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Bordered and Pentagonal Magic Squares Multiples of 7

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Abstract

*During past years author worked with **block-wise borderedmagic squares** of even order blocks. It includes blocks of orders 4, 6, 8, 10, etc. Most of the cases are with equal sums magic squares. This type of work is an extension of classical bordered magic squares. In case of multiples of 4, the extension is made for **pentagonal** magic squares [23]. For multiples of order 6 refer Taneja [24]. Recently, author worked on multiples of 3 and 5, based on different sums magic squares of order 3 [29] and order 5 [30]. This work is for bordered of magic squares multiples of magic squares of order 7. It is done with seven different types of magic squares of order 7. These includes, **pandiagonal, bordered, doube digits, corners**, etc type magic squares. This work is up to order 35. Higher orders examples can be seen in **Excel file** attached with the work. The total work is up to order 140. **Pandiagonal** magic squares based on equal sums pandiagonal magic squares of order 7 are also included in the **Excel file**.*

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Contents

1 Introduction

During past years author [2, 3, 4, 5, 6, 7, 8] worked with **block-wise** magic squares from orders 12 to 47. Author [9, 10, 11, 12, 13, 14] also worked with **bordered** magic squares. The study on **bordered** magic squares is extended to **block-bordered** magic squares [15, 16, 17]. This is specially done for the magic squares of orders p and p, where p is a prime number. This study is still extended to **block-wise bordered** magic squares [18, 19, 20, 21]. Some conection with Pythagorean triples and area-representations are also made [23, 24, 25, 26, 27]. The main property of **bordered** magic squares is that if we remove external borders, still we get **sub-bordered** magic squares, i.e., each layer in itself lead us to magic squares. In many cases, the properties of **bordered** magic square are seperated by **even** and **odd** orders magic squares. In many cases, we get good properties for the **even** order **bordered** magic squares. In many cases, we have to use fractional numbers entries, specially to reach minimum perfect square sum of entries. For more study on **bordered** magic squares refer H. White's web-site [1].

The aim of this work is to combine the study of **block-wise** and **bordered** magic squares. This kind of study still not seen by author. In this case we considers blocks of magic squares such as magic squares of order 4 and then put them in such a way that every time removing external borders, still we are left with magic squares. Based on this idea, we wrote with **block-wise bordered** magic squares of orders 108 and 104. Every time when we remove the external, we are left with **block-wise bordered** magic squares with minus order 8. For example, in case of order 108, removing external orders we are left with orders 100, 92, 84, etc. and in case of orders 104, removing external orders we are left with orders 96, 88, 80, etc. Thus alternatively we complete all order magic squares multiples of 4. The first two orders 4 and 8 are not **block-wise bordered** magic squares. From order 12 onwards, we always get **block-wise bordered** magic squares multiples of 4, i.e., of orders 12, 16, 20, etc. In all the situations the constructions of magic squares of order 4 are **pentagonal** and of equal sums, while the **block-wise bordered** magic squares are not **pentagonal**. In each case, if we redistribute the blocks of order 4 already constructed we reach to **pentagonal** magic squares of orders 12, 16, 20, etc. but unfortunately they are no more **block-wise bordered** magic squares. Before proceeding further, let's classify the idea of bordered magic squares:

1.1 Classification of Bordered Magic Squares

- **Single Digit:** Bordered magic squares based on single digit [9, 10, 1].
- **Two Digits:** Bordered magic squares based on magic rectangles multiples of 2 [58, 59, 60, 61, 61].
- **Three Digits:** Bordered magic squares based on magic squares of order 3 [29].
- **Four Digits:** Bordered magic squares based on magic squares of order 4 [23].
- **Five Digits:** Bordered magic squares based on magic squares of order 5 [30]
- **Six Digits:** Bordered magic squares based on magic squares of order 6 [24], etc.

It is revised version of author's previous work. In the previous work we worked only with two magic squares of order 7. Here are working with 7 magic square of order 7. The procedure, how to these bordered magic squares are obtained is also given. Pentagonal magic squares multiples of 7 are also given. Here, the work is only up to order 28. Higher orders examples can be seen in **Excel file** is attached with this work.

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2 Bordered Magic Squares Multiples of Magic Squares of Order 7

Below are seven magic squares of order 7. Based these, we shall write bordered magic squares multiples of order 7. The total work is up to order 140.

	pan	175	175	175	175	175	175	175
175	1	9	17	25	33	41	49	175
175	40	48	7	8	16	24	32	175
175	23	31	39	47	6	14	15	175
175	13	21	22	30	38	46	5	175
175	45	4	12	20	28	29	37	175
175	35	36	44	3	11	19	27	175
	18	26	34	42	43	2	10	175
1	175	175	175	175	175	175	175	175

2	mgc	200	190	180	170	160	150	175
	42	38	40	5	4	2	44	175
	1	34	37	17	19	18	49	175
	3	14	24	29	22	36	47	175
	43	15	23	25	27	35	7	175
	41	30	28	21	26	20	9	175
	39	32	13	33	31	16	11	175
	6	12	10	45	46	48	8	175
	175	175	175	175	175	175	175	175

3	mgc	207	194	197	174	134	144	175
	4	30	44	32	15	13	37	175
	46	20	6	18	35	9	41	175
	34	16	26	21	28	17	33	175
	42	8	27	25	23	47	3	175
	43	7	22	29	24	39	11	175
	1	49	48	12	19	36	10	175
	5	45	2	38	31	14	40	175
	175	175	175	175	175	175	175	175

4	mgc	170	222	99	211	175	173	175
	26	21	28	30	20	8	42	175
	27	25	23	33	17	12	38	175
	22	29	24	14	36	48	2	175
	34	32	31	13	15	45	5	175
	16	18	19	35	37	10	40	175
	46	49	7	47	6	11	9	175
	4	1	43	3	44	41	39	175
	175	175	175	175	175	175	175	175

5	mgc	153	206	107	200	175	209	175
	13	19	25	31	37	12	38	175
	30	36	17	18	24	8	42	175
	22	23	29	35	16	48	2	175
	34	15	21	27	28	45	5	175
	26	32	33	14	20	10	40	175
	46	49	7	47	6	11	9	175
	4	1	43	3	44	41	39	175
	175	175	175	175	175	175	175	175

6	mgc	200	203	98	179	175	195	175
	34	37	19	17	18	12	38	175
	14	24	29	22	36	8	42	175
	30	23	25	27	20	48	2	175
	15	28	21	26	35	45	5	175
	32	13	31	33	16	10	40	175
	47	49	7	46	6	11	9	175
	3	1	43	4	44	41	39	175
	175	175	175	175	175	175	175	175

7	mgc	200	190	180	170	160	150	175
	42	38	40	5	4	2	44	175
	1	26	21	28	30	20	49	175
	3	27	25	23	33	17	47	175
	43	22	29	24	14	36	7	175
	41	34	32	31	13	15	9	175
	39	16	18	19	35	37	11	175
	6	12	10	45	46	48	8	175
	175	175	175	175	175	175	175	175

These magic squares are of type pandiagonal, bordered double digits and cornered.

2.1 Magic Squares of Orders 140 and 133

Let's consider bordered magic square of orders 19 and 20 given by

19x19																				3439
	344	326	328	330	332	334	336	338	340	17	16	14	12	10	8	6	4	2	342	3439
	35	310	294	296	298	300	302	304	306	51	50	48	46	44	42	40	38	308	327	3439
	33	67	280	266	268	270	272	274	276	81	80	78	76	74	72	70	278	295	329	3439
	31	65	95	254	242	244	246	248	250	107	106	104	102	100	98	252	267	297	331	3439
	29	63	93	119	232	222	224	226	228	129	128	126	124	122	230	243	269	299	333	3439
	27	61	91	117	139	214	206	208	210	147	146	144	142	212	223	245	271	301	335	3439
	25	59	89	115	137	155	200	194	196	161	160	158	198	207	225	247	273	303	337	3439
	23	57	87	113	135	153	167	190	186	171	170	188	195	209	227	249	275	305	339	3439
	21	55	85	111	133	151	165	175	184	177	182	187	197	211	229	251	277	307	341	3439
	19	53	83	109	131	149	163	173	179	181	183	189	199	213	231	253	279	309	343	3439
	347	313	283	257	235	217	203	193	180	185	178	169	159	145	127	105	79	49	15	3439
	349	315	285	259	237	219	205	174	176	191	192	172	157	143	125	103	77	47	13	3439
	351	317	287	261	239	221	164	168	166	201	202	204	162	141	123	101	75	45	11	3439
	353	319	289	263	241	150	156	154	152	215	216	218	220	148	121	99	73	43	9	3439
	355	321	291	265	132	140	138	136	134	233	234	236	238	240	130	97	71	41	7	3439
	357	323	293	110	120	118	116	114	112	255	256	258	260	262	264	108	69	39	5	3439
	359	325	84	96	94	92	90	88	86	281	282	284	286	288	290	292	82	37	3	3439
	361	54	68	66	64	62	60	58	56	311	312	314	316	318	320	322	324	52	1	3439
	20	36	34	32	30	28	26	24	22	345	346	348	350	352	354	356	358	360	18	3439
	3439	3439	3439	3439	3439	3439	3439	3439	3439	3439	3439	3439	3439	3439	3439	3439	3439	3439	3439	3439

