.68	113.3	85.52	61.24	68.44	65.78	185.68
	32.72	172.5	201.96	169.76	102.98	116.92	40.48	179.72	193.3	51.64
	77.8	71.1	52.4	169.96	140.82	100.92	113.96	65.98	171.64	
	62.12	203.4	195.62	108.5	100.1	188.16	68.28	148.32	241.28	124
	131.02	149.88	104.96	214.44	200.26	142.28	90.9	61.3		
	69.52	55.5	70.94	192.76	164.44	58.9	44.86	174.6	133.14	92.52
	114.34	53.48	255.44	84.04	161.66	146	59.46	187.92	96.12	83.36
	212.42	156.66	51.8	268.04	70.66	67.3	9999	70.14	207.84	78.08
	108.32	62.24								
137.4	169.02	36.92	127.54	193.8	201.48	148.56	66.42	68.14	128.96	
	146.14	79.22	198.16	245.14	97.16	98.44	113.1	195.54	135.32	
	118.84	81.3	132.86	80.52	123.76	154.4	98.9	202.22	61.9	155.52
	36.46	155.4	154.92	190.04	48.24	126.18	145.26	205.5	45.48	188.72
	114	47.42	194.78	73.82	82.94	102.44	74.96	92.88	81.16	141.06
	209.44	101.98	242.84	131.24	78.86	249.72	179.72	246.82		
	109.52	175.98	127.46	267.02	265.36	91.48	200.16	58.22		
	94.1	160.74	114.4	120.8	116.98	187.92	36.12	236.16	46.34	214.82
	116.4	92.34	51.06	121.7	202.42	186.58	145.08	240.34	126.7	66.36
	32.68	131.56	57.3	83.22	75.2	180.6	195.02	189.12	70.14	9999
	59.08	86.8	67.7							153.2
165.26	52.98	239.94	83.78	137.4	156	282.04	135.96	243.2	98.36	212.12
	179.64	132.22	259.88	54.2	190.96	102.1	80.26	44.46	199.82	
	197.44	49.46	41.46	108.16	230.22	180.22	170.86	231.18		
	56.12	151.84	140.32	133	190.96	162.48	118.28	111.3	70.52	
	169.9	186.44	110.16	152.14	50.06	80.22	63.66	99.7	126.08	32.3
	90.42	63.78	52.96	133.3	204.56	93.38	148.3	86.1	103.62	171.72
	214.4	58.82	55.3	147.38	152.62	223.28	74.22	110.82	102.94	183.92
	110.22	73.04	189.14	55.86	87.66	33.7	139.02	224.84	208.82	
	176.38	226.98	192.74	88.36	102.52	192.94	63.42	110.12		
	76.36	166.76	93.44	69.28	201.48	137.38	229.52	133.86	77.34	
	142.38	207.84	153.2	9999	173.54	211.36	232.48			
204.12	84.72	151.34	81.5	178.74	142.14	100.94	230.16	99.28		
	189.68	44.86	38.88	155.34	144.98	190.14	112.08	107	267.4	
	193.44	189.74	52.68	159.48	33.4	241.36	91.9	46.92	83.04	189.94
	70.82	44.82	115.32	186.94	166.84	202.64	285.38	117.7	183.08	
	175.4	83.6	203.92	79.68	180.48	213.16	261.5	61.28	164.2	45.16
	208.04	50.44	147.64	69.18	150	173.06	122.74	38.54	109.74	173.88
	186.62	210.04	88.38	247.02	139.5	86.7	139.68	109.92	184.88	
	153.42	35.36	55.18	76.82	66.18	102.44	84.8	57.4	120.68	88.26
	149.06	201.76	72.14	180.56	65.24	118.98	168.66	96.58	215.58	62.14
	170.44	115.64	146.94	140.2	190.6	68.6	52.38	174.88	78.08	59.08
	173.54	9999	123.82	272.52						
180.6	188.68	257.98	122.84	87.08	105.28	146.08	120.74	151.34		
	82.98	85.94	165.84	167.8	188.34	76.98	193.16	44.76	143.22	51.4
	201.56	72.26	67.1	92.8	246.28	53.3	45.52	109.52	30.82	231.74
	91.22	66.7	167.4	191.12	82.58	126.62	187.06	104.3	109.18	54.88
	67.06	127.2	155.26	42.36	52.48	69	114.9	109.56	105.3	107.9
	155.6	145.2	65.22	74.44	85	126.66	220.22	92.7	234.44	222.28
	146.38	36.4	101.34	174.44	257.54	101.48	75.04	233.24	190.16	
	41.12	145.62	164.02	67.62	77.64	119.88	285.28	215.98	97.16	

```

297.82      85.2  86.54 199.1 36.9  209.88      133.84      139.96      136.66
53.96 136.88      271.76      159.06      177.26      121.72      96.06 191.76
108.32      86.8  211.36      123.82      9999  89.64
120.06  99.9  114.68      174.46      144.5  72.26 182.1  90.46 152.92      141.3 110.24
178.54      53.9  81.28 64.44 65.46 134.06      65.24 89.82 206.46      122.1 99.38
59.84 45.22 198.6 82.88 175.22      225.68      68.8  52.5 210.44      147.32
66.94 152.62      144.58      199.26      148.88      65.9  58.54 40.64 195.94
136.24      168.78      187.06      164.74      56.28 37.6 181.64      64.84 62.7
91.78 48.9  63.74 268.38      54.84 52.72 195.92      87.24 39.72 153.62      106.22
196.34      108.24      126.74      154.72      136.18      85.98 185.34      132.36
122  118.62      47.96 94.8  100.18      123.96      83.74 31.92 172.68      89.62
195.06      239.5 194.62      149.22      183.48      54.44 42.02 163.26      138.7
257.32      39.6  61.92 86.7  155.04      89.16 62.24 67.7  232.48      272.52
89.64 9999 ;

```

```

! Pull data from a spreadsheet;
! CITY = @OLE();      ! Range name in Excel for names of cities;
! DISTANCE = @OLE(); ! Range name in Excel for Distance matrix;

! Using non-default inputs. Changes will also be needed
! in output section at end;
! CITY = @OLE("\models\lingo\tsp\TSPTokyo40.xls", "city30");
! DISTANCE = @OLE("\models\lingo\tsp\TSPTokyo40.xls", "dist30");

! Case 2, Opt Dist = 7577;
! Take input from LINGO;
! The old National League;
! Options;
! DISTMTYP = -1: x-y coordinates, Manhattan/L1 metric,
!             0: x-y coordinates, Euclidean distance,
!             1: latitude-longitude, use Great Circle distances,
!             2: explicit distance matrix;
!Case2  DISTMTYP = 2;

! Additional options;
!Case2  TRANSPOSE = 0;  ! = 1 if distance matrix is from column to row;
!             ! = 0 if distance matrix is from row to column;
!Case2  BACK21ST = 1 ;! > 0 means must do a changeover back to first at end;

!Case2  CITY =
!       NYK  ATL  CHI  CIN  HOU  LAX  MON  PHL  PIT  STL  SND  SNF;

!Case2  NUM_STOPS = 12; ! Number of stops to make, including depot;

!Case2  DISTANCE=
!       0  864  845  664 1706 2844  396   92  386 1002 2892 3032
!       864  0  702  454  842 2396 1196  772  714  554 2363 2679
!       845  702  0  324 1093 2136  764  764  459  294 2184 2187
!       664  454  324  0 1137 2180  798  572  284  338 2228 2463
!       1706  842 1093 1137  0 1616 1857 1614 1421  799 1521 2021
!       2844 2396 2136 2180 1616  0 2900 2752 2464 1842  95  405
!       396 1196  764  798 1857 2900  0  424  514 1058 2948 2951
!       92  772  764  572 1614 2752  424  0  305  910 2800 2951
!       386  714  459  284 1421 2464  514  305  0  622 2512 2646
!       1002  554  294  338  799 1842 1058  910  622  0 1890 2125
!       2892 2363 2184 2228 1521  95 2948 2800 2512 1890  0  500
!       3032 2679 2187 2463 2021  405 2951 2951 2646 2125  500  0;
!Case2  CITYBGN = NYK; ! The city we want to call the beginning (and ending) city;
!Case2  INFLAG = 1;   ! INFLAG(j) = 0 if city j is not to be included in tour. All are in
! ;
!Case2  RUNTIME= 0;   ! RUNTIME(j) = time spent at city j. Run times are 0,;

! Case 3 Opt dist = 6806;
!Case3  TRANSPOSE = 0;  ! = 1 if distance matrix is from column to row;
!             ! = 0 if distance matrix is from row to column;
!Case3  BACK21ST = 1 ;! > 0 means must do a changeover back to first at end;
! DISTMTYP = -1: x-y coordinates, Manhattan/L1 metric,
!             0: x-y coordinates, Euclidean distance,

```

```

1: latitude-longitude, use Great Circle distances,
2: explicit distance matrix;
!Case3 DISTMTYP = 2;

!Case3 CITY=
Chi Den Frsn Hous KC LA Oakl Anah Peor Phnx Prtl Rvrs Sacr SLC Sntn SBrn SDgo
SFrn SJos Seat Spkn Tucs Wich LngB;
! Additional options;
!Case3 CITYBGN = Chi;! The city we want to call the beginning (and ending) city;
!Case3 INFLAG = 1; ! INFLAG(j) = 0 if city j is not to be included in tour. All are in
;
!Case3 RUNTIME= 0; ! RUNTIME(j) = time spent at city j. Run times are 0,;
!Case3 NUM_STOPS = 24; ! Number of stops to make, including depot;

!Case3 DISTANCE =
! To City;
! Chi Den Frsn Hous KC LA Oakl Anah Peor Phnx Prtl Rvrs Sacr SLC Sntn SBrn
SDgo SFrn SJos Seat Spkn Tucs Wich LngB From;
!Case3 0 996 2162 1067 499 2054 2134 2050 151 1713 2083 2005 2049 1390 1187 1996
2064 2142 2160 2013 1735 1688 696 2060! Chicago;
!Case3 996 0 1167 1019 596 1059 1227 1055 904 792 1238 1010 1142 504 939 1001
1108 1235 1242 1307 1089 835 509 1075! Denver;
!Case3 2162 1167 0 1747 1723 214 168 250 2070 598 745 268 162 814 1572 265
339 176 151 917 991 714 1534 270! Fresno;
!Case3 1067 1019 1747 0 710 1538 1904 1528 948 1149 2205 1484 1909 1438 197 1533
1482 1912 1873 2274 2102 1067 608 1548! Houston;
!Case3 499 596 1723 710 0 1589 1827 1579 354 1214 1809 1535 1742 1086 759 1482
1565 1835 1842 1839 1561 1189 197 1599! K. City;
!Case3 2054 1059 214 1538 1589 0 371 36 1943 389 959 54 376 715 1363 59
125 379 340 1131 1205 505 1400 22! L. A.;
!Case3 2134 1227 168 1904 1827 371 0 407 2043 755 628 425 85 744 1729 422
496 8 42 800 874 871 1687 396! Oakland;
!Case3 2050 1055 250 1528 1579 36 407 0 1933 379 995 45 412 711 1353 55
99 415 376 1167 1241 491 1390 30! Anaheim;
!Case3 151 904 2070 948 354 1943 2043 1933 0 1568 2022 1889 1958 1299 1066 1887
1919 2051 2069 1991 1713 1543 551 1953! Peoria;
!Case3 1713 792 598 1149 1214 389 755 379 1568 0 1266 335 760 648 974 333
355 763 724 1437 1335 118 1025 399! Phoenix;
!Case3 2083 1238 745 2205 1809 959 628 995 2022 1266 0 1001 583 767 2086 992
1084 636 665 172 348 1382 1739 1015! Portland;
!Case3 2005 1010 268 1484 1535 54 425 45 1889 335 1001 0 430 666 1309 10
98 433 394 1173 1202 451 1346 65! Riverside;
!Case3 2049 1142 162 1909 1742 376 85 412 1958 760 583 430 0 659 1734 427
501 93 118 755 829 876 1602 401! Sacrmnto;
!Case3 1390 504 814 1438 1086 715 744 711 1299 648 767 666 659 0 1319 657
764 752 770 836 712 764 1003 731! SLC;
!Case3 1187 939 1572 197 759 1363 1729 1353 1066 974 2086 1309 1734 1319 0 1307
1307 1737 1698 2155 2022 892 625 1373! SAnt;
!Case3 1996 1001 265 1482 1533 59 422 55 1887 333 992 10 427 657 1307 0
1108 430 391 1164 1193 449 1344 75! SBrn;
!Case3 2064 1108 339 1482 1565 125 496 99 1919 355 1084 98 501 764 1307 108
0 504 465 1256 1300 415 1376 119! SDgo;
!Case3 2142 1235 176 1912 1835 379 8 415 2051 763 636 433 93 752 1737 430
504 0 44 808 882 879 1695 404! SFrn;
!Case3 2160 1242 151 1873 1842 340 42 376 2069 724 665 394 118 770 1698 391
465 44 0 837 911 840 1669 365! SJos;
!Case3 2013 1307 917 2274 1839 1131 800 1167 1991 1437 172 1173 755 836 2155 1164
1256 808 837 0 278 1553 1808 1156! Seat;
!Case3 1735 1089 991 2102 1561 1205 874 1241 1713 1335 348 1202 829 712 2022 1193
1300 882 911 278 0 1451 1544 1230! Spkn;
!Case3 1688 835 714 1067 1189 505 871 491 1543 118 1382 451 876 764 892 449
415 879 840 1553 1451 0 1000 515! Tucs;
!Case3 696 509 1534 608 197 1400 1687 1390 551 1025 1739 1346 1602 1003 625 1344
1376 1695 1669 1808 1544 1000 0 1410! Wich;
!Case3 2060 1075 270 1548 1599 22 396 30 1953 399 1015 65 401 731 1373 75
119 404 365 1156 1230 515 1410 0;!LngB;

