

Hinweise zu den Anregungen zum Nachdenken und für eigene Untersuchungen

zu A 7.1:

- **Kontrolle der Endziffern:** 58^2 hat die gleichen Endziffern wie $8^2 = \underline{64}$.

- **Methode 1 (schrittweise Berechnung)**

Hilfsgröße: $55^2 = 50 \cdot 60 + 5^2 = 3025$

$$58^2 = 55^2 + (55 + 56) + (56 + 57) + (57 + 58) = 55^2 + 6 \cdot 56,5 = 3025 + 339 = 3364$$

Hinweis: 56,5 ist der Mittelwert der sechs Summanden.

Hilfsgröße: $60^2 = 3600$

$$58^2 = 60^2 - (60 + 59) - (59 + 58) = 60^2 - 4 \cdot 59 = 3600 - 236 = 3364$$

Hinweis: 59 ist der Mittelwert der vier Summanden.

- **Methode 2 (Berechnung mithilfe einer Zehnerzahl und eines symmetrisch liegenden Partners)**

$$58^2 = (60 - 2) \cdot (56 + 2) = 60 \cdot 56 + 2^2 = 3360 + 4 = 3364$$

$$58^2 = (50 + 8) \cdot (66 - 8) + 8^2 = 50 \cdot 66 + 8^2 = 3300 + 64 = 3364$$

- **Methode 3 (Anwenden der 1. binomischen Formel und Umlegen)**

$$58^2 = (50 + 8)^2 = 50^2 + 2 \cdot 50 \cdot 8 + 8^2 = 50 \cdot (50 + 2 \cdot 8) + 8^2 = 50 \cdot 66 + 8^2 = 3300 + 64 = 3364$$

$$58^2 = (60 - 2)^2 = 60^2 - 2 \cdot 60 \cdot 2 + 2^2 = 60 \cdot (60 - 2 \cdot 2) + 2^2 = 60 \cdot 56 + 4 = 3360 + 4 = 3364$$

- **Kontrolle der Endziffern:** 84^2 hat die gleichen Endziffern wie $16^2 = \underline{56}$.

- **Methode 1 (schrittweise Berechnung)**

Hilfsgröße: $85^2 = 80 \cdot 90 + 5^2 = 7225$

$$84^2 = 85^2 - (85 + 84) = 85^2 - 2 \cdot 84,5 = 7225 - 169 = 7056$$

Hilfsgröße: $80^2 = 6400$

$$84^2 = 80^2 + (80 + 81) + (81 + 82) + (82 + 83) + (83 + 84) = 80^2 + 8 \cdot 82 = 6400 + 656 = 7056$$

- **Methode 2 (Berechnung mithilfe einer Zehnerzahl und eines symmetrisch liegenden Partners)**

$$84^2 = (80 + 4) \cdot (88 - 4) = 80 \cdot 88 + 4^2 = 7040 + 16 = 7056$$

$$84^2 = (90 - 6) \cdot (78 + 6) + 6^2 = 90 \cdot 78 + 6^2 = 7020 + 36 = 7056$$

- **Methode 3 (Anwenden der 1. binomischen Formel und Umlegen)**

$$84^2 = (80 + 4)^2 = 80^2 + 2 \cdot 80 \cdot 4 + 4^2 = 80 \cdot (80 + 2 \cdot 4) + 4^2 = 80 \cdot 88 + 4^2 = 7040 + 16 = 7056$$

$$84^2 = (90 - 6)^2 = 90^2 - 2 \cdot 90 \cdot 6 + 6^2 = 90 \cdot (90 - 2 \cdot 6) + 6^2 = 90 \cdot 78 + 6^2 = 7020 + 36 = 7056$$

- **Kontrolle der Endziffern:** 73^2 hat die gleichen Endziffern wie $23^2 = \underline{29}$.