20x20																					4010
	381	364	366	368	370	393	395	397	399	38	36	34	32	30	9	7	5	3	1	382	4010
	29	345	330	332	334	336	356	358	360	72	70	68	66	64	46	44	42	40	346	372	4010
	27	63	313	300	302	304	323	325	327	102	100	98	96	79	77	75	73	314	338	374	4010
	25	61	95	285	274	276	278	294	296	128	126	124	122	108	106	104	286	306	340	376	4010
	22	59	93	121	261	252	254	269	271	150	148	146	133	131	129	262	280	308	342	379	4010
	21	57	90	119	145	241	234	236	248	168	166	164	154	152	242	256	282	311	344	380	4010
	16	53	89	117	142	163	225	220	231	182	180	171	169	226	238	259	284	312	348	385	4010
	14	51	84	113	141	161	178	213	210	192	190	184	214	223	240	260	288	317	350	387	4010
	12	49	82	111	136	157	177	189	208	205	196	193	212	224	244	265	290	319	352	389	4010
	10	39	80	103	134	151	172	183	194	195	206	207	218	229	250	267	298	321	362	391	4010
	373	339	307	281	257	239	222	215	197	200	201	204	186	179	162	144	120	94	62	28	4010
	375	341	309	283	258	243	227	216	203	202	199	198	185	174	158	143	118	92	60	26	4010
	377	343	310	287	263	245	228	187	191	209	211	217	188	173	156	138	114	91	58	24	4010
	378	347	315	289	264	246	175	181	170	219	221	230	232	176	155	137	112	86	54	23	4010
	383	349	316	291	266	159	167	165	153	233	235	237	247	249	160	135	110	85	52	18	4010
	384	351	318	292	139	149	147	132	130	251	253	255	268	270	272	140	109	83	50	17	4010
	386	353	320	115	127	125	123	107	105	273	275	277	279	293	295	297	116	81	48	15	4010
	388	354	87	101	99	97	78	76	74	299	301	303	305	322	324	326	328	88	47	13	4010
	390	55	71	69	67	65	45	43	41	329	331	333	335	337	355	357	359	361	56	11	4010
	19	37	35	33	31	8	6	4	2	363	365	367	369	371	392	394	396	398	400	20	4010
	4010	4010	4010	4010	4010	4010	4010	4010	4010	4010	4010	4010	4010	4010	4010	4010	4010	4010	4010	4010	4010

The entries of above two magic squares are sequential numbers starting from 1:

$$D_{29\times 29} := \{1, 2, \ldots, 360, 361\}$$
$$D_{30\times 30} := \{1, 2, \ldots, 399, 400\}$$

These two magic squares are such that replacing the upper border still we are left with magic squares of lower orders in sequential values. Sometimes, these are called as **nested** or **embedded** magic squares.

Multiplying each entry by 49, we get

19x19																				168511
	16856	15974	16072	16170	16268	16366	16464	16562	16660	833	784	686	588	490	392	294	196	98	16758	168511
	1715	15190	14406	14504	14602	14700	14798	14896	14994	2499	2450	2352	2254	2156	2058	1960	1862	15092	16023	168511
	1617	3283	13720	13034	13132	13230	13328	13426	13524	3969	3920	3822	3724	3626	3528	3430	13622	14455	16121	168511
	1519	3185	4655	12446	11858	11956	12054	12152	12250	5243	5194	5096	4998	4900	4802	12348	13083	14553	16219	168511
	1421	3087	4557	5831	11368	10878	10976	11074	11172	6321	6272	6174	6076	5978	11270	11907	13181	14651	16317	168511
	1323	2989	4459	5733	6811	10486	10094	10192	10290	7203	7154	7056	6958	10388	10927	12005	13279	14749	16415	168511
	1225	2891	4361	5635	6713	7595	9800	9506	9604	7889	7840	7742	9702	10143	11025	12103	13377	14847	16513	168511
	1127	2793	4263	5537	6615	7497	8183	9310	9114	8379	8330	9212	9555	10241	11123	12201	13475	14945	16611	168511
	1029	2695	4165	5439	6517	7399	8085	8575	9016	8673	8918	9163	9653	10339	11221	12299	13573	15043	16709	168511
	931	2597	4067	5341	6419	7301	7987	8477	8771	8869	8967	9261	9751	10437	11319	12397	13671	15141	16807	168511
	17003	15337	13867	12593	11515	10633	9947	9457	8820	9065	8722	8281	7791	7105	6223	5145	3871	2401	735	168511
	17101	15435	13965	12691	11613	10731	10045	8526	8624	9359	9408	8428	7693	7007	6125	5047	3773	2303	637	168511
	17199	15533	14063	12789	11711	10829	8036	8232	8134	9849	9898	9996	7938	6909	6027	4949	3675	2205	539	168511
	17297	15631	14161	12887	11809	7350	7644	7546	7448	10535	10584	10682	10780	7252	5929	4851	3577	2107	441	168511
	17395	15729	14259	12985	6468	6860	6762	6664	6566	11417	11466	11564	11662	11760	6370	4753	3479	2009	343	168511
	17493	15827	14357	5390	5880	5782	5684	5586	5488	12495	12544	12642	12740	12838	12936	5292	3381	1911	245	168511
	17591	15925	4116	4704	4606	4508	4410	4312	4214	13769	13818	13916	14014	14112	14210	14308	4018	1813	147	168511
	17689	2646	3332	3234	3136	3038	2940	2842	2744	15239	15288	15386	15484	15582	15680	15778	15876	2548	49	168511
	980	1764	1666	1568	1470	1372	1274	1176	1078	16905	16954	17052	17150	17248	17346	17444	17542	17640	882	168511
	168511	168511	168511	168511	168511	168511	168511	168511	168511	168511	168511	168511	168511	168511	168511	168511	168511	168511	168511	168511

20x20																					196490
	18669	17836	17934	18032	18130	19257	19355	19453	19551	1862	1764	1666	1568	1470	441	343	245	147	49	18718	196490
	1421	16905	16170	16268	16366	16464	17444	17542	17640	3528	3430	3332	3234	3136	2254	2156	2058	1960	16954	18228	196490
	1323	3087	15337	14700	14798	14896	15827	15925	16023	4998	4900	4802	4704	3871	3773	3675	3577	15386	16562	18326	196490
	1225	2989	4655	13965	13426	13524	13622	14406	14504	6272	6174	6076	5978	5292	5194	5096	14014	14994	16660	18424	196490
	1078	2891	4557	5929	12789	12348	12446	13181	13279	7350	7252	7154	6517	6419	6321	12838	13720	15092	16758	18571	196490
	1029	2793	4410	5831	7105	11809	11466	11564	12152	8232	8134	8036	7546	7448	11858	12544	13818	15239	16856	18620	196490
	784	2597	4361	5733	6958	7987	11025	10780	11319	8918	8820	8379	8281	11074	11662	12691	13916	15288	17052	18865	196490
	686	2499	4116	5537	6909	7889	8722	10437	10290	9408	9310	9016	10486	10927	11760	12740	14112	15533	17150	18963	196490
	588	2401	4018	5439	6664	7693	8673	9261	10192	10045	9604	9457	10388	10976	11956	12985	14210	15631	17248	19061	196490
	490	1911	3920	5047	6566	7399	8428	8967	9506	9555	10094	10143	10682	11221	12250	13083	14602	15729	17738	19159	196490
	18277	16611	15043	13769	12593	11711	10878	10535	9653	9800	9849	9996	9114	8771	7938	7056	5880	4606	3038	1372	196490
	18375	16709	15141	13867	12642	11907	11123	10584	9947	9898	9751	9702	9065	8526	7742	7007	5782	4508	2940	1274	196490
	18473	16807	15190	14063	12887	12005	11172	9163	9359	10241	10339	10633	9212	8477	7644	6762	5586	4459	2842	1176	196490
	18522	17003	15435	14161	12936	12054	8575	8869	8330	10731	10829	11270	11368	8624	7595	6713	5488	4214	2646	1127	196490
	18767	17101	15484	14259	13034	7791	8183	8085	7497	11417	11515	11613	12103	12201	7840	6615	5390	4165	2548	882	196490
	18816	17199	15582	14308	6811	7301	7203	6468	6370	12299	12397	12495	13132	13230	13328	6860	5341	4067	2450	833	196490
	18914	17297	15680	5635	6223	6125	6027	5243	5145	13377	13475	13573	13671	14357	14455	14553	5684	3969	2352	735	196490
	19012	17346	4263	4949	4851	4753	3822	3724	3626	14651	14749	14847	14945	15778	15876	15974	16072	4312	2303	637	196490
	19110	2695	3479	3381	3283	3185	2205	2107	2009	16121	16219	16317	16415	16513	17395	17493	17591	17689	2744	539	196490
	931	1813	1715	1617	1519	392	294	196	98	17787	17885	17983	18081	18179	19208	19306	19404	19502	19600	980	196490
	196490	196490	196490	196490	196490	196490	196490	196490	196490	196490	196490	196490	196490	196490	196490	196490	196490	196490	196490	196490	196490

The distributions of these two magic squares are given by

$$D_{19\times 19} := \{49, 98, \ldots, 17640, 17689\}$$
$$D_{20\times 20} := \{49, 98, \ldots, 19551, 19600\}$$

In both the cases the difference between entries is 25. Now in each case replace the entries by magic squares of order 5 formed by the entries as given below:

$$\begin{aligned} 49 &\rightarrow 1, 2, \ldots, 49 \\ 98 &\rightarrow 50, 51, \ldots, 98 \\ 147 &\rightarrow 99, 100, \ldots, 147 \\ \ldots &\rightarrow \ldots \quad \ldots \\ \ldots &\rightarrow \ldots \quad \ldots \end{aligned}$$

This lead us to two magic squares of orders 140 and 133. Since these magic squares are very big to put in this work, these can be seen in an **excel file** attached in with the work. Below are few examples of magic squares obtained from above two magic squares. These are of orders 21 and 28.