```

```

! Case Miller P. TSP distance = 33696;
! DISTMTYP = -1: x-y coordinates, Manhattan/L1 metric,
                0: x-y coordinates, Euclidean distance,
                1: latitude-longitude, use Great Circle distances,
                2: explicit distance matrix;
!CaseMillerP; DISTMTYP = 2;
!CaseMillerP; DISTMAX = 9999999; ! Maximum distance of any route;
!CaseMillerP; TRANSPOSE = 0; ! = 1 if distance matrix is from column to row;
                ! = 0 if distance matrix is from row to column;
!CaseMillerP; BACK21ST = 1 ;! > 0 means must do a changeover back to first at end;

!Truck Loads
CustId      Truck #
Customer ID truck1      truck2      truck3      Sum      Customer Total      ;
!CaseMillerP;
CITY =
  HOME C2014 C2037 C2044 C2059 C2075 C2105 C2145 C2149;
!CaseMillerP; NUM_STOPS = 9; ! Number of stops to make;

!CaseMillerP; !CITYBGN = HOME;! Depot city;

!Durations in seconds between points;
! Home C2014 C2037 C2044 C2059 C2075 C2105 C2145 C2149 ;
!CaseMillerP;
DISTANCE=
  0 4754 8272 9114 5585 4240 2959 4320 6379
  4754 0 9710 10553 3840 533 3865 6476 2990
  8272 9710 0 1617 8284 9682 5990 4694 12337
  9114 10553 1617 0 8057 10496 6805 5509 12786
  5585 3840 8284 8057 0 3711 2914 5173 5981
  4240 533 9682 10496 3711 0 3704 6315 3098
  2959 3865 5990 6805 2914 3704 0 2756 6473
  4320 6476 4694 5509 5173 6315 2756 0 9094
  6379 2990 12337 12786 5981 3098 6473 9094 0
;
! RUNTIME(j) = time spent at city j;
!CaseMillerP; RUNTIME = 0;

!CasePonce TRANSPOSE = 0; ! = 1 if distance matrix is from column to row;
                ! = 0 if distance matrix is from row to column;
!CasePonce BACK21ST = 1 ;! > 0 means must do a changeover back to first at end;
! DISTMTYP = -1: x-y coordinates, Manhattan/L1 metric,
                0: x-y coordinates, Euclidean distance,
                1: latitude-longitude, use Great Circle distances,
                2: explicit distance matrix;
!CasePonce DISTMTYP = 2;
!CasePonce CITY= 1..75;
! Additional options;
!CasePonce CITYBGN = 1;! The city we want to call the beginning (and ending) city;
!CasePonce INFLAG = 1; ! INFLAG(j) = 0 if city j is not to be included in tour. All are
in ;
!CasePonce RUNTIME= 0; ! RUNTIME(j) = time spent at city j. Run times are 0,;
!CasePonce NUM_STOPS = 75; ! Number of stops to make, including depot;

!CasePonce DISTANCE =
0 1.333 1.617 1.430 1.167 1.867 1.483 1.167 1.933 0.950 1.800 1.800 1.683 1.650 1.400
  1.633 1.160 1.050 1.683 1.197 1.717 2.683 1.766 0.967 1.197 1.617 1.617 1.063 1.534
  1.534 1.750 1.867 1.433 2.333 2.150 2.717 2.617 2.467 2.333 2.433 2.533 1.100 1.267
  1.100 1.600 1.700 1.367 1.183 1.617 1.833 1.767 1.733 1.150 0.917 1.167 1.600 1.117
  0.950 1.367 1.483 1.400 1.300 1.266 1.733 2.650 2.233 1.733 1.650 0.967 2.650 1.434
  1.750 1.550 1.816 1.833
1.333 0 1.367 1.097 0.967 1.267 1.467 1.084 1.933 0.900 1.200 1.200 1.083 1.500 0.800
  1.100 1.093 1.000 1.050 1.247 1.217 2.200 1.133 1.000 0.530 0.950 0.950 1.246 0.817
  0.817 1.033 1.233 1.200 1.700 2.583 2.617 2.717 2.933 3.083 2.783 2.300 0.950 1.117
  0.950 1.450 1.250 0.917 0.633 1.383 1.400 1.183 1.267 0.733 1.050 1.300 1.300 0.984
  0.817 1.133 1.066 1.183 1.034 1.116 1.133 2.183 1.683 1.116 1.033 0.867 2.300 1.000

```

	1.117	1.300	1.316	1.500										
1.617	1.367	0	1.113	0.967	1.466	1.033	0.900	1.766	0.7	1.4	1.4	1.316	1.55	1.033
	1.316	0.86	0.683	1.25	1.113	1.466	2.366	1.333	0.683	0.763	1.183	1.183	1.013	1.050
	1.050	1.35	1.6	1.299	2.116	1.766	2.166	2.333	2.366	2.366	2.4	2.366	1.066	1.233
	1.066	1.566	1.5	1.167	1.033	1.366	1.383	1.566	1.566	1	0.683	0.933	1.45	1.100
	0.933	1.366	1.316	1.183	1.033	1.366	1.366	2.466	1.883	1.383	1.3	0.833	2.333	1.000
	1.333	1.466	1.683	1.666										
1.430	1.097	1.113	0	0.867	1.350	1.333	0.917	1.750	0.700	1.367	1.367	1.216	1.433	0.967
	1.316	0.893	0.717	1.233	0.997	1.367	2.250	1.333	0.867	0.680	1.100	1.100	0.913	0.967
	0.967	1.250	1.450	1.100	1.967	1.683	2.367	2.567	2.550	2.467	2.033	2.200	0.933	1.100
	0.933	1.433	1.400	1.067	0.900	1.367	1.367	1.483	1.467	0.833	0.783	1.033	1.250	0.917
	0.750	1.183	1.166	1.033	0.950	1.283	1.300	2.300	1.733	1.283	1.200	0.683	2.233	0.967
	1.217	1.133	1.483	1.433										
1.167	0.967	0.967	0.867	0	1.567	1.433	0.917	1.750	0.750	1.450	1.450	1.300	1.300	1.033
	1.466	0.943	0.800	1.367	1.013	1.333	2.300	1.483	0.867	0.830	1.250	1.250	0.913	1.067
	1.067	1.400	1.650	1.033	2.000	1.700	2.483	2.567	2.550	2.467	2.583	2.300	0.783	0.950
	0.783	1.283	1.583	1.250	0.950	1.550	1.550	1.550	1.500	0.983	0.850	1.100	1.167	0.750
	0.583	1.000	1.083	1.133	1.050	1.433	1.366	2.200	1.733	1.333	1.250	0.533	2.350	1.050
	1.400	1.383	1.583	1.567										
1.867	1.267	1.467	1.350	1.567	0	1.567	1.217	2.050	1.050	1.200	1.200	1.066	1.650	0.633
	0.966	1.210	1.067	0.933	1.430	1.467	2.383	1.016	1.133	0.563	0.983	0.983	1.246	0.950
	0.950	1.000	1.183	1.366	1.933	1.983	2.650	2.683	2.700	2.683	2.683	2.383	1.167	1.334
	1.167	1.667	1.300	0.967	0.767	1.367	1.483	1.367	1.100	0.767	1.100	1.350	1.450	1.167
	1.000	1.400	1.266	1.283	1.117	0.900	0.966	2.383	1.933	0.916	0.833	0.967	2.450	1.117
	0.950	1.333	1.033	1.567										
1.483	1.467	1.033	1.333	1.433	1.567	0	0.867	1.700	0.700	1.533	1.533	1.600	1.583	1.333
	1.416	0.860	0.667	1.350	1.080	1.517	2.383	1.433	0.583	0.813	1.233	1.233	0.946	1.150
	1.150	1.350	1.567	1.383	2.100	1.833	2.183	2.383	2.317	2.433	2.400	2.400	1.100	1.267
	1.100	1.600	1.600	1.267	1.067	1.533	1.550	1.683	1.650	1.000	0.683	0.933	1.500	1.034
	0.867	1.317	1.500	1.217	1.034	1.583	1.666	2.633	1.983	1.616	1.533	0.900	2.333	1.000
	1.550	1.400	1.716	1.650										
1.167	1.084	0.900	0.917	0.917	1.217	0.867	0	1.517	0.533	1.483	1.483	1.383	1.500	1.133
	1.366	0.727	0.567	1.300	1.013	1.433	2.350	1.383	0.783	0.763	1.183	1.183	0.930	1.067
	1.067	1.317	1.533	1.200	2.000	1.583	2.350	2.450	2.433	2.383	2.483	2.283	0.967	1.134
	0.967	1.467	1.467	1.134	0.933	1.400	1.533	1.533	1.467	0.950	0.600	0.850	1.367	0.950
	0.783	1.217	1.333	1.083	1.000	1.433	1.466	2.483	1.933	1.600	1.517	0.767	2.400	1.017
	1.483	1.300	1.616	1.550										
1.933	1.933	1.767	1.750	1.750	2.050	1.700	1.517	0	0.533	1.450	1.450	1.383	1.483	1.133
	1.366	0.727	0.583	1.333	1.013	1.467	2.333	1.400	0.783	0.780	1.200	1.200	0.963	1.117
	1.117	1.383	1.600	1.216	2.067	1.600	2.383	2.450	2.450	2.433	2.500	2.333	0.983	1.150
	0.983	1.483	1.533	1.200	0.983	1.483	1.533	1.633	1.533	0.983	0.600	0.850	1.367	0.967
	0.800	1.233	1.333	1.083	1.034	1.433	1.466	2.483	1.933	1.600	1.517	0.767	2.400	1.017
	1.483	1.300	1.616	1.550										
0.950	0.900	0.700	0.700	0.750	1.050	0.700	0.533	0.533	0	1.633	1.633	1.416	1.533	1.167
	1.500	0.727	0.567	1.467	1.063	1.583	2.533	1.583	0.850	1.097	1.517	1.517	1.030	1.367
	1.367	1.583	1.783	1.233	2.217	1.600	2.400	2.633	2.550	2.600	2.583	2.383	1.000	1.167
	1.000	1.500	1.583	1.250	1.167	1.367	1.467	1.833	1.700	1.200	0.600	0.850	1.367	0.934
	0.767	1.233	1.350	0.917	1.000	1.583	1.500	2.500	2.000	1.633	1.550	0.783	2.350	1.034
	1.500	1.283	1.600	1.483										
1.800	1.200	1.400	1.367	1.450	1.200	1.533	1.483	1.450	1.633	0	1.033	0.866	1.433	0.667
	1.000	1.010	0.850	1.000	1.130	1.333	2.300	1.083	0.933	0.463	0.883	0.883	1.130	0.800
	0.800	1.083	1.283	1.200	1.900	1.783	2.400	2.500	2.583	2.667	2.483	2.167	1.050	1.217
	1.050	1.550	1.100	0.767	0.650	1.200	1.250	1.233	1.150	0.600	0.883	1.133	1.217	0.950
	0.783	1.100	1.183	0.950	0.850	1.000	0.983	2.267	1.767	0.983	0.900	0.867	2.250	0.934
	1.000	0.983	1.100	1.250										
1.800	1.200	1.400	1.367	1.450	1.200	1.533	1.483	1.450	1.633	1.033	0	0.866	1.433	0.667
	1.000	1.010	0.850	1.000	1.130	1.333	2.300	1.083	0.933	0.463	0.883	0.883	1.130	0.800
	0.800	1.083	1.283	1.200	1.900	1.783	2.400	2.500	2.583	2.667	2.483	2.167	1.050	1.217
	1.050	1.550	1.100	0.767	0.650	1.200	1.250	1.233	1.150	0.600	0.883	1.133	1.217	0.950
	0.783	1.100	1.183	0.950	0.850	1.000	0.983	2.267	1.767	0.983	0.900	0.867	2.250	0.934
	1.000	0.983	1.100	1.250										
1.683	1.083	1.316	1.216	1.300	1.066	1.600	1.383	1.383	1.416	0.866	0.866	0	1.433	0.667
	1.000	1.010	0.850	1.000	1.130	1.333	2.300	1.083	0.933	0.463	0.883	0.883	1.130	0.800
	0.800	1.083	1.283	1.200	1.900	1.783	2.400	2.500	2.583	2.667	2.483	2.167	1.050	1.217
	1.050	1.550	1.100	0.767	0.650	1.200	1.250	1.233	1.150	0.600	0.883	1.133	1.217	0.950
	0.783	1.100	1.183	0.950	0.850	1.000	0.983	2.267	1.767	0.983	0.900	0.867	2.250	0.934
	1.000	1.000	1.133	1.267										
1.650	1.500	1.550	1.433	1.300	1.650	1.583	1.500	1.483	1.533	1.433	1.433	1.433	0	0.983