- **Methode 1 (schrittweise Berechnung)**

Hilfsgröße: $75^2 = 70 \cdot 80 + 5^2 = 5625$

$$73^2 = 75^2 - (75 + 74) - (74 + 73) = 75^2 - 4 \cdot 74 = 5625 - 296 = 5329$$

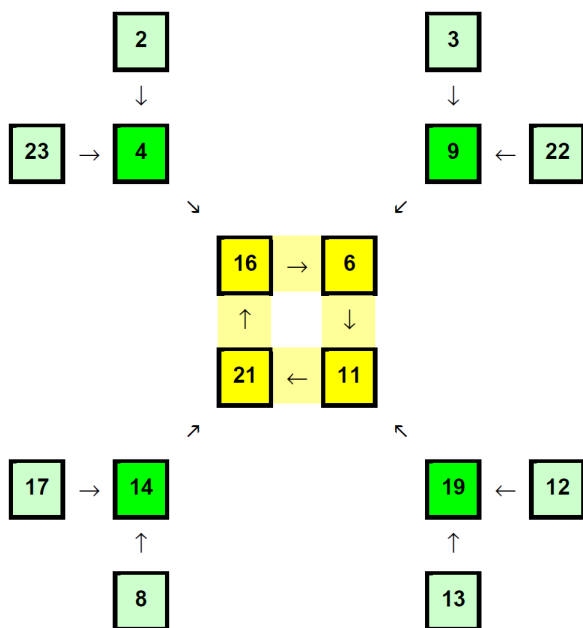
Hilfsgröße: $70^2 = 4900$

$$73^2 = 70^2 + (70 + 71) + (71 + 72) + (72 + 73) = 70^2 + 6 \cdot 71,5 = 4900 + 429 = 5329$$

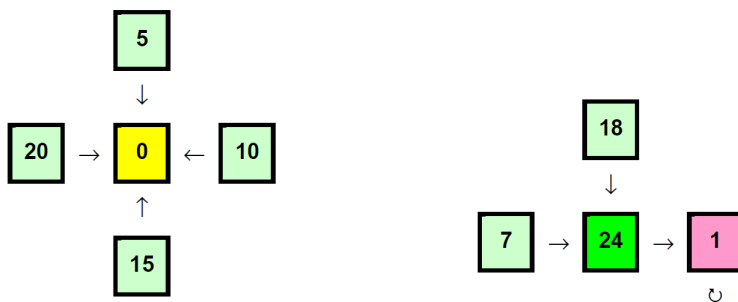
- **Methode 2 (Berechnung mithilfe einer Zehnerzahl und eines symmetrisch liegenden Partners)**

$$73^2 = (70 + 3) \cdot (76 - 3) = 70 \cdot 76 + 3^2 = 5320 + 9 = 5329$$

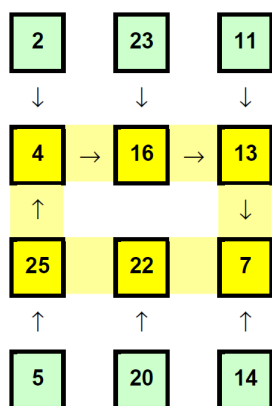
$$73^2 = (80 - 7) \cdot (66 + 7) + 7^2 = 80 \cdot 66 + 7^2 = 5280 + 49 = 5329$$