2.2 Magic Squares of Order 28

These magic squares are obtained from the magic squares of order 140 by using the formula $\frac{a^2 - b^2}{2}$, $a > b$. Removing the external borders of order 7 and then subtracting $\frac{145^2 - 35^2}{2} := 9408$ from each entry, we get 7 magic squares of orders 28 given by

1	mgc	11774	12558	13342	14126	14910	15694	16478	15694	14910	14126	13342	12558	11774	10990	10206	9422	8638	7854	7070	6286	5502	6286	7070	7854	8638	9422	10206	10990
	736	744	752	760	768	776	784	589	597	605	613	621	629	637	148	156	164	172	180	188	196	1	9	17	25	33	41	49	10990
	775	783	742	743	751	759	767	628	636	595	596	604	612	620	187	195	154	155	163	171	179	40	48	7	8	16	24	32	10990
	758	766	774	782	741	749	750	611	619	627	635	594	602	603	170	178	186	194	153	161	162	23	31	39	47	6	14	15	10990
	748	756	757	765	773	781	740	601	609	610	618	626	634	593	160	168	169	177	185	193	152	13	21	22	30	38	46	5	10990
	780	739	747	755	763	764	772	633	592	600	608	616	617	625	192	151	159	167	175	176	184	45	4	12	20	28	29	37	10990
	770	771	779	738	746	754	762	623	624	632	591	599	607	615	182	183	191	150	158	166	174	35	36	44	3	11	19	27	10990
	753	761	769	777	778	737	745	606	614	622	630	631	590	598	165	173	181	189	190	149	157	18	26	34	42	43	2	10	10990
	50	58	66	74	82	90	98	99	107	115	123	131	139	147	638	646	654	662	670	678	686	687	695	703	711	719	727	735	10990
	89	97	56	57	65	73	81	138	146	105	106	114	122	130	677	685	644	645	653	661	669	726	734	693	694	702	710	718	10990
	72	80	88	96	55	63	64	121	129	137	145	104	112	113	660	668	676	684	643	651	652	709	717	725	733	692	700	701	10990
	62	70	71	79	87	95	54	111	119	120	128	136	144	103	650	658	659	667	675	683	642	699	707	708	716	724	732	691	10990
	94	53	61	69	77	78	86	143	102	110	118	126	127	135	682	641	649	657	665	666	674	731	690	698	706	714	715	723	10990
	84	85	93	52	60	68	76	133	134	142	101	109	117	125	672	673	681	640	648	656	664	721	722	730	689	697	705	713	10990
	67	75	83	91	92	51	59	116	124	132	140	141	100	108	655	663	671	679	680	639	647	704	712	720	728	729	688	696	10990
	197	205	213	221	229	237	245	344	352	360	368	376	384	392	393	401	409	417	425	433	441	540	548	556	564	572	580	588	10990
	236	244	203	204	212	220	228	383	391	350	351	359	367	375	432	440	399	400	408	416	424	579	587	546	547	555	563	571	10990
	219	227	235	243	202	210	211	366	374	382	390	349	357	358	415	423	431	439	398	406	407	562	570	578	586	545	553	554	10990
	209	217	218	226	234	242	201	356	364	365	373	381	389	348	405	413	414	422	430	438	397	552	560	561	569	577	585	544	10990
	241	200	208	216	224	225	233	388	347	355	363	371	372	380	437	396	404	412	420	421	429	584	543	551	559	567	568	576	10990
	231	232	240	199	207	215	223	378	379	387	346	354	362	370	427	428	436	395	403	411	419	574	575	583	542	550	558	566	10990
	214	222	230	238	239	198	206	361	369	377	385	386	345	353	410	418	426	434	435	394	402	557	565	573	581	582	541	549	10990
	491	499	507	515	523	531	539	442	450	458	466	474	482	490	295	303	311	319	327	335	343	246	254	262	270	278	286	294	10990
	530	538	497	498	506	514	522	481	489	448	449	457	465	473	334	342	301	302	310	318	326	285	293	252	253	261	269	277	10990
	513	521	529	537	496	504	505	464	472	480	488	447	455	456	317	325	333	341	300	308	309	268	276	284	292	251	259	260	10990
	503	511	512	520	528	536	495	454	462	463	471	479	487	446	307	315	316	324	332	340	299	258	266	267	275	283	291	250	10990
	535	494	502	510	518	519	527	486	445	453	461	469	470	478	339	298	306	314	322	323	331	290	249	257	265	273	274	282	10990
	525	526	534	493	501	509	517	476	477	485	444	452	460	468	329	330	338	297	305	313	321	280	281	289	248	256	264	272	10990
	508	516	524	532	533	492	500	459	467	475	483	484	443	451	312	320	328	336	337	296	304	263	271	279	287	288	247	255	10990
	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990

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2	mgc	11874	12618	13362	14106	14850	15594	16478	15794	14970	14146	13322	12498	11674	10990	10306	9482	8658	7834	7010	6186	5502	6386	7130	7874	8618	9362	10106	10990
	777	773	775	740	739	737	779	630	626	628	593	592	590	632	189	185	187	152	151	149	191	42	38	40	5	4	2	44	10990
	736	769	772	752	754	753	784	589	622	625	605	607	606	637	148	181	184	164	166	165	196	1	34	37	17	19	18	49	10990
	738	749	759	764	757	771	782	591	602	612	617	610	624	635	150	161	171	176	169	183	194	3	14	24	29	22	36	47	10990
	778	750	758	760	762	770	742	631	603	611	613	615	623	595	190	162	170	172	174	182	154	43	15	23	25	27	35	7	10990
	776	765	763	756	761	755	744	629	618	616	609	614	608	597	188	177	175	168	173	167	156	41	30	28	21	26	20	9	10990
	774	767	748	768	766	751	746	627	620	601	621	619	604	599	186	179	160	180	178	163	158	39	32	13	33	31	16	11	10990
	741	747	745	780	781	783	743	594	600	598	633	634	636	596	153	159	157	192	193	195	155	6	12	10	45	46	48	8	10990
	91	87	89	54	53	51	93	140	136	138	103	102	100	142	679	675	677	642	641	639	681	728	724	726	691	690	688	730	10990
	50	83	86	66	68	67	98	99	132	135	115	117	116	147	638	671	674	654	656	655	686	687	720	723	703	705	704	735	10990
	52	63	73	78	71	85	96	101	112	122	127	120	134	145	640	651	661	666	659	673	684	689	700	710	715	708	722	733	10990
	92	64	72	74	76	84	56	141	113	121	123	125	133	105	680	652	660	662	664	672	644	729	701	709	711	713	721	693	10990
	90	79	77	70	75	69	58	139	128	126	119	124	118	107	678	667	665	658	663	657	646	727	716	714	707	712	706	695	10990
	88	81	62	82	80	65	60	137	130	111	131	129	114	109	676	669	650	670	668	653	648	725	718	699	719	717	702	697	10990
	55	61	59	94	95	97	57	104	110	108	143	144	146	106	643	649	647	682	683	685	645	692	698	696	731	732	734	694	10990
	238	234	236	201	200	198	240	385	381	383	348	347	345	387	434	430	432	397	396	394	436	581	577	579	544	543	541	583	10990
	197	230	233	213	215	214	245	344	377	380	360	362	361	392	393	426	429	409	411	410	441	540	573	576	556	558	557	588	10990
	199	210	220	225	218	232	243	346	357	367	372	365	379	390	395	406	416	421	414	428	439	542	553	563	568	561	575	586	10990
	239	211	219	221	223	231	203	386	358	366	368	370	378	350	435	407	415	417	419	427	399	582	554	562	564	566	574	546	10990
	237	226	224	217	222	216	205	384	373	371	364	369	363	352	433	422	420	413	418	412	401	580	569	567	560	565	559	548	10990
	235	228	209	229	227	212	207	382	375	356	376	374	359	354	431	424	405	425	423	408	403	578	571	552	572	570	555	550	10990
	202	208	206	241	242	244	204	349	355	353	388	389	391	351	398	404	402	437	438	440	400	545	551	549	584	585	587	547	10990
	532	528	530	495	494	492	534	483	479	481	446	445	443	485	336	332	334	299	298	296	338	287	283	285	250	249	247	289	10990
	491	524	527	507	509	508	539	442	475	478	458	460	459	490	295	328	331	311	313	312	343	246	279	282	262	264	263	294	10990
	493	504	514	519	512	526	537	444	455	465	470	463	477	488	297	308	318	323	316	330	341	248	259	269	274	267	281	292	10990
	533	505	513	515	517	525	497	484	456	464	466	468	476	448	337	309	317	319	321	329	301	288	260	268	270	272	280	252	10990
	531	520	518	511	516	510	499	482	471	469	462	467	461	450	335	324	322	315	320	314	303	286	275	273	266	271	265	254	10990
	529	522	503	523	521	506	501	480	473	454	474	472	457	452	333	326	307	327	325	310	305	284	277	258	278	276	261	256	10990
	496	502	500	535	536	538	498	447	453	451	486	487	489	449	300	306	304	339	340	342	302	251	257	255	290	291	293	253	10990
	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990