	1.316	1.043	0.883	1.283	1.113	1.250	2.233	1.366	1.067	0.797	1.217	1.217	1.030	1.050
	1.050	1.333	1.533	0.900	2.000	1.833	2.550	2.667	2.633	2.533	2.667	2.383	0.683	0.850
	0.683	1.183	1.500	1.167	0.967	1.483	1.583	1.600	1.550	1.033	0.967	1.217	1.100	0.767
	0.600	0.933	1.016	1.100	1.134	1.433	1.383	2.183	1.683	1.466	1.383	0.633	2.483	1.217
	1.383	1.316	1.583	1.533										
1.400	0.800	1.033	0.967	1.033	0.633	1.333	1.133	1.133	1.167	0.667	0.667	0.667	0.983	0
	0.866	1.243	1.150	0.933	1.380	1.500	2.400	1.016	1.267	0.547	0.967	0.967	1.380	0.867
	0.867	1.183	1.267	1.433	2.000	2.167	2.700	2.900	2.900	2.900	2.883	2.283	1.283	1.450
	1.283	1.783	1.250	0.917	0.783	1.333	1.550	1.383	1.067	0.700	1.367	1.617	1.383	1.134
	0.967	1.250	1.333	1.150	1.017	0.983	0.866	2.467	1.967	1.000	0.917	1.100	2.433	1.134
	0.883	1.266	1.033	1.467										
1.633	1.100	1.316	1.316	1.466	0.966	1.416	1.366	1.366	1.500	1.000	1.000	1.000	1.316	0.866
	0	1.243	1.150	0.933	1.380	1.500	2.400	1.016	1.267	0.547	0.967	0.967	1.380	0.867
	0.867	1.183	1.267	1.433	2.000	2.167	2.700	2.900	2.900	2.900	2.883	2.283	1.283	1.450
	1.283	1.783	1.250	0.917	0.783	1.333	1.550	1.383	1.067	0.700	1.367	1.617	1.383	1.134
	0.967	1.250	1.333	1.150	1.017	0.983	0.866	2.467	1.967	1.000	0.917	1.100	2.433	1.134
	0.883	1.266	1.033	1.467										
1.160	1.093	0.860	0.893	0.943	1.210	0.860	0.727	0.727	0.727	1.010	1.010	1.010	1.043	1.243
	1.243	0	0.533	1.617	1.080	1.583	2.467	1.516	0.750	0.897	1.317	1.317	0.996	1.217
	1.217	1.517	1.733	1.233	2.167	1.633	2.333	2.600	2.467	2.533	2.550	2.400	1.000	1.167
	1.000	1.500	1.650	1.317	1.067	1.433	1.450	1.733	1.783	1.150	0.567	0.817	1.433	1.000
	0.833	1.300	1.383	1.050	0.967	1.566	1.616	2.483	1.967	1.566	1.483	0.783	2.300	1.017
	1.450	1.300	1.616	1.550										
1.050	1.000	0.683	0.717	0.800	1.067	0.667	0.567	0.583	0.567	0.850	0.850	0.850	0.883	1.150
	1.150	0.533	0	1.617	1.080	1.583	2.467	1.516	0.750	0.897	1.317	1.317	0.996	1.217
	1.217	1.517	1.733	1.233	2.167	1.633	2.333	2.600	2.467	2.533	2.550	2.400	1.000	1.167
	1.000	1.500	1.650	1.317	1.067	1.433	1.450	1.733	1.783	1.150	0.567	0.817	1.433	1.000
	0.833	1.300	1.383	1.050	0.967	1.566	1.616	2.483	1.967	1.566	1.483	0.783	2.300	1.017
	1.450	1.300	1.616	1.550										
1.683	1.050	1.250	1.233	1.367	0.933	1.350	1.300	1.333	1.467	1.000	1.000	1.000	1.283	0.933
	0.933	1.617	1.617	0	1.280	1.450	2.400	0.900	1.183	0.613	1.033	1.033	1.196	1.000
	1.000	1.117	1.233	1.400	2.033	2.083	2.633	2.833	2.767	3.000	2.800	2.333	1.300	1.467
	1.300	1.800	1.383	1.050	0.867	1.367	1.383	1.367	1.100	0.867	1.183	1.433	1.600	1.350
	1.183	1.283	1.366	1.200	1.034	0.933	0.983	2.450	1.967	0.933	0.850	1.233	2.433	1.334
	0.883	1.366	0.916	1.583										
1.197	1.247	1.113	0.997	1.013	1.430	1.080	1.013	1.013	1.063	1.130	1.130	1.130	1.113	1.380
	1.380	1.080	1.080	1.280	0	1.450	2.367	1.433	0.883	0.797	1.217	1.217	0.796	1.134
	1.134	1.383	1.633	1.100	2.083	1.700	2.450	2.700	2.567	2.583	2.667	2.350	0.867	1.034
	0.867	1.367	1.633	1.300	1.033	1.483	1.500	1.650	1.550	0.983	0.800	1.050	1.283	0.867
	0.700	1.133	1.216	0.983	1.100	1.483	1.483	2.367	1.867	1.500	1.417	0.633	2.367	1.067
	1.517	1.333	1.616	1.533										
1.717	1.217	1.467	1.367	1.333	1.467	1.517	1.433	1.467	1.583	1.333	1.333	1.333	1.250	1.500
	1.500	1.583	1.583	1.450	1.450	0	2.150	1.283	1.133	0.563	0.983	0.983	1.163	0.867
	0.867	1.217	1.400	1.033	1.783	1.950	2.633	2.800	2.783	2.867	2.783	2.333	0.867	1.034
	0.867	1.367	1.350	1.017	0.700	1.433	1.433	1.383	1.350	0.800	1.033	1.283	1.233	0.950
	0.783	0.850	0.933	1.100	1.034	1.183	1.183	2.083	1.583	1.200	1.117	0.783	2.400	1.117
	1.200	1.466	1.500	1.683										
2.683	2.200	2.367	2.250	2.300	2.383	2.383	2.350	2.333	2.533	2.300	2.300	2.300	2.233	2.400
	2.400	2.467	2.467	2.400	2.367	2.150	0	1.200	0.950	0.563	0.983	0.983	0.996	0.800
	0.800	1.083	1.283	0.983	1.800	1.833	2.483	2.650	2.633	2.633	2.650	2.200	0.800	0.967
	0.800	1.300	1.333	1.000	0.700	1.300	1.350	1.333	1.333	0.700	0.900	1.150	1.150	0.900
	0.733	0.850	0.933	1.017	0.967	1.166	1.166	2.083	1.583	1.166	1.083	0.767	2.300	1.017
	1.133	1.266	1.483	1.483										
1.766	1.133	1.333	1.333	1.483	1.016	1.433	1.383	1.400	1.583	1.083	1.083	1.083	1.366	1.016
	1.016	1.516	1.516	0.900	1.433	1.283	1.200	0	1.167	0.597	1.017	1.017	1.346	0.950
	0.950	1.033	1.233	1.383	2.000	2.050	2.750	2.933	2.867	2.850	2.867	2.383	1.183	1.350
	1.183	1.683	1.300	0.967	0.800	1.350	1.383	1.350	1.167	0.783	1.133	1.383	1.500	1.200
	1.033	1.200	1.283	1.283	1.000	0.916	0.966	2.400	1.900	0.933	0.850	1.133	2.383	1.317
	0.850	1.333	0.883	1.567										
0.967	1.000	0.683	0.867	0.867	1.133	0.583	0.783	0.783	0.850	0.933	0.933	0.933	1.067	1.267
	1.267	0.750	0.750	1.183	0.883	1.133	0.950	1.167	0	0.913	1.333	1.333	0.963	1.234
	1.234	1.517	1.733	1.300	2.183	1.800	2.117	2.283	2.200	2.367	2.300	2.433	1.100	1.267
	1.100	1.600	1.633	1.300	1.100	1.467	1.500	1.733	1.650	1.083	0.750	1.000	1.483	1.034
	0.867	1.383	1.466	1.100	1.067	1.500	1.483	2.567	2.067	1.500	1.417	0.850	2.333	1.000
	1.500	1.400	1.716	1.550										
1.197	0.530	0.763	0.680	0.830	0.563	0.813	0.763	0.780	1.097	0.463	0.463	0.463	0.797	0.547
	0.547	0.897	0.897	0.613	0.797	0.563	0.563	0.597	0.913	0	0.783	0.783	1.246	0.750
	0.750	1.017	1.167	1.200	1.883	1.950	2.533	2.783	2.683	2.767	2.800	2.283	1.033	1.200