3	mgc	11646	12482	13254	14130	15074	15818	16478	15566	14834	14038	13346	12722	11898	10990	10078	9346	8550	7858	7234	6410	5502	6158	6994	7766	8642	9586	10330	10990
	781	755	741	753	770	772	748	634	608	594	606	623	625	601	193	167	153	165	182	184	160	46	20	6	18	35	37	13	10990
	739	765	779	767	750	776	744	592	618	632	620	603	629	597	151	177	191	179	162	188	156	4	30	44	32	15	41	9	10990
	751	769	759	764	757	768	752	604	622	612	617	610	621	605	163	181	171	176	169	180	164	16	34	24	29	22	33	17	10990
	743	777	758	760	762	738	782	596	630	611	613	615	591	635	155	189	170	172	174	150	194	8	42	23	25	27	3	47	10990
	742	778	763	756	761	746	774	595	631	616	609	614	599	627	154	190	175	168	173	158	186	7	43	28	21	26	11	39	10990
	784	736	737	773	766	749	775	637	589	590	626	619	602	628	196	148	149	185	178	161	187	49	1	2	38	31	14	40	10990
	780	740	783	747	754	771	745	633	593	636	600	607	624	598	192	152	195	159	166	183	157	45	5	48	12	19	36	10	10990
	95	69	55	67	84	86	62	144	118	104	116	133	135	111	683	657	643	655	672	674	650	732	706	692	704	721	723	699	10990
	53	79	93	81	64	90	58	102	128	142	130	113	139	107	641	667	681	669	652	678	646	690	716	730	718	701	727	695	10990
	65	83	73	78	71	82	66	114	132	122	127	120	131	115	653	671	661	666	659	670	654	702	720	710	715	708	719	703	10990
	57	91	72	74	76	52	96	106	140	121	123	125	101	145	645	679	660	662	664	640	684	694	728	709	711	713	689	733	10990
	56	92	77	70	75	60	88	105	141	126	119	124	109	137	644	680	665	658	663	648	676	693	729	714	707	712	697	725	10990
	98	50	51	87	80	63	89	147	99	100	136	129	112	138	686	638	639	675	668	651	677	735	687	688	724	717	700	726	10990
	94	54	97	61	68	85	59	143	103	146	110	117	134	108	682	642	685	649	656	673	647	731	691	734	698	705	722	696	10990
	242	216	202	214	231	233	209	389	363	349	361	378	380	356	438	412	398	410	427	429	405	585	559	545	557	574	576	552	10990
	200	226	240	228	211	237	205	347	373	387	375	358	384	352	396	422	436	424	407	433	401	543	569	583	571	554	580	548	10990
	212	230	220	225	218	229	213	359	377	367	372	365	376	360	408	426	416	421	414	425	409	555	573	563	568	561	572	556	10990
	204	238	219	221	223	199	243	351	385	366	368	370	346	390	400	434	415	417	419	395	439	547	581	562	564	566	542	586	10990
	203	239	224	217	222	207	235	350	386	371	364	369	354	382	399	435	420	413	418	403	431	546	582	567	560	565	550	578	10990
	245	197	198	234	227	210	236	392	344	345	381	374	357	383	441	393	394	430	423	406	432	588	540	541	577	570	553	579	10990
	241	201	244	208	215	232	206	388	348	391	355	362	379	353	437	397	440	404	411	428	402	584	544	587	551	558	575	549	10990
	536	510	496	508	525	527	503	487	461	447	459	476	478	454	340	314	300	312	329	331	307	291	265	251	263	280	282	258	10990
	494	520	534	522	505	531	499	445	471	485	473	456	482	450	298	324	338	326	309	335	303	249	275	289	277	260	286	254	10990
	506	524	514	519	512	523	507	457	475	465	470	463	474	458	310	328	318	323	316	327	311	261	279	269	274	267	278	262	10990
	498	532	513	515	517	493	537	449	483	464	466	468	444	488	302	336	317	319	321	297	341	253	287	268	270	272	248	292	10990
	497	533	518	511	516	501	529	448	484	469	462	467	452	480	301	337	322	315	320	305	333	252	288	273	266	271	256	284	10990
	539	491	492	528	521	504	530	490	442	443	479	472	455	481	343	295	296	332	325	308	334	294	246	247	283	276	259	285	10990
	535	495	538	502	509	526	500	486	446	489	453	460	477	451	339	299	342	306	313	330	304	290	250	293	257	264	281	255	10990
	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990

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4	mgc	11794	12370	13646	13982	14910	15702	16478	15714	14722	14430	13198	12558	11782	10990	10226	9234	8942	7710	7070	6294	5502	6306	6882	8158	8494	9422	10214	10990
	759	764	757	755	765	777	743	612	617	610	608	618	630	596	171	176	169	167	177	189	155	24	29	22	20	30	42	8	10990
	758	760	762	752	768	773	747	611	613	615	605	621	626	600	170	172	174	164	180	185	159	23	25	27	17	33	38	12	10990
	763	756	761	771	749	737	783	616	609	614	624	602	590	636	175	168	173	183	161	149	195	28	21	26	36	14	2	48	10990
	751	753	754	772	770	740	780	604	606	607	625	623	593	633	163	165	166	184	182	152	192	16	18	19	37	35	5	45	10990
	769	767	766	750	748	775	745	622	620	619	603	601	628	598	181	179	178	162	160	187	157	34	32	31	15	13	40	10	10990
	739	736	778	738	779	774	776	592	589	631	591	632	627	629	151	148	190	150	191	186	188	4	1	43	3	44	39	41	10990
	781	784	742	782	741	744	746	634	637	595	635	594	597	599	193	196	154	194	153	156	158	46	49	7	47	6	9	11	10990
	73	78	71	69	79	91	57	122	127	120	118	128	140	106	661	666	659	657	667	679	645	710	715	708	706	716	728	694	10990
	72	74	76	66	82	87	61	121	123	125	115	131	136	110	660	662	664	654	670	675	649	709	711	713	703	719	724	698	10990
	77	70	75	85	63	51	97	126	119	124	134	112	100	146	665	658	663	673	651	639	685	714	707	712	722	700	688	734	10990
	65	67	68	86	84	54	94	114	116	117	135	133	103	143	653	655	656	674	672	642	682	702	704	705	723	721	691	731	10990
	83	81	80	64	62	89	59	132	130	129	113	111	138	108	671	669	668	652	650	677	647	720	718	717	701	699	726	696	10990
	53	50	92	52	93	88	90	102	99	141	101	142	137	139	641	638	680	640	681	676	678	690	687	729	689	730	725	727	10990
	95	98	56	96	55	58	60	144	147	105	145	104	107	109	683	686	644	684	643	646	648	732	735	693	733	692	695	697	10990
	220	225	218	216	226	238	204	367	372	365	363	373	385	351	416	421	414	412	422	434	400	563	568	561	559	569	581	547	10990
	219	221	223	213	229	234	208	366	368	370	360	376	381	355	415	417	419	409	425	430	404	562	564	566	556	572	577	551	10990
	224	217	222	232	210	198	244	371	364	369	379	357	345	391	420	413	418	428	406	394	440	567	560	565	575	553	541	587	10990
	212	214	215	233	231	201	241	359	361	362	380	378	348	388	408	410	411	429	427	397	437	555	557	558	576	574	544	584	10990
	230	228	227	211	209	236	206	377	375	374	358	356	383	353	426	424	423	407	405	432	402	573	571	570	554	552	579	549	10990
	200	197	239	199	240	235	237	347	344	386	346	387	382	384	396	393	435	395	436	431	433	543	540	582	542	583	578	580	10990
	242	245	203	243	202	205	207	389	392	350	390	349	352	354	438	441	399	439	398	401	403	585	588	546	586	545	548	550	10990
	514	519	512	510	520	532	498	465	470	463	461	471	483	449	318	323	316	314	324	336	302	269	274	267	265	275	287	253	10990
	513	515	517	507	523	528	502	464	466	468	458	474	479	453	317	319	321	311	327	332	306	268	270	272	262	278	283	257	10990
	518	511	516	526	504	492	538	469	462	467	477	455	443	489	322	315	320	330	308	296	342	273	266	271	281	259	247	293	10990
	506	508	509	527	525	495	535	457	459	460	478	476	446	486	310	312	313	331	329	299	339	261	263	264	282	280	250	290	10990
	524	522	521	505	503	530	500	475	473	472	456	454	481	451	328	326	325	309	307	334	304	279	277	276	260	258	285	255	10990
	494	491	533	493	534	529	531	445	442	484	444	485	480	482	298	295	337	297	338	333	335	249	246	288	248	289	284	286	10990
	536	539	497	537	496	499	501	487	490	448	488	447	450	452	340	343	301	341	300	303	305	291	294	252	292	251	254	256	10990
	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990

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5	mgc	11862	12434	13614	14026	14910	15558	16478	15782	14786	14398	13242	12558	11638	10990	10294	9298	8910	7754	7070	6150	5502	6374	6946	8126	8538	9422	10070	10990
	772	766	760	754	748	773	747	625	619	613	607	601	626	600	184	178	172	166	160	185	159	37	31	25	19	13	38	12	10990
	755	749	768	767	761	777	743	608	602	621	620	614	630	596	167	161	180	179	173	189	155	20	14	33	32	26	42	8	10990
	763	762	756	750	769	737	783	616	615	609	603	622	590	636	175	174	168	162	181	149	195	28	27	21	15	34	2	48	10990
	751	770	764	758	757	740	780	604	623	617	611	610	593	633	163	182	176	170	169	152	192	16	35	29	23	22	5	45	10990
	759	753	752	771	765	775	745	612	606	605	624	618	628	598	171	165	164	183	177	187	157	24	18	17	36	30	40	10	10990
	739	736	778	738	779	774	776	592	589	631	591	632	627	629	151	148	190	150	191	186	188	4	1	43	3	44	39	41	10990
	781	784	742	782	741	744	746	634	637	595	635	594	597	599	193	196	154	194	153	156	158	46	49	7	47	6	9	11	10990
	86	80	74	68	62	87	61	135	129	123	117	111	136	110	674	668	662	656	650	675	649	723	717	711	705	699	724	698	10990
	69	63	82	81	75	91	57	118	112	131	130	124	140	106	657	651	670	669	663	679	645	706	700	719	718	712	728	694	10990
	77	76	70	64	83	51	97	126	125	119	113	132	100	146	665	664	658	652	671	639	685	714	713	707	701	720	688	734	10990
	65	84	78	72	71	54	94	114	133	127	121	120	103	143	653	672	666	660	659	642	682	702	721	715	709	708	691	731	10990
	73	67	66	85	79	89	59	122	116	115	134	128	138	108	661	655	654	673	667	677	647	710	704	703	722	716	726	696	10990
	53	50	92	52	93	88	90	102	99	141	101	142	137	139	641	638	680	640	681	676	678	690	687	729	689	730	725	727	10990
	95	98	56	96	55	58	60	144	147	105	145	104	107	109	683	686	644	684	643	646	648	732	735	693	733	692	695	697	10990
	233	227	221	215	209	234	208	380	374	368	362	356	381	355	429	423	417	411	405	430	404	576	570	564	558	552	577	551	10990
	216	210	229	228	222	238	204	363	357	376	375	369	385	351	412	406	425	424	418	434	400	559	553	572	571	565	581	547	10990
	224	223	217	211	230	198	244	371	370	364	358	377	345	391	420	419	413	407	426	394	440	567	566	560	554	573	541	587	10990
	212	231	225	219	218	201	241	359	378	372	366	365	348	388	408	427	421	415	414	397	437	555	574	568	562	561	544	584	10990
	220	214	213	232	226	236	206	367	361	360	379	373	383	353	416	410	409	428	422	432	402	563	557	556	575	569	579	549	10990
	200	197	239	199	240	235	237	347	344	386	346	387	382	384	396	393	435	395	436	431	433	543	540	582	542	583	578	580	10990
	242	245	203	243	202	205	207	389	392	350	390	349	352	354	438	441	399	439	398	401	403	585	588	546	586	545	548	550	10990
	527	521	515	509	503	528	502	478	472	466	460	454	479	453	331	325	319	313	307	332	306	282	276	270	264	258	283	257	10990
	510	504	523	522	516	532	498	461	455	474	473	467	483	449	314	308	327	326	320	336	302	265	259	278	277	271	287	253	10990
	518	517	511	505	524	492	538	469	468	462	456	475	443	489	322	321	315	309	328	296	342	273	272	266	260	279	247	293	10990
	506	525	519	513	512	495	535	457	476	470	464	463	446	486	310	329	323	317	316	299	339	261	280	274	268	267	250	290	10990
	514	508	507	526	520	530	500	465	459	458	477	471	481	451	318	312	311	330	324	334	304	269	263	262	281	275	285	255	10990
	494	491	533	493	534	529	531	445	442	484	444	485	480	482	298	295	337	297	338	333	335	249	246	288	248	289	284	286	10990
	536	539	497	537	496	499	501	487	490	448	488	447	450	452	340	343	301	341	300	303	305	291	294	252	292	251	254	256	10990
	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990

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July 23, 2023, pp. 1-34, https://doi.org/10.5281/zenodo.8176061

6	mgc	11674	12446	13650	14110	14910	15614	16478	15594	14798	14434	13326	12558	11694	10990	10106	9310	8946	7838	7070	6206	5502	6186	6958	8162	8622	9422	10126	10990
	751	748	766	768	767	773	747	604	601	619	621	620	626	600	163	160	178	180	179	185	159	16	13	31	33	32	38	12	10990
	771	761	756	763	749	777	743	624	614	609	616	602	630	596	183	173	168	175	161	189	155	36	26	21	28	14	42	8	10990
	755	762	760	758	765	737	783	608	615	613	611	618	590	636	167	174	172	170	177	149	195	20	27	25	23	30	2	48	10990
	770	757	764	759	750	740	780	623	610	617	612	603	593	633	182	169	176	171	162	152	192	35	22	29	24	15	5	45	10990
	753	772	754	752	769	775	745	606	625	607	605	622	628	598	165	184	166	164	181	187	157	18	37	19	17	34	40	10	10990
	738	736	778	739	779	774	776	591	589	631	592	632	627	629	150	148	190	151	191	186	188	3	1	43	4	44	39	41	10990
	782	784	742	781	741	744	746	635	637	595	634	594	597	599	194	196	154	193	153	156	158	47	49	7	46	6	9	11	10990
	65	62	80	82	81	87	61	114	111	129	131	130	136	110	653	650	668	670	669	675	649	702	699	717	719	718	724	698	10990
	85	75	70	77	63	91	57	134	124	119	126	112	140	106	673	663	658	665	651	679	645	722	712	707	714	700	728	694	10990
	69	76	74	72	79	51	97	118	125	123	121	128	100	146	657	664	662	660	667	639	685	706	713	711	709	716	688	734	10990
	84	71	78	73	64	54	94	133	120	127	122	113	103	143	672	659	666	661	652	642	682	721	708	715	710	701	691	731	10990
	67	86	68	66	83	89	59	116	135	117	115	132	138	108	655	674	656	654	671	677	647	704	723	705	703	720	726	696	10990
	52	50	92	53	93	88	90	101	99	141	102	142	137	139	640	638	680	641	681	676	678	689	687	729	690	730	725	727	10990
	96	98	56	95	55	58	60	145	147	105	144	104	107	109	684	686	644	683	643	646	648	733	735	693	732	692	695	697	10990
	212	209	227	229	228	234	208	359	356	374	376	375	381	355	408	405	423	425	424	430	404	555	552	570	572	571	577	551	10990
	232	222	217	224	210	238	204	379	369	364	371	357	385	351	428	418	413	420	406	434	400	575	565	560	567	553	581	547	10990
	216	223	221	219	226	198	244	363	370	368	366	373	345	391	412	419	417	415	422	394	440	559	566	564	562	569	541	587	10990
	231	218	225	220	211	201	241	378	365	372	367	358	348	388	427	414	421	416	407	397	437	574	561	568	563	554	544	584	10990
	214	233	215	213	230	236	206	361	380	362	360	377	383	353	410	429	411	409	426	432	402	557	576	558	556	573	579	549	10990
	199	197	239	200	240	235	237	346	344	386	347	387	382	384	395	393	435	396	436	431	433	542	540	582	543	583	578	580	10990
	243	245	203	242	202	205	207	390	392	350	389	349	352	354	439	441	399	438	398	401	403	586	588	546	585	545	548	550	10990
	506	503	521	523	522	528	502	457	454	472	474	473	479	453	310	307	325	327	326	332	306	261	258	276	278	277	283	257	10990
	526	516	511	518	504	532	498	477	467	462	469	455	483	449	330	320	315	322	308	336	302	281	271	266	273	259	287	253	10990
	510	517	515	513	520	492	538	461	468	466	464	471	443	489	314	321	319	317	324	296	342	265	272	270	268	275	247	293	10990
	525	512	519	514	505	495	535	476	463	470	465	456	446	486	329	316	323	318	309	299	339	280	267	274	269	260	250	290	10990
	508	527	509	507	524	530	500	459	478	460	458	475	481	451	312	331	313	311	328	334	304	263	282	264	262	279	285	255	10990
	493	491	533	494	534	529	531	444	442	484	445	485	480	482	297	295	337	298	338	333	335	248	246	288	249	289	284	286	10990
	537	539	497	536	496	499	501	488	490	448	487	447	450	452	341	343	301	340	300	303	305	292	294	252	291	251	254	256	10990
	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990

7	mgc	11742	12602	13358	14074	14894	15734	16478	15662	14954	14142	13290	12542	11814	10990	10174	9466	8654	7802	7054	6326	5502	6254	7114	7870	8586	9406	10246	10990
	743	747	745	780	781	783	741	596	600	598	633	634	636	594	155	159	157	192	193	195	153	8	12	10	45	46	48	6	10990
	784	759	764	757	755	765	736	637	612	617	610	608	618	589	196	171	176	169	167	177	148	49	24	29	22	20	30	1	10990
	782	758	760	762	752	768	738	635	611	613	615	605	621	591	194	170	172	174	164	180	150	47	23	25	27	17	33	3	10990
	742	763	756	761	771	749	778	595	616	609	614	624	602	631	154	175	168	173	183	161	190	7	28	21	26	36	14	43	10990
	744	751	753	754	772	770	776	597	604	606	607	625	623	629	156	163	165	166	184	182	188	9	16	18	19	37	35	41	10990
	746	769	767	766	750	748	774	599	622	620	619	603	601	627	158	181	179	178	162	160	186	11	34	32	31	15	13	39	10990
	779	773	775	740	739	737	777	632	626	628	593	592	590	630	191	185	187	152	151	149	189	44	38	40	5	4	2	42	10990
	57	61	59	94	95	97	55	106	110	108	143	144	146	104	645	649	647	682	683	685	643	694	698	696	731	732	734	692	10990
	98	73	78	71	69	79	50	147	122	127	120	118	128	99	686	661	666	659	657	667	638	735	710	715	708	706	716	687	10990
	96	72	74	76	66	82	52	145	121	123	125	115	131	101	684	660	662	664	654	670	640	733	709	711	713	703	719	689	10990
	56	77	70	75	85	63	92	105	126	119	124	134	112	141	644	665	658	663	673	651	680	693	714	707	712	722	700	729	10990
	58	65	67	68	86	84	90	107	114	116	117	135	133	139	646	653	655	656	674	672	678	695	702	704	705	723	721	727	10990
	60	83	81	80	64	62	88	109	132	130	129	113	111	137	648	671	669	668	652	650	676	697	720	718	717	701	699	725	10990
	93	87	89	54	53	51	91	142	136	138	103	102	100	140	681	675	677	642	641	639	679	730	724	726	691	690	688	728	10990
	204	208	206	241	242	244	202	351	355	353	388	389	391	349	400	404	402	437	438	440	398	547	551	549	584	585	587	545	10990
	245	220	225	218	216	226	197	392	367	372	365	363	373	344	441	416	421	414	412	422	393	588	563	568	561	559	569	540	10990
	243	219	221	223	213	229	199	390	366	368	370	360	376	346	439	415	417	419	409	425	395	586	562	564	566	556	572	542	10990
	203	224	217	222	232	210	239	350	371	364	369	379	357	386	399	420	413	418	428	406	435	546	567	560	565	575	553	582	10990
	205	212	214	215	233	231	237	352	359	361	362	380	378	384	401	408	410	411	429	427	433	548	555	557	558	576	574	580	10990
	207	230	228	227	211	209	235	354	377	375	374	358	356	382	403	426	424	423	407	405	431	550	573	571	570	554	552	578	10990
	240	234	236	201	200	198	238	387	381	383	348	347	345	385	436	430	432	397	396	394	434	583	577	579	544	543	541	581	10990
	498	502	500	535	536	538	496	449	453	451	486	487	489	447	302	306	304	339	340	342	300	253	257	255	290	291	293	251	10990
	539	514	519	512	510	520	491	490	465	470	463	461	471	442	343	318	323	316	314	324	295	294	269	274	267	265	275	246	10990
	537	513	515	517	507	523	493	488	464	466	468	458	474	444	341	317	319	321	311	327	297	292	268	270	272	262	278	248	10990
	497	518	511	516	526	504	533	448	469	462	467	477	455	484	301	322	315	320	330	308	337	252	273	266	271	281	259	288	10990
	499	506	508	509	527	525	531	450	457	459	460	478	476	482	303	310	312	313	331	329	335	254	261	263	264	282	280	286	10990
	501	524	522	521	505	503	529	452	475	473	472	456	454	480	305	328	326	325	309	307	333	256	279	277	276	260	258	284	10990
	534	528	530	495	494	492	532	485	479	481	446	445	443	483	338	332	334	299	298	296	336	289	283	285	250	249	247	287	10990
	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990	10990