	1.033	1.533	1.167	0.834	0.567	1.250	1.283	1.183	1.150	0.583	1.083	1.333	1.300	1.034
	0.867	1.033	1.116	1.133	0.967	1.033	0.983	2.250	1.750	1.000	0.917	0.900	2.400	1.117
	1.017	1.016	1.200	1.283										
1.617	0.950	1.183	1.100	1.250	0.983	1.233	1.183	1.200	1.517	0.883	0.883	0.883	1.217	0.967
	0.967	1.317	1.317	1.033	1.217	0.983	0.983	1.017	1.333	0.783	0	0.783	1.246	0.750
	0.750	1.017	1.167	1.200	1.883	1.950	2.533	2.783	2.683	2.767	2.800	2.283	1.033	1.200
	1.033	1.533	1.167	0.834	0.567	1.250	1.283	1.183	1.150	0.583	1.083	1.333	1.300	1.034
	0.867	1.033	1.116	1.133	0.967	1.033	0.983	2.250	1.750	1.000	0.917	0.900	2.400	1.117
	1.017	1.016	1.200	1.283										
1.617	0.950	1.183	1.100	1.250	0.983	1.233	1.183	1.200	1.517	0.883	0.883	0.883	1.217	0.967
	0.967	1.317	1.317	1.033	1.217	0.983	0.983	1.017	1.333	0.783	0.783	0	1.246	0.750
	0.750	1.017	1.167	1.200	1.883	1.950	2.533	2.783	2.683	2.767	2.800	2.283	1.033	1.200
	1.033	1.533	1.167	0.834	0.567	1.250	1.283	1.183	1.150	0.583	1.083	1.333	1.300	1.034
	0.867	1.033	1.116	1.133	0.967	1.033	0.983	2.250	1.750	1.000	0.917	0.900	2.400	1.117
	1.017	1.016	1.200	1.283										
1.063	1.246	1.013	0.913	0.913	1.246	0.946	0.930	0.963	1.030	1.130	1.130	1.130	1.030	1.380
	1.380	0.996	0.996	1.196	0.796	1.163	0.996	1.346	0.963	1.246	1.246	1.246	0	1.217
	1.217	1.450	1.683	1.166	2.150	1.833	2.500	2.500	2.367	2.333	2.500	2.533	0.967	1.134
	0.967	1.467	1.583	1.250	1.050	1.550	1.550	1.650	1.583	1.033	0.950	1.200	1.367	0.917
	0.750	1.200	1.283	1.183	1.117	1.500	1.416	2.400	1.900	1.516	1.433	0.700	2.583	1.250
	1.400	1.433	1.766	1.667										
1.534	0.817	1.050	0.967	1.067	0.950	1.150	1.067	1.117	1.367	0.800	0.800	0.800	1.050	0.867
	0.867	1.217	1.217	1.000	1.134	0.867	0.800	0.950	1.234	0.750	0.750	0.750	1.217	0
	0.700	1.050	1.250	1.166	1.800	1.900	2.567	2.733	2.683	2.567	2.700	2.233	0.967	1.134
	0.967	1.467	1.167	0.834	0.550	1.250	1.283	1.283	1.183	0.583	1.033	1.283	1.283	1.017
	0.850	1.000	1.083	1.050	0.950	1.066	1.033	2.183	1.683	1.083	1.000	0.850	2.333	1.034
	1.017	1.033	1.233	1.300										
1.534	0.817	1.050	0.967	1.067	0.950	1.150	1.067	1.117	1.367	0.800	0.800	0.800	1.050	0.867
	0.867	1.217	1.217	1.000	1.134	0.867	0.800	0.950	1.234	0.750	0.750	0.750	1.217	0.700
	0	1.050	1.250	1.166	1.800	1.900	2.567	2.733	2.683	2.567	2.700	2.233	0.967	1.134
	0.967	1.467	1.167	0.834	0.550	1.250	1.283	1.283	1.183	0.583	1.033	1.283	1.283	1.017
	0.850	1.000	1.083	1.050	0.950	1.066	1.033	2.183	1.683	1.083	1.000	0.850	2.333	1.034
	1.017	1.033	1.233	1.300										
1.750	1.033	1.350	1.250	1.400	1.000	1.350	1.317	1.383	1.583	1.083	1.083	1.083	1.333	1.183
	1.183	1.517	1.517	1.117	1.383	1.217	1.083	1.033	1.517	1.017	1.017	1.017	1.450	1.050
	1.050	0	1.083	1.400	1.883	2.100	2.783	3.020	2.950	2.933	3.020	2.533	1.183	1.350
	1.183	1.683	1.333	1.000	0.850	1.467	1.600	1.183	1.300	0.800	1.267	1.517	1.467	1.217
	1.050	1.183	1.266	1.250	1.250	1.000	1.183	2.367	1.867	1.016	0.933	1.150	2.600	1.317
	1.050	1.316	1.283	1.533										
1.867	1.233	1.600	1.450	1.650	1.183	1.567	1.533	1.600	1.783	1.283	1.283	1.283	1.533	1.267
	1.267	1.733	1.733	1.233	1.633	1.400	1.283	1.233	1.733	1.167	1.167	1.167	1.683	1.250
	1.250	1.083	0	1.383	1.900	2.100	2.750	2.900	2.933	2.983	2.933	2.467	1.150	1.317
	1.150	1.650	1.267	0.934	0.800	1.550	1.583	1.200	1.283	0.750	1.300	1.550	1.450	1.234
	1.067	1.200	1.283	1.233	1.234	0.966	1.133	2.383	1.883	0.983	0.900	1.100	2.533	1.317
	1.017	1.233	1.083	1.600										
1.433	1.200	1.300	1.100	1.033	1.366	1.383	1.200	1.216	1.233	1.200	1.200	1.200	0.900	1.433
	1.433	1.233	1.233	1.400	1.100	1.033	0.983	1.383	1.300	1.200	1.200	1.200	1.166	1.166
	1.166	1.400	1.383	0	1.933	1.800	2.500	2.683	2.600	2.500	2.617	2.267	0.700	0.867
	0.700	1.200	1.400	1.067	0.883	1.400	1.433	1.483	1.400	0.867	0.900	1.150	1.100	0.800
	0.633	0.917	1.000	1.100	1.034	1.283	1.266	2.167	1.667	1.283	1.200	0.667	2.400	1.117
	1.217	1.366	1.600	1.583										
2.333	1.700	2.117	1.967	2.000	1.933	2.100	2.000	2.067	2.217	1.900	1.900	1.900	2.000	2.000
	2.000	2.167	2.167	2.033	2.083	1.783	1.800	2.000	2.183	1.883	1.883	1.883	2.150	1.800
	1.800	1.883	1.900	1.933	0	2.050	2.783	2.867	2.900	2.833	2.983	2.400	1.033	1.200
	1.033	1.533	1.400	1.067	0.883	1.533	1.567	1.333	1.467	0.883	1.183	1.433	1.350	1.100
	0.933	1.100	1.183	1.283	1.150	1.266	1.283	2.233	1.733	1.283	1.200	0.983	2.500	1.250
	1.283	1.466	1.533	1.717										
2.150	2.583	1.767	1.683	1.700	1.983	1.833	1.583	1.600	1.600	1.783	1.783	1.783	1.833	2.167
	2.167	1.633	1.633	2.083	1.700	1.950	1.833	2.050	1.800	1.950	1.950	1.950	1.833	1.900
	1.900	2.100	2.100	1.800	2.050	0	2.367	2.433	2.400	2.433	2.433	2.367	1.050	1.217
	1.050	1.550	1.500	1.167	0.983	1.333	1.367	1.600	1.567	1.050	0.633	0.883	1.400	1.000
	0.833	1.233	1.316	0.917	0.950	1.433	1.366	2.450	1.950	1.433	1.350	0.750	2.283	0.950
	1.400	1.316	1.666	1.600										
2.717	2.617	2.167	2.367	2.483	2.650	2.183	2.350	2.383	2.400	2.400	2.400	2.400	2.550	2.700
	2.700	2.333	2.333	2.633	2.450	2.633	2.483	2.750	2.117	2.533	2.533	2.533	2.500	2.567
	2.567	2.783	2.750	2.500	2.783	2.367	0	2.350	2.267	2.350	2.333	2.333	1.133	1.300
	1.133	1.633	1.483	1.150	0.950	1.367	1.383	1.767	1.667	0.950	0.800	1.050	1.467	1.134
	0.967	1.400	1.483	1.133	1.100	1.600	1.583	2.633	2.133	1.600	1.517	0.933	2.350	1.000

	1.450	1.633	1.833	1.867										
2.617	2.717	2.333	2.567	2.567	2.683	2.383	2.450	2.450	2.633	2.500	2.500	2.500	2.667	2.900
	2.900	2.600	2.600	2.833	2.700	2.800	2.650	2.933	2.283	2.783	2.783	2.783	2.500	2.733
	2.733	3.020	2.900	2.683	2.867	2.433	2.350	0	2.183	2.333	2.050	2.650	1.350	1.517
	1.350	1.850	1.900	1.567	1.383	1.583	1.617	2.033	1.917	1.400	0.967	1.217	1.783	1.217
	1.050	1.633	1.716	1.417	1.234	1.766	1.766	2.783	2.283	1.766	1.683	1.050	2.617	1.250
	1.683	1.816	1.933	1.867										
2.467	2.933	2.367	2.550	2.550	2.700	2.317	2.433	2.450	2.550	2.583	2.583	2.583	2.633	2.900
	2.900	2.467	2.467	2.767	2.567	2.783	2.633	2.867	2.200	2.683	2.683	2.683	2.367	2.683
	2.683	2.950	2.933	2.600	2.900	2.400	2.267	2.183	0	2.250	2.250	2.667	1.250	1.417
	1.250	1.750	1.950	1.617	1.450	1.850	1.867	1.967	1.967	1.400	0.883	1.133	1.633	1.200
	1.033	1.500	1.583	1.233	1.300	1.816	1.800	2.733	2.233	1.866	1.783	1.000	2.567	1.234
	1.733	1.700	2.033	1.933										
2.333	3.083	2.367	2.467	2.467	2.683	2.433	2.383	2.433	2.600	2.667	2.667	2.667	2.533	2.900
	2.900	2.533	2.533	3.000	2.583	2.867	2.633	2.850	2.367	2.767	2.767	2.767	2.333	2.567
	2.567	2.933	2.983	2.500	2.833	2.433	2.350	2.333	2.250	0	2.350	2.633	1.200	1.367
	1.200	1.700	1.883	1.550	1.350	1.933	1.883	1.983	1.933	1.383	0.900	1.150	1.650	1.200
	1.033	1.533	1.616	1.333	1.300	1.766	1.766	2.733	2.233	1.783	1.700	1.000	2.650	1.334
	1.817	1.683	1.966	1.900										
2.433	2.783	2.400	2.033	2.583	2.683	2.400	2.483	2.500	2.583	2.483	2.483	2.483	2.667	2.883
	2.883	2.550	2.550	2.800	2.667	2.783	2.650	2.867	2.300	2.800	2.800	2.800	2.500	2.700
	2.700	3.020	2.933	2.617	2.983	2.433	2.333	2.050	2.250	2.350	0	2.700	1.400	1.567
	1.400	1.900	2.083	1.750	1.567	1.700	1.750	2.083	2.100	1.567	1.050	1.300	1.850	1.350
	1.183	1.633	1.716	1.433	1.350	1.916	1.916	2.850	2.350	1.900	1.817	1.183	2.667	1.334
	1.733	1.316	1.833	2.100										
2.533	2.300	2.367	2.200	2.300	2.383	2.400	2.283	2.333	2.383	2.167	2.167	2.167	2.383	2.283
	2.283	2.400	2.400	2.333	2.350	2.333	2.200	2.383	2.433	2.283	2.283	2.283	2.533	2.233
	2.233	2.533	2.467	2.267	2.400	2.367	2.333	2.650	2.667	2.633	2.700	0	0.983	1.150
	0.983	1.483	1.383	1.050	0.783	1.183	1.233	1.533	1.550	0.950	1.000	1.250	1.283	1.000
	0.833	1.117	1.200	0.950	0.867	1.400	1.383	2.300	1.800	1.366	1.283	0.867	2.233	0.917
	1.283	1.016	1.333	1.233										
1.100	0.950	1.067	0.933	0.783	1.167	1.100	0.967	0.983	1.000	1.050	1.050	1.050	0.683	1.283
	1.283	1.000	1.000	1.300	0.867	0.867	0.800	1.183	1.100	1.033	1.033	1.033	0.967	0.967
	0.967	1.183	1.150	0.700	1.033	1.050	1.133	1.350	1.250	1.200	1.400	0.983	0	0.700
	0.533	1.033	1.683	1.350	1.067	1.667	1.700	1.733	1.483	1.183	1.167	1.417	1.367	0.967
	0.800	1.150	1.233	1.283	1.300	1.550	1.616	2.433	1.933	1.550	1.467	0.867	2.633	1.334
	1.517	1.466	1.616	1.850										
1.267	1.117	1.234	1.100	0.950	1.334	1.267	1.134	1.150	1.167	1.217	1.217	1.217	0.850	1.450
	1.450	1.167	1.167	1.467	1.034	1.034	0.967	1.350	1.267	1.200	1.200	1.200	1.134	1.134
	1.134	1.350	1.317	0.867	1.200	1.217	1.300	1.517	1.417	1.367	1.567	1.150	0.700	0
	0.533	1.033	1.683	1.350	1.067	1.667	1.700	1.733	1.483	1.183	1.167	1.417	1.367	0.967
	0.800	1.150	1.233	1.283	1.300	1.550	1.616	2.433	1.933	1.550	1.467	0.867	2.633	1.334
	1.517	1.466	1.616	1.850										
1.100	0.950	1.067	0.933	0.783	1.167	1.100	0.967	0.983	1.000	1.050	1.050	1.050	0.683	1.283
	1.283	1.000	1.000	1.300	0.867	0.867	0.800	1.183	1.100	1.033	1.033	1.033	0.967	0.967
	0.967	1.183	1.150	0.700	1.033	1.050	1.133	1.350	1.250	1.200	1.400	0.983	0.533	0.533
	0	1.033	1.683	1.350	1.067	1.667	1.700	1.733	1.483	1.183	1.167	1.417	1.367	0.967
	0.800	1.150	1.233	1.283	1.300	1.550	1.616	2.433	1.933	1.550	1.467	0.867	2.633	1.334
	1.517	1.466	1.616	1.850										
1.600	1.450	1.567	1.433	1.283	1.667	1.600	1.467	1.483	1.500	1.550	1.550	1.550	1.183	1.783
	1.783	1.500	1.500	1.800	1.367	1.367	1.300	1.683	1.600	1.533	1.533	1.533	1.467	1.467
	1.467	1.683	1.650	1.200	1.533	1.550	1.633	1.850	1.750	1.700	1.900	1.483	1.033	1.033
	1.033	0	1.683	1.350	1.067	1.667	1.700	1.733	1.483	1.183	1.167	1.417	1.367	0.967
	0.800	1.150	1.233	1.283	1.300	1.550	1.616	2.433	1.933	1.550	1.467	0.867	2.633	1.334
	1.517	1.466	1.616	1.850										
1.700	1.250	1.500	1.400	1.583	1.300	1.600	1.467	1.533	1.583	1.100	1.100	1.100	1.500	1.250
	1.250	1.650	1.650	1.383	1.633	1.350	1.333	1.300	1.633	1.167	1.167	1.167	1.583	1.167
	1.167	1.333	1.267	1.400	1.400	1.500	1.483	1.900	1.950	1.883	2.083	1.383	1.683	1.683
	1.683	1.683	0	0.700	0.667	1.267	1.283	1.250	1.167	0.633	1.067	1.317	1.267	1.017
	0.850	1.133	1.216	1.083	0.950	1.066	1.016	2.300	1.800	1.000	0.917	0.883	2.367	1.050
	1.017	1.016	1.116	1.283										
1.367	0.917	1.167	1.067	1.250	0.967	1.267	1.134	1.200	1.250	0.767	0.767	0.767	1.167	0.917
	0.917	1.317	1.317	1.050	1.300	1.017	1.000	0.967	1.300	0.834	0.834	0.834	1.250	0.834
	0.834	1.000	0.934	1.067	1.067	1.167	1.150	1.567	1.617	1.550	1.750	1.050	1.350	1.350
	1.350	1.350	0.700	0	0.667	1.267	1.283	1.250	1.167	0.633	1.067	1.317	1.267	1.017
	0.850	1.133	1.216	1.083	0.950	1.066	1.016	2.300	1.800	1.000	0.917	0.883	2.367	1.050
	1.017	1.016	1.116	1.283										
1.183	0.633	1.033	0.900	0.950	0.767	1.067	0.933	0.983	1.167	0.650	0.650	0.650	0.967	0.783

	0.783	1.067	1.067	0.867	1.033	0.700	0.700	0.800	1.100	0.567	0.567	0.567	1.050	0.550
	0.550	0.850	0.800	0.883	0.883	0.983	0.950	1.383	1.450	1.350	1.567	0.783	1.067	1.067
	1.067	1.067	0.667	0.667	0	1.233	1.300	1.267	1.167	0.600	0.967	1.217	1.267	0.967
	0.800	0.983	1.066	1.050	0.950	1.033	1.033	2.200	1.700	1.066	0.983	0.850	2.333	1.034
	1.033	1.033	1.133	1.283										
1.617	1.383	1.367	1.367	1.550	1.367	1.533	1.400	1.483	1.367	1.200	1.200	1.200	1.483	1.333
	1.333	1.433	1.433	1.367	1.483	1.433	1.300	1.350	1.467	1.250	1.250	1.250	1.550	1.250
	1.250	1.467	1.550	1.400	1.533	1.333	1.367	1.583	1.850	1.933	1.700	1.183	1.667	1.667
	1.667	1.667	1.267	1.267	1.233	0	1.050	1.533	1.300	0.767	0.833	1.083	1.333	1.050
	0.883	1.183	1.266	0.917	0.767	1.216	1.166	2.367	1.867	1.233	1.150	0.867	2.183	0.867
	1.183	0.966	1.333	1.100										
1.833	1.400	1.383	1.367	1.550	1.483	1.550	1.533	1.533	1.467	1.250	1.250	1.250	1.583	1.550
	1.550	1.450	1.450	1.383	1.500	1.433	1.350	1.383	1.500	1.283	1.283	1.283	1.550	1.283
	1.283	1.600	1.583	1.433	1.567	1.367	1.383	1.617	1.867	1.883	1.750	1.233	1.700	1.700
	1.700	1.700	1.283	1.283	1.300	1.050	0	1.533	1.300	0.767	0.833	1.083	1.333	1.050
	0.883	1.183	1.266	0.917	0.767	1.216	1.166	2.367	1.867	1.233	1.150	0.867	2.183	0.867
	1.183	0.966	1.333	1.100										
1.767	1.183	1.567	1.483	1.550	1.367	1.683	1.533	1.633	1.833	1.233	1.233	1.233	1.600	1.383
	1.383	1.733	1.733	1.367	1.650	1.383	1.333	1.350	1.733	1.183	1.183	1.183	1.650	1.283
	1.283	1.183	1.200	1.483	1.333	1.600	1.767	2.033	1.967	1.983	2.083	1.533	1.733	1.733
	1.733	1.733	1.250	1.250	1.267	1.533	1.533	0	1.283	0.800	1.083	1.333	1.367	1.117
	0.950	1.133	1.216	1.150	1.117	1.100	1.133	2.283	1.783	1.100	1.017	0.967	2.483	1.167
	1.117	1.266	1.183	1.483										
1.733	1.267	1.567	1.467	1.500	1.100	1.650	1.467	1.533	1.700	1.150	1.150	1.150	1.550	1.067
	1.067	1.783	1.783	1.100	1.550	1.350	1.333	1.167	1.650	1.150	1.150	1.150	1.583	1.183
	1.183	1.300	1.283	1.400	1.467	1.567	1.667	1.917	1.967	1.933	2.100	1.550	1.483	1.483
	1.483	1.483	1.167	1.167	1.167	1.300	1.300	1.283	0	0.733	1.383	1.633	1.433	1.367
	1.200	1.233	1.316	1.250	1.050	0.900	0.883	2.433	1.933	0.883	0.800	1.067	2.350	1.200
	0.900	1.133	1.016	1.500										
1.150	0.733	1.000	0.833	0.983	0.767	1.000	0.950	0.983	1.200	0.600	0.600	0.600	1.033	0.700
	0.700	1.150	1.150	0.867	0.983	0.800	0.700	0.783	1.083	0.583	0.583	0.583	1.033	0.583
	0.583	0.800	0.750	0.867	0.883	1.050	0.950	1.400	1.400	1.383	1.567	0.950	1.183	1.183
	1.183	1.183	0.633	0.633	0.600	0.767	0.767	0.800	0.733	0	1.183	1.433	1.367	1.100
	0.933	1.083	1.166	1.183	1.017	1.033	1.016	2.283	1.783	1.066	0.983	0.967	2.400	1.050
	1.017	1.066	1.166	1.300										
0.917	1.050	0.683	0.783	0.850	1.100	0.683	0.600	0.600	0.600	0.883	0.883	0.883	0.967	1.367
	1.367	0.567	0.567	1.183	0.800	1.033	0.900	1.133	0.750	1.083	1.083	1.083	0.950	1.033
	1.033	1.267	1.300	0.900	1.183	0.633	0.800	0.967	0.883	0.900	1.050	1.000	1.167	1.167
	1.167	1.167	1.067	1.067	0.967	0.833	0.833	1.083	1.383	1.183	0	0.783	1.400	1.000
	0.833	1.250	1.333	1.050	1.050	1.483	1.416	2.533	2.033	1.466	1.383	0.783	2.250	1.034
	1.400	1.216	1.533	1.400										
1.167	1.300	0.933	1.033	1.100	1.350	0.933	0.850	0.850	0.850	1.133	1.133	1.133	1.217	1.617
	1.617	0.817	0.817	1.433	1.050	1.283	1.150	1.383	1.000	1.333	1.333	1.333	1.200	1.283
	1.283	1.517	1.550	1.150	1.433	0.883	1.050	1.217	1.133	1.150	1.300	1.250	1.417	1.417
	1.417	1.417	1.317	1.317	1.217	1.083	1.083	1.333	1.633	1.433	0.783	0	1.400	1.000
	0.833	1.250	1.333	1.050	1.050	1.483	1.416	2.533	2.033	1.466	1.383	0.783	2.250	1.034
	1.400	1.216	1.533	1.400										
1.600	1.300	1.450	1.250	1.167	1.450	1.500	1.367	1.367	1.367	1.217	1.217	1.217	1.100	1.383
	1.383	1.433	1.433	1.600	1.283	1.233	1.150	1.500	1.483	1.300	1.300	1.300	1.367	1.283
	1.283	1.467	1.450	1.100	1.350	1.400	1.467	1.783	1.633	1.650	1.850	1.283	1.367	1.367
	1.367	1.367	1.267	1.267	1.267	1.333	1.333	1.367	1.433	1.367	1.400	1.400	0	0.834
	0.667	0.917	1.000	1.100	1.017	1.233	1.233	2.150	1.650	1.216	1.133	0.683	2.400	1.117
	1.217	1.233	1.316	1.433										
1.117	0.984	1.100	0.917	0.750	1.167	1.034	0.950	0.967	0.934	0.950	0.950	0.950	0.767	1.134
	1.134	1.000	1.000	1.350	0.867	0.950	0.900	1.200	1.034	1.034	1.034	1.034	0.917	1.017
	1.017	1.217	1.234	0.800	1.100	1.000	1.134	1.217	1.200	1.200	1.350	1.000	0.967	0.967
	0.967	0.967	1.017	1.017	0.967	1.050	1.050	1.117	1.367	1.100	1.000	1.000	0.834	0
	0.533	0.983	1.066	1.050	1.000	1.316	1.300	2.200	1.700	1.283	1.200	0.583	2.350	1.050
	1.233	1.216	1.383	1.433										
0.950	0.817	0.933	0.750	0.583	1.000	0.867	0.783	0.800	0.767	0.783	0.783	0.783	0.600	0.967
	0.967	0.833	0.833	1.183	0.700	0.783	0.733	1.033	0.867	0.867	0.867	0.867	0.750	0.850
	0.850	1.050	1.067	0.633	0.933	0.833	0.967	1.050	1.033	1.033	1.183	0.833	0.800	0.800
	0.800	0.800	0.850	0.850	0.800	0.883	0.883	0.950	1.200	0.933	0.833	0.833	0.667	0.533
	0	0.983	1.066	1.050	1.000	1.316	1.300	2.200	1.700	1.283	1.200	0.583	2.350	1.050
	1.233	1.216	1.383	1.433										
1.367	1.133	1.367	1.183	1.000	1.400	1.317	1.217	1.233	1.233	1.100	1.100	1.100	0.933	1.250
	1.250	1.300	1.300	1.283	1.133	0.850	0.850	1.200	1.383	1.033	1.033	1.033	1.200	1.000
	1.000	1.183	1.200	0.917	1.100	1.233	1.400	1.633	1.500	1.533	1.633	1.117	1.150	1.150