Above seven magic squares of order 28 formed by multiples blocks of magic squares of order 7 and are with entries

$$D_{35\times 35} := \{1, 2, \ldots, 783, 784\}.$$

2.3 Magic Squares of Order 21

These magic squares are obtained from the magic squares of order 133 by using the formula $\frac{a^2-b^2}{2}$, $a>b$. Removing the external borders of order 7 and then subtracting $\frac{133^2-21^2}{2} := 8624$ from each entry, we get 7 magic squares of orders 21 given by

1	mgc	5082	5523	5964	6405	6846	7287	7728	6846	5964	5082	4200	3318	2436	1554	1995	2436	2877	3318	3759	4200	4641
	344	352	360	368	376	384	392	1	9	17	25	33	41	49	246	254	262	270	278	286	294	4641
	383	391	350	351	359	367	375	40	48	7	8	16	24	32	285	293	252	253	261	269	277	4641
	366	374	382	390	349	357	358	23	31	39	47	6	14	15	268	276	284	292	251	259	260	4641
	356	364	365	373	381	389	348	13	21	22	30	38	46	5	258	266	267	275	283	291	250	4641
	388	347	355	363	371	372	380	45	4	12	20	28	29	37	290	249	257	265	273	274	282	4641
	378	379	387	346	354	362	370	35	36	44	3	11	19	27	280	281	289	248	256	264	272	4641
	361	369	377	385	386	345	353	18	26	34	42	43	2	10	263	271	279	287	288	247	255	4641
	99	107	115	123	131	139	147	197	205	213	221	229	237	245	295	303	311	319	327	335	343	4641
	138	146	105	106	114	122	130	236	244	203	204	212	220	228	334	342	301	302	310	318	326	4641
	121	129	137	145	104	112	113	219	227	235	243	202	210	211	317	325	333	341	300	308	309	4641
	111	119	120	128	136	144	103	209	217	218	226	234	242	201	307	315	316	324	332	340	299	4641
	143	102	110	118	126	127	135	241	200	208	216	224	225	233	339	298	306	314	322	323	331	4641
	133	134	142	101	109	117	125	231	232	240	199	207	215	223	329	330	338	297	305	313	321	4641
	116	124	132	140	141	100	108	214	222	230	238	239	198	206	312	320	328	336	337	296	304	4641
	148	156	164	172	180	188	196	393	401	409	417	425	433	441	50	58	66	74	82	90	98	4641
	187	195	154	155	163	171	179	432	440	399	400	408	416	424	89	97	56	57	65	73	81	4641
	170	178	186	194	153	161	162	415	423	431	439	398	406	407	72	80	88	96	55	63	64	4641
	160	168	169	177	185	193	152	405	413	414	422	430	438	397	62	70	71	79	87	95	54	4641
	192	151	159	167	175	176	184	437	396	404	412	420	421	429	94	53	61	69	77	78	86	4641
	182	183	191	150	158	166	174	427	428	436	395	403	411	419	84	85	93	52	60	68	76	4641
	165	173	181	189	190	149	157	410	418	426	434	435	394	402	67	75	83	91	92	51	59	4641
	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641

2	mgc	5157	5568	5979	6390	6801	7212	7728	6921	6009	5097	4185	3273	2361	1554	2070	2481	2892	3303	3714	4125	4641
	385	381	383	348	347	345	387	42	38	40	5	4	2	44	287	283	285	250	249	247	289	4641
	344	377	380	360	362	361	392	1	34	37	17	19	18	49	246	279	282	262	264	263	294	4641
	346	357	367	372	365	379	390	3	14	24	29	22	36	47	248	259	269	274	267	281	292	4641
	386	358	366	368	370	378	350	43	15	23	25	27	35	7	288	260	268	270	272	280	252	4641
	384	373	371	364	369	363	352	41	30	28	21	26	20	9	286	275	273	266	271	265	254	4641
	382	375	356	376	374	359	354	39	32	13	33	31	16	11	284	277	258	278	276	261	256	4641
	349	355	353	388	389	391	351	6	12	10	45	46	48	8	251	257	255	290	291	293	253	4641
	140	136	138	103	102	100	142	238	234	236	201	200	198	240	336	332	334	299	298	296	338	4641
	99	132	135	115	117	116	147	197	230	233	213	215	214	245	295	328	331	311	313	312	343	4641
	101	112	122	127	120	134	145	199	210	220	225	218	232	243	297	308	318	323	316	330	341	4641
	141	113	121	123	125	133	105	239	211	219	221	223	231	203	337	309	317	319	321	329	301	4641
	139	128	126	119	124	118	107	237	226	224	217	222	216	205	335	324	322	315	320	314	303	4641
	137	130	111	131	129	114	109	235	228	209	229	227	212	207	333	326	307	327	325	310	305	4641
	104	110	108	143	144	146	106	202	208	206	241	242	244	204	300	306	304	339	340	342	302	4641
	189	185	187	152	151	149	191	434	430	432	397	396	394	436	91	87	89	54	53	51	93	4641
	148	181	184	164	166	165	196	393	426	429	409	411	410	441	50	83	86	66	68	67	98	4641
	150	161	171	176	169	183	194	395	406	416	421	414	428	439	52	63	73	78	71	85	96	4641
	190	162	170	172	174	182	154	435	407	415	417	419	427	399	92	64	72	74	76	84	56	4641
	188	177	175	168	173	167	156	433	422	420	413	418	412	401	90	79	77	70	75	69	58	4641
	186	179	160	180	178	163	158	431	424	405	425	423	408	403	88	81	62	82	80	65	60	4641
	153	159	157	192	193	195	155	398	404	402	437	438	440	400	55	61	59	94	95	97	57	4641
	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641

3	mgc	4986	5466	5898	6408	6969	7380	7728	6750	5907	5016	4203	3441	2529	1554	1899	2379	2811	3321	3882	4293	4641
	389	363	349	361	378	380	356	46	20	6	18	35	37	13	291	265	251	263	280	282	258	4641
	347	373	387	375	358	384	352	4	30	44	32	15	41	9	249	275	289	277	260	286	254	4641
	359	377	367	372	365	376	360	16	34	24	29	22	33	17	261	279	269	274	267	278	262	4641
	351	385	366	368	370	346	390	8	42	23	25	27	3	47	253	287	268	270	272	248	292	4641
	350	386	371	364	369	354	382	7	43	28	21	26	11	39	252	288	273	266	271	256	284	4641
	392	344	345	381	374	357	383	49	1	2	38	31	14	40	294	246	247	283	276	259	285	4641
	388	348	391	355	362	379	353	45	5	48	12	19	36	10	290	250	293	257	264	281	255	4641
	144	118	104	116	133	135	111	242	216	202	214	231	233	209	340	314	300	312	329	331	307	4641
	102	128	142	130	113	139	107	200	226	240	228	211	237	205	298	324	338	326	309	335	303	4641
	114	132	122	127	120	131	115	212	230	220	225	218	229	213	310	328	318	323	316	327	311	4641
	106	140	121	123	125	101	145	204	238	219	221	223	199	243	302	336	317	319	321	297	341	4641
	105	141	126	119	124	109	137	203	239	224	217	222	207	235	301	337	322	315	320	305	333	4641
	147	99	100	136	129	112	138	245	197	198	234	227	210	236	343	295	296	332	325	308	334	4641
	143	103	146	110	117	134	108	241	201	244	208	215	232	206	339	299	342	306	313	330	304	4641
	193	167	153	165	182	184	160	438	412	398	410	427	429	405	95	69	55	67	84	86	62	4641
	151	177	191	179	162	188	156	396	422	436	424	407	433	401	53	79	93	81	64	90	58	4641
	163	181	171	176	169	180	164	408	426	416	421	414	425	409	65	83	73	78	71	82	66	4641
	155	189	170	172	174	150	194	400	434	415	417	419	395	439	57	91	72	74	76	52	96	4641
	154	190	175	168	173	158	186	399	435	420	413	418	403	431	56	92	77	70	75	60	88	4641
	196	148	149	185	178	161	187	441	393	394	430	423	406	432	98	50	51	87	80	63	89	4641
	192	152	195	159	166	183	157	437	397	440	404	411	428	402	94	54	97	61	68	85	59	4641
	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641

4	mgc	5097	5382	6192	6297	6846	7293	7728	6861	5823	5310	4092	3318	2442	1554	2010	2295	3105	3210	3759	4206	4641
	367	372	365	363	373	385	351	24	29	22	20	30	42	8	269	274	267	265	275	287	253	4641
	366	368	370	360	376	381	355	23	25	27	17	33	38	12	268	270	272	262	278	283	257	4641
	371	364	369	379	357	345	391	28	21	26	36	14	2	48	273	266	271	281	259	247	293	4641
	359	361	362	380	378	348	388	16	18	19	37	35	5	45	261	263	264	282	280	250	290	4641
	377	375	374	358	356	383	353	34	32	31	15	13	40	10	279	277	276	260	258	285	255	4641
	347	344	386	346	387	382	384	4	1	43	3	44	39	41	249	246	288	248	289	284	286	4641
	389	392	350	390	349	352	354	46	49	7	47	6	9	11	291	294	252	292	251	254	256	4641
	122	127	120	118	128	140	106	220	225	218	216	226	238	204	318	323	316	314	324	336	302	4641
	121	123	125	115	131	136	110	219	221	223	213	229	234	208	317	319	321	311	327	332	306	4641
	126	119	124	134	112	100	146	224	217	222	232	210	198	244	322	315	320	330	308	296	342	4641
	114	116	117	135	133	103	143	212	214	215	233	231	201	241	310	312	313	331	329	299	339	4641
	132	130	129	113	111	138	108	230	228	227	211	209	236	206	328	326	325	309	307	334	304	4641
	102	99	141	101	142	137	139	200	197	239	199	240	235	237	298	295	337	297	338	333	335	4641
	144	147	105	145	104	107	109	242	245	203	243	202	205	207	340	343	301	341	300	303	305	4641
	171	176	169	167	177	189	155	416	421	414	412	422	434	400	73	78	71	69	79	91	57	4641
	170	172	174	164	180	185	159	415	417	419	409	425	430	404	72	74	76	66	82	87	61	4641
	175	168	173	183	161	149	195	420	413	418	428	406	394	440	77	70	75	85	63	51	97	4641
	163	165	166	184	182	152	192	408	410	411	429	427	397	437	65	67	68	86	84	54	94	4641
	181	179	178	162	160	187	157	426	424	423	407	405	432	402	83	81	80	64	62	89	59	4641
	151	148	190	150	191	186	188	396	393	435	395	436	431	433	53	50	92	52	93	88	90	4641
	193	196	154	194	153	156	158	438	441	399	439	398	401	403	95	98	56	96	55	58	60	4641
	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641