	1.150	1.150	1.133	1.133	0.983	1.183	1.183	1.133	1.233	1.083	1.250	1.250	0.917	0.983
	0.983	0	0.866	1.117	1.034	1.200	1.200	2.067	1.567	1.216	1.133	0.800	2.400	1.134
	1.200	1.216	1.316	1.450										
1.483	1.066	1.316	1.166	1.083	1.266	1.500	1.333	1.333	1.350	1.183	1.183	1.183	1.016	1.333
	1.333	1.383	1.383	1.366	1.216	0.933	0.933	1.283	1.466	1.116	1.116	1.116	1.283	1.083
	1.083	1.266	1.283	1.000	1.183	1.316	1.483	1.716	1.583	1.616	1.716	1.200	1.233	1.233
	1.233	1.233	1.216	1.216	1.066	1.266	1.266	1.216	1.316	1.166	1.333	1.333	1.000	1.066
	1.066	0.866	0	1.117	1.034	1.200	1.200	2.067	1.567	1.216	1.133	0.800	2.400	1.134
	1.200	1.216	1.316	1.450										
1.400	1.183	1.183	1.033	1.133	1.283	1.217	1.083	1.083	0.917	0.950	0.950	0.950	1.100	1.150
	1.150	1.050	1.050	1.200	0.983	1.100	1.017	1.283	1.100	1.133	1.133	1.133	1.183	1.050
	1.050	1.250	1.233	1.100	1.283	0.917	1.133	1.417	1.233	1.333	1.433	0.950	1.283	1.283
	1.283	1.283	1.083	1.083	1.050	0.917	0.917	1.150	1.250	1.183	1.050	1.050	1.100	1.050
	1.050	1.117	1.117	0	0.817	1.400	1.233	2.350	1.850	1.216	1.133	0.833	2.133	0.834
	1.417	1.016	1.483	1.217										
1.300	1.034	1.034	0.950	1.050	1.117	1.034	1.000	1.034	1.000	0.850	0.850	0.850	1.134	1.017
	1.017	0.967	0.967	1.034	1.100	1.034	0.967	1.000	1.067	0.967	0.967	0.967	1.117	0.950
	0.950	1.250	1.234	1.034	1.150	0.950	1.100	1.234	1.300	1.300	1.350	0.867	1.300	1.300
	1.300	1.300	0.950	0.950	0.950	0.767	0.767	1.117	1.050	1.017	1.050	1.050	1.017	1.000
	1.000	1.034	1.034	0.817	0	1.400	1.266	2.367	1.867	1.233	1.150	0.850	2.133	0.834
	1.450	1.016	1.500	1.233										
1.266	1.116	1.366	1.283	1.433	0.900	1.583	1.433	1.433	1.583	1.000	1.000	1.000	1.433	0.983
	0.983	1.566	1.566	0.933	1.483	1.183	1.166	0.916	1.500	1.033	1.033	1.033	1.500	1.066
	1.066	1.000	0.966	1.283	1.266	1.433	1.600	1.766	1.816	1.766	1.916	1.400	1.550	1.550
	1.550	1.550	1.066	1.066	1.033	1.216	1.216	1.100	0.900	1.033	1.483	1.483	1.233	1.316
	1.316	1.200	1.200	1.400	1.400	0	0.933	2.400	1.900	0.866	0.783	1.033	2.367	1.334
	0.900	1.116	0.983	1.350										
1.733	1.133	1.366	1.300	1.366	0.966	1.666	1.466	1.466	1.500	0.983	0.983	0.983	1.383	0.866
	0.866	1.616	1.616	0.983	1.483	1.183	1.166	0.966	1.483	0.983	0.983	0.983	1.416	1.033
	1.033	1.183	1.133	1.266	1.283	1.366	1.583	1.766	1.800	1.766	1.916	1.383	1.616	1.616
	1.616	1.616	1.016	1.016	1.033	1.166	1.166	1.133	0.883	1.016	1.416	1.416	1.233	1.300
	1.300	1.200	1.200	1.233	1.266	0.933	0	2.400	1.900	0.900	0.817	1.100	2.383	1.050
	0.900	1.233	1.016	1.333										
2.650	2.183	2.467	2.300	2.200	2.383	2.633	2.483	2.483	2.500	2.267	2.267	2.267	2.183	2.467
	2.467	2.483	2.483	2.450	2.367	2.083	2.083	2.400	2.567	2.250	2.250	2.250	2.400	2.183
	2.183	2.367	2.383	2.167	2.233	2.450	2.633	2.783	2.733	2.733	2.850	2.300	2.433	2.433
	2.433	2.433	2.300	2.300	2.200	2.367	2.367	2.283	2.433	2.283	2.533	2.533	2.150	2.200
	2.200	2.067	2.067	2.350	2.367	2.400	2.400	0	1.550	1.216	1.133	0.833	2.500	1.167
	1.250	1.233	1.300	1.500										
2.233	1.683	1.883	1.733	1.733	1.933	1.983	1.933	1.933	2.000	1.767	1.767	1.767	1.683	1.967
	1.967	1.967	1.967	1.967	1.867	1.583	1.583	1.900	2.067	1.750	1.750	1.750	1.900	1.683
	1.683	1.867	1.883	1.667	1.733	1.950	2.133	2.283	2.233	2.233	2.350	1.800	1.933	1.933
	1.933	1.933	1.800	1.800	1.700	1.867	1.867	1.783	1.933	1.783	2.033	2.033	1.650	1.700
	1.700	1.567	1.567	1.850	1.867	1.900	1.900	1.550	0	1.216	1.133	0.833	2.500	1.167
	1.250	1.233	1.300	1.500										
1.733	1.116	1.383	1.283	1.333	0.916	1.616	1.600	1.600	1.633	0.983	0.983	0.983	1.466	1.000
	1.000	1.566	1.566	0.933	1.500	1.200	1.166	0.933	1.500	1.000	1.000	1.000	1.516	1.083
	1.083	1.016	0.983	1.283	1.283	1.433	1.600	1.766	1.866	1.783	1.900	1.366	1.550	1.550
	1.550	1.550	1.000	1.000	1.066	1.233	1.233	1.100	0.883	1.066	1.466	1.466	1.216	1.283
	1.283	1.216	1.216	1.216	1.233	0.866	0.900	1.216	1.216	0	0.783	1.100	2.400	1.067
	0.900	1.283	0.966	1.383										
1.650	1.033	1.300	1.200	1.250	0.833	1.533	1.517	1.517	1.550	0.900	0.900	0.900	1.383	0.917
	0.917	1.483	1.483	0.850	1.417	1.117	1.083	0.850	1.417	0.917	0.917	0.917	1.433	1.000
	1.000	0.933	0.900	1.200	1.200	1.350	1.517	1.683	1.783	1.700	1.817	1.283	1.467	1.467
	1.467	1.467	0.917	0.917	0.983	1.150	1.150	1.017	0.800	0.983	1.383	1.383	1.133	1.200
	1.200	1.133	1.133	1.133	1.150	0.783	0.817	1.133	1.133	0.783	0	1.100	2.400	1.067
	0.900	1.283	0.966	1.383										
0.967	0.867	0.833	0.683	0.533	0.967	0.900	0.767	0.767	0.783	0.867	0.867	0.867	0.633	1.100
	1.100	0.783	0.783	1.233	0.633	0.783	0.767	1.133	0.850	0.900	0.900	0.900	0.700	0.850
	0.850	1.150	1.100	0.667	0.983	0.750	0.933	1.050	1.000	1.000	1.183	0.867	0.867	0.867
	0.867	0.867	0.883	0.883	0.850	0.867	0.867	0.967	1.067	0.967	0.783	0.783	0.683	0.583
	0.583	0.800	0.800	0.833	0.850	1.033	1.100	0.833	0.833	1.100	1.100	0	2.433	1.134
	1.500	1.366	1.583	1.567										
2.650	2.300	2.333	2.233	2.350	2.450	2.333	2.400	2.400	2.350	2.250	2.250	2.250	2.483	2.433
	2.433	2.300	2.300	2.433	2.367	2.400	2.300	2.383	2.333	2.400	2.400	2.400	2.583	2.333
	2.333	2.600	2.533	2.400	2.500	2.283	2.350	2.617	2.567	2.650	2.667	2.233	2.633	2.633
	2.633	2.633	2.367	2.367	2.333	2.183	2.183	2.483	2.350	2.400	2.250	2.250	2.400	2.350
	2.350	2.400	2.400	2.133	2.133	2.367	2.383	2.500	2.500	2.400	2.400	2.433	0	0.717

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1.300 1.016 1.366 1.250
1.434 1.000 1.000 0.967 1.050 1.117 1.000 1.017 1.017 1.034 0.934 0.934 0.934 1.217 1.134
1.134 1.017 1.017 1.334 1.067 1.117 1.017 1.317 1.000 1.117 1.117 1.117 1.250 1.034
1.034 1.317 1.317 1.117 1.250 0.950 1.000 1.250 1.234 1.334 1.334 0.917 1.334 1.334
1.334 1.334 1.050 1.050 1.034 0.867 0.867 1.167 1.200 1.050 1.034 1.034 1.117 1.050
1.050 1.134 1.134 0.834 0.834 1.334 1.050 1.167 1.167 1.067 1.067 1.134 0.717 0
1.350 1.083 1.416 1.300
1.750 1.117 1.333 1.217 1.400 0.950 1.550 1.483 1.483 1.500 1.000 1.000 1.000 1.383 0.883
0.883 1.450 1.450 0.883 1.517 1.200 1.133 0.850 1.500 1.017 1.017 1.017 1.400 1.017
1.017 1.050 1.017 1.217 1.283 1.400 1.450 1.683 1.733 1.817 1.733 1.283 1.517 1.517
1.517 1.517 1.017 1.017 1.033 1.183 1.183 1.117 0.900 1.017 1.400 1.400 1.217 1.233
1.233 1.200 1.200 1.417 1.450 0.900 0.900 1.250 1.250 0.900 0.900 1.500 1.300 1.350
0 1.183 0.933 1.400
1.550 1.300 1.466 1.133 1.383 1.333 1.400 1.300 1.300 1.283 0.983 0.983 1.000 1.316 1.266
1.266 1.300 1.300 1.366 1.333 1.466 1.266 1.333 1.400 1.016 1.016 1.016 1.433 1.033
1.033 1.316 1.233 1.366 1.466 1.316 1.633 1.816 1.700 1.683 1.316 1.016 1.466 1.466
1.466 1.466 1.016 1.016 1.033 0.966 0.966 1.266 1.133 1.066 1.216 1.216 1.233 1.216
1.216 1.216 1.216 1.016 1.016 1.116 1.233 1.233 1.233 1.283 1.283 1.366 1.016 1.083
1.183 0 1.216 1.167
1.816 1.316 1.683 1.483 1.583 1.033 1.716 1.616 1.616 1.600 1.100 1.100 1.133 1.583 1.033
1.033 1.616 1.616 0.916 1.616 1.500 1.483 0.883 1.716 1.200 1.200 1.200 1.766 1.233
1.233 1.283 1.083 1.600 1.533 1.666 1.833 1.933 2.033 1.966 1.833 1.333 1.616 1.616
1.616 1.616 1.116 1.116 1.133 1.333 1.333 1.183 1.016 1.166 1.533 1.533 1.316 1.383
1.383 1.316 1.316 1.483 1.500 0.983 1.016 1.300 1.300 0.966 0.966 1.583 1.366 1.416
0.933 1.216 0 1.400
1.833 1.500 1.667 1.433 1.567 1.567 1.650 1.550 1.550 1.483 1.250 1.250 1.267 1.533 1.467
1.467 1.550 1.550 1.583 1.533 1.683 1.483 1.567 1.550 1.283 1.283 1.283 1.667 1.300
1.300 1.533 1.600 1.583 1.717 1.600 1.867 1.867 1.933 1.900 2.100 1.233 1.850 1.850
1.850 1.850 1.283 1.283 1.283 1.100 1.100 1.483 1.500 1.300 1.400 1.400 1.433 1.433
1.433 1.450 1.450 1.217 1.233 1.350 1.333 1.500 1.500 1.383 1.383 1.567 1.250 1.300
1.400 1.167 1.400 0;

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ENDDATA

```
!-----;
```

PROCEDURE SETUPDISTMAT:

```

! Setup standard from-to distance matrix from whatever
initial form the data are supplied;
! Inputs:
  CITY = set of cities to be visited,
  DISTANCE(i,j) = distance from city i to city j, if explicitly supplied,
  CFIRST = index of first city,
  TRANSPOSE = 1 if DISTANCE matrix should be transposed,
  INFLAG(i) = 1 if city i is to be included in the problem,
  BACK21ST = 1 if trip must return to CFIRST city,
  RUNTIME(i) = time spent visiting city i,
Outputs:
  NUMC = number of cities in problem, based on INFLAG( ),
  ISREALLY( j) = original index of city j in reduced problem based on INFLAG( ),
  CMBDIST( i, j) = effective distance from i to j, including any visit time
                  for i and j in the reduced problem,
;
N = @SIZE( CITY); ! Number cities in the full problem;
NUMC = N;

! DISTMTYP = -1: x-y coordinates, Manhattan/L1 metric,
             0: x-y coordinates, Euclidean distance,
             1: latitude-longitude, use Great Circle distances,
             2: explicit distance matrix;
! If using X-Y coordinates Manhattan/L1 metric, compute the distance matrix;
@IFC( DISTMTYP #EQ# -1:
  @for( CXC(i,j) | i #le# j:
    DISTANCE( i,j) = @abs( xcord(i) - xcord( j)) + @abs( ycord(i) - ycord(j));
    DISTANCE(j,i) = DISTANCE(i,j);
  );
);

! If using X-Y coordinates Euclidean metric, compute the distance matrix;

```

```

@IFC( DISTMTYP #EQ# 0:
  @for( CXC(i,j) | i #le# j:
    DISTANCE( i,j) = (( xcord(i) - xcord( j))^2 + (ycord(i) - ycord(j))^2 )^0.5;
    DISTANCE(j,i) = DISTANCE(i,j);
  );
);

@IFC( DISTMTYP #EQ# 1:
! This portion calculates the distance matrix DIST(i,j) assuming XCORD and YCORD
  are the longitude and latitude in degrees;
  D2R=@PI()/180; ! Degrees to radians conversion factor;
! Compute Great Circle Distances. Radius of earth = 6371 km.
  Notice this simplifies if YCORD(i) = YCORD(j) or XCORD(i) = XCORD(j);
  @FOR( CXC(i,j):
    @IFC( i #EQ# j: distance(i,j) = 0; ! Get rid of trivial roundoff;
      @ELSE
        distance( i,j) = 6371
* @acos( @sin( D2R*YCORD(i) ) * @sin( D2R*YCORD(j) ) + @cos( D2R*YCORD(i) ) * @cos( D2R*YCORD(j) )
          * @cos( @ABS( D2R*(XCORD(i)-XCORD(j)) ) ) );
      );
    );
  ); ! End Lat-long distance calculation;

! Index of first/depot city;
@FOR( CITYBGN( k): CFIRST = k);

@for( SYS | 0:
! Write out part of the distance matrix;
  @for(city(j):
    @write( @format( city(j), '7s' ) );
  );
  @write( @newline(1) );
  @for( city(i) | i #le# 24:
    @for( city(j) | j #le# 24:
      @write( @format( distance(i,j), '7.2f' ) );
    );
    @write( ' ', city(i), @newline(1) );
  );
);

! Do an in-place transpose if requested;
@IFC( TRANSPOSE:
  @FOR( CXC( i,j) | i #LT# j #AND# j #LE# NUMC:
    TEMP = DISTANCE(i,j);
    DISTANCE(i,j) = DISTANCE(j,i);
    DISTANCE(j,i) = TEMP;
  );
);

! Check if CFIRST makes sense;
@IFC( CFIRST #GE# 1 #AND# CFIRST #LE# N:
  @IFC( INFLAG(CFIRST) #EQ# 0:
    Status = 1;
  );
  @ELSE
    Status = 2;
  );
@IFC( Status #GT# 0:
  @WRITE(' ERROR: First task, ', CFIRST, ' is not in active set.', @NEWLINE(1));
  CFIRST = 1; ! Arbitrarily choose 1;
);

! If need not do changeover back to CFIRST, set its changeover = 0;
@IFC( BACK21ST #EQ# 0:
  @FOR( CITY(i):
    DISTANCE(i,CFIRST) = 0;
  );
);

```

```

);

! Strip out the cities with INFLAG(j) = 0;
NUMC = 0;

@FOR( CITY( j) | INFLAG( j) #GE# 1:
    NUMC = NUMC + 1;
    ISREALLY( NUMC) = j;
!   @WRITE( ' j to NUMC, CFIRST = ',j,', ', NUMC, @NEWLINE(1));
    @IFC( j #EQ# CFIRST: CFIRST = NUMC);
    RUNTIME( NUMC) = RUNTIME( j);
!   Q( NUMC) = Q( j);
!   @write( 'NUMC,Q(NUMC)= ',NUMC,', ', Q(NUMC), @newline(1));
    @FOR( CITY( k):
        DISTANCE( k, NUMC) = DISTANCE( k, j); ! Move col j early;
        DISTANCE( NUMC, k) = DISTANCE( j, k); ! Move row j early;
    );

! Assume Demands greater than vehicle capacity have been handled beforehand;
! Subtract out obvious full loads;
!   @IFC( Q( NUMC) #GT# VCAP:
        QOVER( NUMC) = @FLOOR( Q( NUMC)/ VCAP); ! Number full loads over;
!       Q( NUMC) = Q( NUMC) - VCAP* QOVER( NUMC); ! Remaining partial load;
!   @ELSE
        QOVER( NUMC) = 0;
!   );
! Special case where Q = VCAP;
);

@WRITE( ' This problem has number cities/products(including depot)= ', NUMC,
@NEWLINE(1));

! Turn off non-selected cities;
@FOR( CXC(i,j) | i #GT# NUMC #OR# j #GT# NUMC:
    Y( i, j) = 0;
);

TOTRUN = @SUM( CITY(j) | j #LE# NUMC: RUNTIME(j));

! Adjust for run time. Time from start of changeover to finish of run of task;
@FOR( CXC(i,j) | i #LE# NUMC #AND# j #LE# NUMC:
    CMBDIST( i, j) = DISTANCE(i,j) + RUNTIME(j);
);

! Write distance matrix;
@ifc( 0:
    @write( ' Here is the distance matrix:', @newline(1));
    @for( city(i) | i #le# numc:
        @write( @format( city(i), '8s')
        );
    @write( @newline(1));
    @for( city( i) | i #le# numc:
        @for( city( j) | j#le# numc:
            @write( @format( cmbdist(i,j), '8.3f'));
        );
        @write( ' ', city(i), @newline(1));
    );
);
endprocedure

SUBMODEL TSP_CUT:
! Inputs:
    ZIN( j) = 1 if city j is part of the problem, else 0.
! Variables:
    Y(i,j) = 1 if arc from i to j is used;
! Minimize total distance traveled;
MIN = tourlen;
    tourlen = @SUM( CXC(i,j) | i #LE# NUMC #AND# j #LE# NUMC: CMBDIST(i,j) * Y(i,j));