5	mgc	5148	5430	6168	6330	6846	7185	7728	6912	5871	5286	4125	3318	2334	1554	2061	2343	3081	3243	3759	4098	4641
	380	374	368	362	356	381	355	37	31	25	19	13	38	12	282	276	270	264	258	283	257	4641
	363	357	376	375	369	385	351	20	14	33	32	26	42	8	265	259	278	277	271	287	253	4641
	371	370	364	358	377	345	391	28	27	21	15	34	2	48	273	272	266	260	279	247	293	4641
	359	378	372	366	365	348	388	16	35	29	23	22	5	45	261	280	274	268	267	250	290	4641
	367	361	360	379	373	383	353	24	18	17	36	30	40	10	269	263	262	281	275	285	255	4641
	347	344	386	346	387	382	384	4	1	43	3	44	39	41	249	246	288	248	289	284	286	4641
	389	392	350	390	349	352	354	46	49	7	47	6	9	11	291	294	252	292	251	254	256	4641
	135	129	123	117	111	136	110	233	227	221	215	209	234	208	331	325	319	313	307	332	306	4641
	118	112	131	130	124	140	106	216	210	229	228	222	238	204	314	308	327	326	320	336	302	4641
	126	125	119	113	132	100	146	224	223	217	211	230	198	244	322	321	315	309	328	296	342	4641
	114	133	127	121	120	103	143	212	231	225	219	218	201	241	310	329	323	317	316	299	339	4641
	122	116	115	134	128	138	108	220	214	213	232	226	236	206	318	312	311	330	324	334	304	4641
	102	99	141	101	142	137	139	200	197	239	199	240	235	237	298	295	337	297	338	333	335	4641
	144	147	105	145	104	107	109	242	245	203	243	202	205	207	340	343	301	341	300	303	305	4641
	184	178	172	166	160	185	159	429	423	417	411	405	430	404	86	80	74	68	62	87	61	4641
	167	161	180	179	173	189	155	412	406	425	424	418	434	400	69	63	82	81	75	91	57	4641
	175	174	168	162	181	149	195	420	419	413	407	426	394	440	77	76	70	64	83	51	97	4641
	163	182	176	170	169	152	192	408	427	421	415	414	397	437	65	84	78	72	71	54	94	4641
	171	165	164	183	177	187	157	416	410	409	428	422	432	402	73	67	66	85	79	89	59	4641
	151	148	190	150	191	186	188	396	393	435	395	436	431	433	53	50	92	52	93	88	90	4641
	193	196	154	194	153	156	158	438	441	399	439	398	401	403	95	98	56	96	55	58	60	4641
	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641

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6	mgc	5007	5439	6195	6393	6846	7227	7728	6771	5880	5313	4188	3318	2376	1554	1920	2352	3108	3306	3759	4140	4641
	359	356	374	376	375	381	355	16	13	31	33	32	38	12	261	258	276	278	277	283	257	4641
	379	369	364	371	357	385	351	36	26	21	28	14	42	8	281	271	266	273	259	287	253	4641
	363	370	368	366	373	345	391	20	27	25	23	30	2	48	265	272	270	268	275	247	293	4641
	378	365	372	367	358	348	388	35	22	29	24	15	5	45	280	267	274	269	260	250	290	4641
	361	380	362	360	377	383	353	18	37	19	17	34	40	10	263	282	264	262	279	285	255	4641
	346	344	386	347	387	382	384	3	1	43	4	44	39	41	248	246	288	249	289	284	286	4641
	390	392	350	389	349	352	354	47	49	7	46	6	9	11	292	294	252	291	251	254	256	4641
	114	111	129	131	130	136	110	212	209	227	229	228	234	208	310	307	325	327	326	332	306	4641
	134	124	119	126	112	140	106	232	222	217	224	210	238	204	330	320	315	322	308	336	302	4641
	118	125	123	121	128	100	146	216	223	221	219	226	198	244	314	321	319	317	324	296	342	4641
	133	120	127	122	113	103	143	231	218	225	220	211	201	241	329	316	323	318	309	299	339	4641
	116	135	117	115	132	138	108	214	233	215	213	230	236	206	312	331	313	311	328	334	304	4641
	101	99	141	102	142	137	139	199	197	239	200	240	235	237	297	295	337	298	338	333	335	4641
	145	147	105	144	104	107	109	243	245	203	242	202	205	207	341	343	301	340	300	303	305	4641
	163	160	178	180	179	185	159	408	405	423	425	424	430	404	65	62	80	82	81	87	61	4641
	183	173	168	175	161	189	155	428	418	413	420	406	434	400	85	75	70	77	63	91	57	4641
	167	174	172	170	177	149	195	412	419	417	415	422	394	440	69	76	74	72	79	51	97	4641
	182	169	176	171	162	152	192	427	414	421	416	407	397	437	84	71	78	73	64	54	94	4641
	165	184	166	164	181	187	157	410	429	411	409	426	432	402	67	86	68	66	83	89	59	4641
	150	148	190	151	191	186	188	395	393	435	396	436	431	433	52	50	92	53	93	88	90	4641
	194	196	154	193	153	156	158	439	441	399	438	398	401	403	96	98	56	95	55	58	60	4641
	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641

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7	mgc	5058	5556	5976	6366	6834	7317	7728	6822	5997	5094	4161	3306	2466	1554	1971	2469	2889	3279	3747	4230	4641
	351	355	353	388	389	391	349	8	12	10	45	46	48	6	253	257	255	290	291	293	251	4641
	392	367	372	365	363	373	344	49	24	29	22	20	30	1	294	269	274	267	265	275	246	4641
	390	366	368	370	360	376	346	47	23	25	27	17	33	3	292	268	270	272	262	278	248	4641
	350	371	364	369	379	357	386	7	28	21	26	36	14	43	252	273	266	271	281	259	288	4641
	352	359	361	362	380	378	384	9	16	18	19	37	35	41	254	261	263	264	282	280	286	4641
	354	377	375	374	358	356	382	11	34	32	31	15	13	39	256	279	277	276	260	258	284	4641
	387	381	383	348	347	345	385	44	38	40	5	4	2	42	289	283	285	250	249	247	287	4641
	106	110	108	143	144	146	104	204	208	206	241	242	244	202	302	306	304	339	340	342	300	4641
	147	122	127	120	118	128	99	245	220	225	218	216	226	197	343	318	323	316	314	324	295	4641
	145	121	123	125	115	131	101	243	219	221	223	213	229	199	341	317	319	321	311	327	297	4641
	105	126	119	124	134	112	141	203	224	217	222	232	210	239	301	322	315	320	330	308	337	4641
	107	114	116	117	135	133	139	205	212	214	215	233	231	237	303	310	312	313	331	329	335	4641
	109	132	130	129	113	111	137	207	230	228	227	211	209	235	305	328	326	325	309	307	333	4641
	142	136	138	103	102	100	140	240	234	236	201	200	198	238	338	332	334	299	298	296	336	4641
	155	159	157	192	193	195	153	400	404	402	437	438	440	398	57	61	59	94	95	97	55	4641
	196	171	176	169	167	177	148	441	416	421	414	412	422	393	98	73	78	71	69	79	50	4641
	194	170	172	174	164	180	150	439	415	417	419	409	425	395	96	72	74	76	66	82	52	4641
	154	175	168	173	183	161	190	399	420	413	418	428	406	435	56	77	70	75	85	63	92	4641
	156	163	165	166	184	182	188	401	408	410	411	429	427	433	58	65	67	68	86	84	90	4641
	158	181	179	178	162	160	186	403	426	424	423	407	405	431	60	83	81	80	64	62	88	4641
	191	185	187	152	151	149	189	436	430	432	397	396	394	434	93	87	89	54	53	51	91	4641
	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641

Above seven magic squares of order 21 formed by multiples blocks of magic squares of order 7 and are with entries

$$D_{35\times 35} := \{1, 2, \ldots, 440, 441\}.$$

3 Pentagonal Magic Squares Multiples 7

This section brings pentagonal magic squares multiples 7. It includes magic squares of orders 7, 21, 28 and 35. The details are excluded as these are studied extensively in author's previous works [5, 7, 20].

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3.1 Pentagonal Magic Square of Order 7

Below is a **pentagonal** magic squares of order 7.

	pan	175	175	175	175	175	175	175
175	1	9	17	25	33	41	49	175
175	40	48	7	8	16	24	32	175
175	23	31	39	47	6	14	15	175
175	13	21	22	30	38	46	5	175
175	45	4	12	20	28	29	37	175
175	35	36	44	3	11	19	27	175
	18	26	34	42	43	2	10	175
	175	175	175	175	175	175	175	175

It is the same magic square given in the beginning of Section 2.