```

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    @free( tourlen);
! The Assignment constraints;
@FOR( CITY( K) | k #LE# NUMC :
! city K must be entered, if ZIN( k) = 1;
  [TSPNTR] @SUM( CITY( I) | I #NE# K #AND# I #LE# NUMC: Y( I, K))= ZIN( k);
! city K must be departed, if ZIN( k) = 1;
  [TSPXIT]@SUM( CITY( J) | J #NE# K #AND# J #LE# NUMC: Y( K, J))= ZIN( k);
! Cannot go to yourself;      Y( K, K) = 0;
);

    @FOR( CXC(i,j) | i #LE# NINTS:
      @BIN(y(i,j))
    );

    ! Prize Collecting TSP constraints;
    @FOR(CITY( i): @BIN( ZIN( i)));
    @SUM( CITY( i): ZIN( i)) = NUM_STOPS;
! Subtour cuts. For any strict subset of the cities you
cannot have a subtour strictly among these cities;
@FOR( SUBCUT(t) | t #LE# ICUT:
  [TSPCUT] @SUM( SSXC( t, i):
    @SUM( SSXC( t, j) | i #NE# j: Y( i, j))) <= TOURSIZE( t) - 1;

  );

ENDSUBMODEL

PROCEDURE TSPSOLVE:
! Solve a Traveling Salesman Problem over a specified set of cities;
! Inputs:
  CITY = set of cities to be visited,
  CMBDIST( i, j) = distance from city i to city j,
  NUMC = number of cities in the full set,
  ZIN( i) = 1 if city i is to be included in the tour, else 0,
           for i = 1, 2, ..., NUMC,
Outputs:
  Y( i, j) = 1 if link i,j is included in the tour, else 0,
  tourlen = length of the tour,
;
! Set numcin = number of cities in current problem;
itest = 0;
numcin = 0;
@while( itest #lt# numc:
  itest = itest + 1;
  @ifc( zin( itest) #gt# 0.5: numcin = numcin + 1);
);

ICUT = 0; ! Current number of cuts;
! Set QUIT1 = 0 when either find optimum or run out of space;
QUIT1 = 1;
NSOLVES = 0; ! Current number of solves;
MAX_TOUR_FOUND = 0;
! Loop over major iteration solves;
@WHILE( QUIT1 # AND# STATUS #EQ# 0:
! Solve current version in this major round;
! @GEN(TSP_CUT);
  @WRITE( 'Solve Assignment problem with subtour cuts added', @newline(1));
  @SOLVE( TSP_CUT);
  NSOLVES = NSOLVES + 1;
  ISTAT = @STATUS(); ! 0: Optimal to tolerance. 1: infeasible, 2: unbounded,
                    3: undetermined, 4: Feasible, 5: Infeasible/unbounded in
preprocessor,
                    6: Local optimum, 7: locally infeasible, 8: Objective cutoff reached,
                    9: numeric error;

  @WRITE( NSOLVES, ' Status= ', ISTAT, ' Current length= ', tourlen, @newline(1));

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! Find all subtours of this major iteration;
! Initially, no cities yet found in a subtour;
  @FOR( CITY( j):
    @IFC( ZIN( j) #gt# 0.5: ! Loop over only cities in this problem instance;
      SFLAG( j) = 0;
    @ELSE
      SFLAG( j) = 1; ! Disregard cities not in;
    );
  );

! Begin loop to find all subtours in this major iteration;
QUIT3 = 1; ! QUIT3 = 1 while successfully adding cuts this iteration;
@WHILE( QUIT3:
  ! Find an initial city, IC1, not yet identified as on a subtour;
  IC1 = 1; ! Skip over city 1;
  QUIT4 = 1;
  @WHILE( QUIT4 #AND# IC1 #LT# NUMC:
    IC1 = IC1 + 1;
    @IFC( SFLAG( IC1) #EQ# 0: QUIT4 = 0);
  );

  ! If QUIT4 = 0 then we found a CITY, IC1, not on a previous subtour;
  @IFC( QUIT4 #EQ# 0:
    ICUT = ICUT + 1;
    @WRITE(' Add cut ', ICUT, @NEWLINE(1));
    TOURSIZE( ICUT) = 0;
    TSPHAS1 = 0; ! Set = 1 if subtour includes city 1;
    ! Loop over cities KURSTOP in subtour until return to IC1;
    KURSTOP = IC1;
    @WRITE(' First stop= ', CITY( ISREALLY( KURSTOP)), @NEWLINE( 1));
    QUIT2 = 1;
    @WHILE( QUIT2: ! Loop over cities in subtour;
      QUIT5 = 1;
      jn = 0;
      @WHILE( QUIT5: ! Find next stop after KURSTOP;
        jn = jn + 1;
        ! @WRITE('KURSTOP= ', KURSTOP, ' jn= ', jn, ' y= ', Y( KURSTOP, jn),
@NEWLINE(1));
        @IFC( Y( KURSTOP, jn) #GT# 0.5:
          KURSTOP = jn;
          QUIT5 = 0;
        );
      );! Next j;
      TOURSIZE( ICUT) = TOURSIZE( ICUT) + 1;

      @IFC( KURSTOP #EQ# 1:
        @WRITE(' Subtour includes 1.', @Newline(1));
        TSPHAS1 = 1; ! Mark if subtour includes 1;
      );
      @INSERT( SSXC, ICUT, KURSTOP); ! Insert city Kurstop into Tour ICut;
      SFLAG( KURSTOP) = 1;
      @WRITE(' Next stop= ', CITY( ISREALLY( KURSTOP)), ' Tour size=',
TOURSIZE( ICUT), @NEWLINE( 1));
      @IFC( KURSTOP #EQ# IC1: ! Back home/Completed the subtour?;
        QUIT2 = 0;
      );
    ); ! End loop over cities in subtour;
    @ELSE ! Did not find any more subtours in this major iteration;
      @WRITE(' No more subtours found in this major iteration.', @NEWLINE(1));
      QUIT3 = 0;
    ); ! End loop to find all subtours in this major iteration;

! If subtour is in fact a full tour, or out of space, get out;
@IFC( TOURSIZE( ICUT) #EQ# NUM_STOPS #OR# ICUT #GE# MXCUTS:
  !We are done;
  QUIT1 = 0;
  @FOR( CXC: Y = Y); !Fix Y;

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);
@IFC( QUIT1 #GT# 0:
    @WRITE(' Found (sub)tour #', icut,' of size= ',TOURSIZE( ICUT),@NEWLINE(1)
    );

@write(@newline(1));
! Skip this subtour cut if it includes city 1;
@IFC( QUIT1 #AND# TSPHAS1 #GT# 0:
    @WRITE(' This subtour cut,',icut,' it contains city 1.', @newline(1));
!     ICUT = ICUT - 1; ! May want to drop it in certain situations;
    TSPHAS1 = 0;
    );
);

!JH To help find a tour of size NUM_STOPS, we can fix the cities in the largest
subtour found and resolve.;
@IFC( TOURSIZE( ICUT) #LT# NUM_STOPS #AND# TOURSIZE( ICUT) #GT# MAX_TOUR_FOUND:
    MAX_TOUR_FOUND = TOURSIZE( ICUT);
    @WRITE(' New largest subtour found of size= ', MAX_TOUR_FOUND, @NEWLINE(1));
! Fix visited cities in this subtour and resolve to see if we can find a larger
subtour;
@FOR( CITY( I):
    ZINTEMP( I) = ZIN( I);
    @RELEASE( ZIN( I));
    @IFC( ZINTEMP( I) #GT# 0.5: ! Loop over only cities in this problem instance;
        ZIN( I) = 1; ! Fix city I in;
    );
);
);

); !End loop over solve latest version;

! Give simple report;
@IFC( TOURSIZE( ICUT) #LT# NUM_STOPS:
    @WRITE(' Sorry, optimum not found', @NEWLINE(1));
    Status = 1;
    TourDistance = -9999;
    @FOR( CITY(j): TOURORDER(j) = -9999);
);

@IFC( TOURSIZE( ICUT) #EQ# NUM_STOPS:
    Status = 0; ! Successfully solved;
    !KURSTOP = CFIRST; !JH: We start from cur stop of optimal subtour;
    @WRITE( 'At opt, first stop = ',KURSTOP,@NEWLINE(1));
    TourDistance = 0;
    ki = 1;
    @WRITE(' Optimum found after ', NSOLVES, ' solves.',@NEWLINE(1));
    @WRITE(' Stop City distance', @NEWLINE( 1));
    @WRITE( ' 1: ',@FORMAT( CITY( ISREALLY( KURSTOP)), "10s"), ' ', 8* ' ', '0',
@NEWLINE(1));

@FOR( CITY( kd) | kd #LE# NUM_STOPS: ! We only report on the optimal subtour;
    TOURORDER( ki) = KURSTOP;
! Get next city;
@FOR( CITY(j) | Y( KURSTOP, j) #GT# .5:
    NEXT = j;
    TourDistance = TourDistance + CMBDIST( KURSTOP, NEXT);
    ki = ki + 1;
    @WRITE( @FORMAT( ki, '5.0f'), ': ', @FORMAT( CITY( ISREALLY( NEXT)), "10s"),
    ' ', @FORMAT( TourDistance, '10.5f'), @NEWLINE(1));
! Optionally, create a set ordered by the optimal tour order;
! @INSERT( TOUR, ISREALLY( NEXT));
! DISTACC( ISREALLY( NEXT)) = TourDistance;
);
    KURSTOP = NEXT;
);
);
!@WRITE(' Total run time= ', TOTRUN, @NEWLINE(1));

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TIME_E = @TIME();
@WRITE(' Total solve seconds = ', @FORMAT( TIME_E - TIME_B, '12.3f'), @NEWLINE(1));

! If using a spreadsheet, Send results back to the spreadsheet;
! Modify or comment out these outputs if nondefaults
  are being used;
! @OLE( )= Status;
! @OLE( )= TourDistance;
! @OLE( )= TOURORDER;
ENDPROCEDURE

CALC:
  TIME_B = @TIME(); ! Get begin time;
  Status = 0; ! Status > 0 if "Failed" for some reason;
  @SET('WNLINE',10000); ! (27) Max command window lines (Windows only);
  @SET('IPTOLR', 0.0000001); ! Set optimality tolerance;
  @SET('TIM2RL', 0); ! Relative opt. tolerance applies immediately;
  @SET('OROUTE', 1); ! Route every line immediately to the window;
  @SET('TERSEO', 1); ! Turn off default output;
  @SET('DUALCO', 0); ! Make sure dual computations are (0:off, 1:On);
  @NULLSET( SSXC); ! Initially the Subtour X City set is empty;

! Solve a TSP using subtour cuts;
N = @SIZE( CITY); ! Number cities in the full problem;
NUMC = N;

! Get out if NUM_STOPS is invalid;
@IFC( NUM_STOPS #LT# 1 #OR# NUM_STOPS #GT# NUMC:
  @WRITE( ' No Feasible solution: 1 <= NUM_STOPS <= ', NUMC,' is not true.',
@NEWLINE(2));
  @ELSE
! Matrix prep stuff Begin ;
  SETUPDISTMAT;
  @WRITE(' Distance matrix has been setup', @newline(1));

  NINTS = N; ! NINTS = 0 allows solution as an LP;
  MXCUTS = @SIZE( SUBCUT);

  TSPSOLVE;
);
ENDCALC
END

```