3.2 Pentagonal Magic Square of Order 21

Below is a **pentagonal** magic squares of order 15.

	pan	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641
4641	1	111	155	243	265	375	397	3	110	154	242	266	374	398	2	109	156	241	267	373	399	4641
4641	370	396	19	106	153	239	264	371	395	20	108	152	238	263	372	394	21	107	151	240	262	4641
4641	237	260	369	391	18	124	148	236	259	368	392	17	125	150	235	261	367	393	16	126	149	4641
4641	123	166	232	258	365	390	13	122	167	234	257	364	389	14	121	168	233	256	366	388	15	4641
4641	386	12	118	165	250	253	363	385	11	119	164	251	255	362	387	10	120	163	252	254	361	4641
4641	271	358	384	8	117	160	249	272	360	383	7	116	161	248	273	359	382	9	115	162	247	4641
4641	159	244	270	376	379	6	113	158	245	269	377	381	5	112	157	246	268	378	380	4	114	4641
4641	43	90	134	222	286	354	418	45	89	133	221	287	353	419	44	88	135	220	288	352	420	4641
4641	349	417	61	85	132	218	285	350	416	62	87	131	217	284	351	415	63	86	130	219	283	4641
4641	216	281	348	412	60	103	127	215	280	347	413	59	104	129	214	282	346	414	58	105	128	4641
4641	102	145	211	279	344	411	55	101	146	213	278	343	410	56	100	147	212	277	345	409	57	4641
4641	407	54	97	144	229	274	342	406	53	98	143	230	276	341	408	52	99	142	231	275	340	4641
4641	292	337	405	50	96	139	228	293	339	404	49	95	140	227	294	338	403	51	94	141	226	4641
4641	138	223	291	355	400	48	92	137	224	290	356	402	47	91	136	225	289	357	401	46	93	4641
4641	22	69	176	201	307	333	439	24	68	175	200	308	332	440	23	67	177	199	309	331	441	4641
4641	328	438	40	64	174	197	306	329	437	41	66	173	196	305	330	436	42	65	172	198	304	4641
4641	195	302	327	433	39	82	169	194	301	326	434	38	83	171	193	303	325	435	37	84	170	4641
4641	81	187	190	300	323	432	34	80	188	192	299	322	431	35	79	189	191	298	324	430	36	4641
4641	428	33	76	186	208	295	321	427	32	77	185	209	297	320	429	31	78	184	210	296	319	4641
4641	313	316	426	29	75	181	207	314	318	425	28	74	182	206	315	317	424	30	73	183	205	4641
	180	202	312	334	421	27	71	179	203	311	335	423	26	70	178	204	310	336	422	25	72	4641
	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641	4641

The blocks of order 7 are **equal sums** magic squares, i.e., $M_{7\times 7} := 1547$

3.3 Pentagonal Magic Square of Order 35

Below is a **pentagonal** magic squares of order 35.

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pan	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455
21455	901	649	253	1081	865	433	109	685	181	1189	829	469	1	937	73	217	505	613	721	1009	1153	289	1225	757	397	37	1045	541	1117	793	361	145	973	577	325	21455
21455	445	118	879	656	264	1058	871	14	911	692	195	1161	839	479	1001	1149	103	213	497	610	718	1017	555	296	1199	770	407	47	588	332	1095	802	373	151	950	21455
21455	1069	848	451	130	888	634	271	811	489	24	924	666	202	1175	602	715	998	1141	99	243	493	420	57	1027	527	310	1206	744	163	956	565	343	1102	780	382	21455
21455	643	249	1076	859	428	136	900	176	1182	825	461	34	934	679	239	523	598	707	995	1138	91	1220	751	394	70	1037	537	282	787	360	172	968	571	320	1113	21455
21455	113	906	655	258	1054	866	439	944	689	189	1156	832	475	6	1135	88	231	519	628	703	987	547	292	1192	765	401	44	1050	326	1090	798	367	150	977	583	21455
21455	844	446	124	883	661	270	1063	482	20	916	699	199	1169	806	733	983	1127	85	228	511	624	51	1024	560	302	1202	737	415	955	592	338	1096	775	378	157	21455
21455	276	1075	853	424	131	894	638	1179	819	456	27	930	671	209	508	616	729	1013	1123	77	225	747	387	65	1031	534	315	1212	355	168	962	570	347	1108	781	21455
21455	283	1197	750	403	56	1044	558	1094	805	372	152	947	590	331	907	653	256	1055	868	437	115	691	194	1163	836	480	13	914	90	216	524	619	714	981	1147	21455
21455	1036	554	313	1193	742	400	53	562	345	1101	779	385	162	957	448	122	885	662	268	1061	845	25	923	669	201	1174	813	486	994	1121	97	230	496	629	724	21455
21455	392	50	1033	546	309	1223	738	175	967	572	317	1115	786	359	1073	851	425	133	892	640	277	824	463	31	935	678	179	1181	601	734	1004	1134	71	237	510	21455
21455	1219	768	388	42	1030	543	301	800	366	149	980	582	327	1087	647	255	1082	863	431	110	903	188	1159	831	474	8	941	690	211	517	615	706	1014	1144	84	21455
21455	540	298	1211	764	418	38	1022	337	1097	772	380	156	954	595	116	880	658	262	1060	872	443	918	696	200	1168	809	481	19	1154	94	224	491	622	720	986	21455
21455	68	1018	532	295	1208	756	414	961	569	350	1107	782	352	170	850	452	128	886	635	273	1067	459	26	929	673	206	1180	818	727	1000	1126	104	234	504	596	21455
21455	753	406	64	1048	528	287	1205	362	142	975	576	324	1120	792	250	1078	857	430	137	898	641	1186	830	468	4	936	684	183	514	609	701	1007	1140	76	244	21455
21455	697	198	1166	810	483	17	920	96	229	498	626	725	993	1124	300	1196	769	409	49	1016	552	1088	777	365	158	966	589	348	884	665	267	1062	842	450	121	21455
21455	28	927	675	207	1178	816	460	1005	1133	74	236	509	603	731	1029	526	307	1210	741	419	59	581	344	1118	773	357	155	963	422	135	891	639	280	1072	852	21455
21455	828	466	5	938	682	185	1187	614	708	1011	1145	83	214	516	391	69	1039	539	281	1217	755	147	960	578	336	1114	803	353	1085	862	432	107	905	646	254	21455
21455	192	1165	837	478	11	915	693	223	494	621	719	988	1151	95	1191	762	405	41	1049	549	294	799	383	143	952	575	333	1106	660	261	1059	875	442	117	877	21455
21455	921	670	203	1172	815	487	23	1128	101	235	503	599	726	999	559	304	1204	736	412	55	1021	330	1103	791	379	173	948	567	127	887	632	275	1066	849	455	21455
21455	465	32	933	676	180	1183	822	704	1006	1139	78	241	515	608	62	1035	531	314	1214	749	386	978	563	322	1100	788	371	169	856	429	140	897	642	247	1080	21455
21455	1160	833	472	10	942	688	186	521	620	713	984	1146	89	218	759	399	36	1042	545	286	1224	368	161	974	593	318	1092	785	257	1052	870	436	114	910	652	21455
21455	1105	776	384	164	959	561	342	878	637	260	1068	861	449	138	674	210	1177	817	457	30	926	102	233	501	600	728	997	1130	306	1209	743	416	60	1028	529	21455
21455	574	316	1112	790	356	174	969	441	134	908	633	252	1065	858	2	940	681	184	1190	827	467	1008	1137	80	242	513	606	705	1040	538	284	1216	754	393	66	21455
21455	146	979	584	329	1086	797	370	1057	855	438	126	904	663	248	840	477	12	912	695	191	1164	618	711	985	1148	87	220	522	404	43	1046	550	293	1194	761	21455
21455	771	377	160	951	594	339	1099	659	278	1053	847	435	123	896	205	1171	814	490	22	922	667	227	500	627	723	991	1125	98	1203	739	411	54	1023	556	305	21455
21455	349	1109	784	351	167	965	566	120	893	651	274	1083	843	427	932	677	177	1185	821	464	35	1131	75	238	507	605	732	1003	533	311	1215	748	389	61	1034	21455
21455	972	580	321	1119	794	364	141	873	423	112	890	648	266	1079	471	9	945	687	187	1157	835	710	1012	1143	81	215	518	612	39	1041	544	288	1221	760	398	21455
21455	374	154	946	587	335	1091	804	263	1071	869	453	108	882	645	1167	807	485	16	919	700	197	495	623	717	990	1152	93	221	766	410	48	1019	551	299	1198	21455
21455	79	245	512	607	702	1010	1136	312	1213	746	390	63	1032	535	1111	789	358	171	970	573	319	895	636	279	1074	854	421	132	668	182	1170	823	476	29	943	21455
21455	982	1150	86	219	525	617	712	1043	542	290	1222	758	396	40	585	328	1089	796	369	148	976	434	106	902	650	251	1084	864	21	939	698	178	1162	820	473	21455
21455	630	722	992	1122	100	226	499	408	46	1020	553	297	1200	767	159	953	591	340	1098	774	376	1056	874	444	119	876	657	265	812	470	18	931	694	208	1158	21455
21455	240	506	604	735	1002	1132	72	1207	745	417	58	1026	530	308	783	354	166	964	568	346	1110	631	272	1070	846	454	129	889	204	1188	808	462	15	928	686	21455
21455	1142	82	212	520	611	709	1015	536	285	1218	752	395	67	1038	323	1116	795	363	144	971	579	139	899	644	246	1077	860	426	925	683	196	1184	838	458	7	21455
21455	716	989	1155	92	222	492	625	45	1047	548	291	1195	763	402	949	586	334	1093	801	375	153	867	440	111	909	654	259	1051	488	3	917	680	193	1176	834	21455
	502	597	730	996	1129	105	232	740	413	52	1025	557	303	1201	381	165	958	564	341	1104	778	269	1064	841	447	125	881	664	1173	826	484	33	913	672	190	21455
	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455	21455

The blocks of order 7 are **equal sums pandiagonal** magic squares, i.e., $M_{7\times7} := 4291$.

Remark 1. *The **excel file** is attached with this work containing only **pandiagonal** magic squares with **equal sums** of order 7 up to order 133, i.e., these are of orders 21, 35, 49, 63, etc. The pandiagonal magic square of order 49 is also bimagic with bimagic sum* $Sb_{49x49} := 94217249$. *The pandiagonal magic squares obtained from different sums of order 7 shall be given in another work.*

4 Author's Contribution to Recreation of Numbers and Magic Squares

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