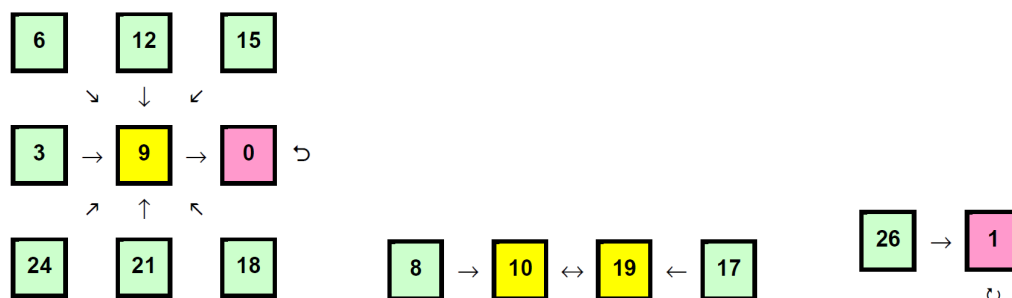
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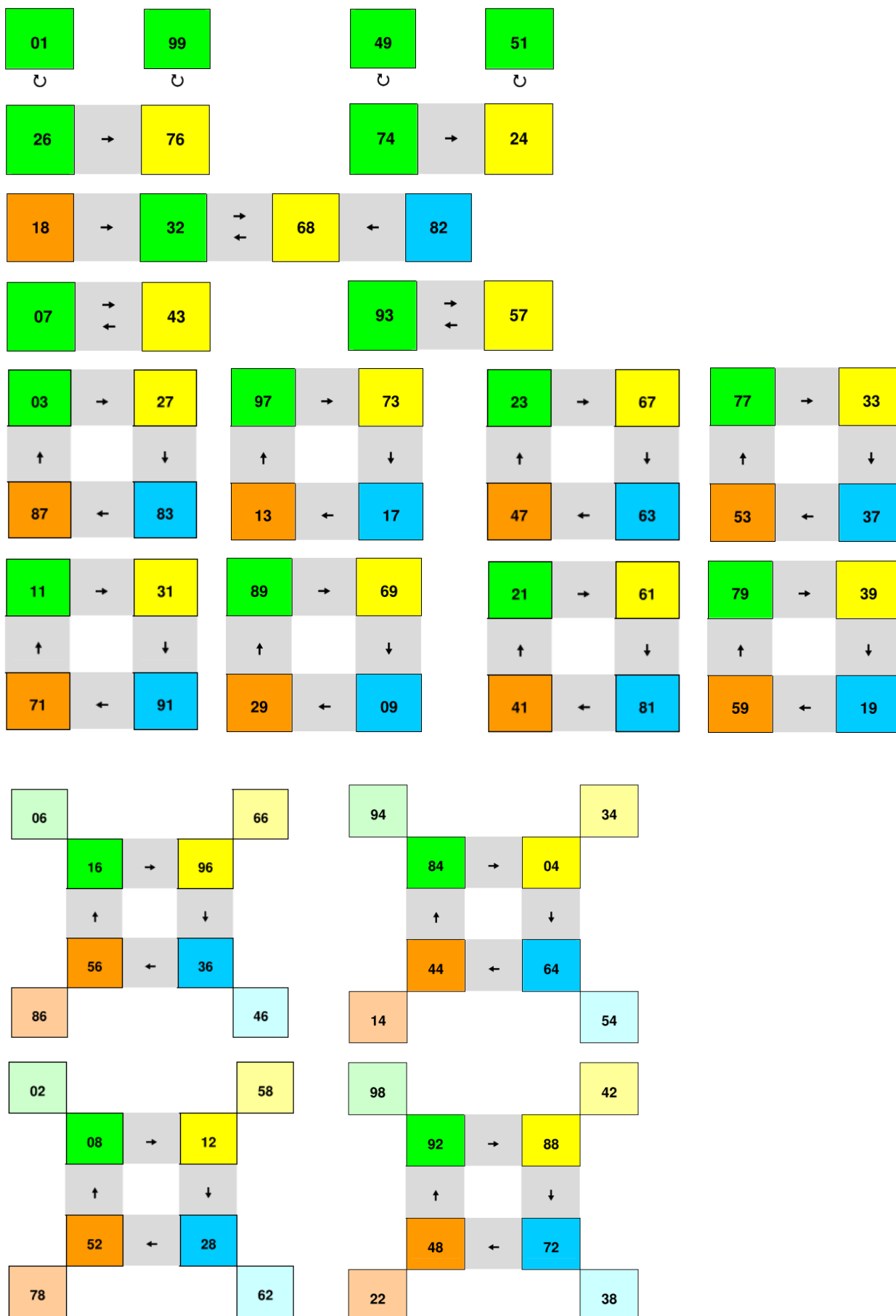
(4) mod 27



außerdem:

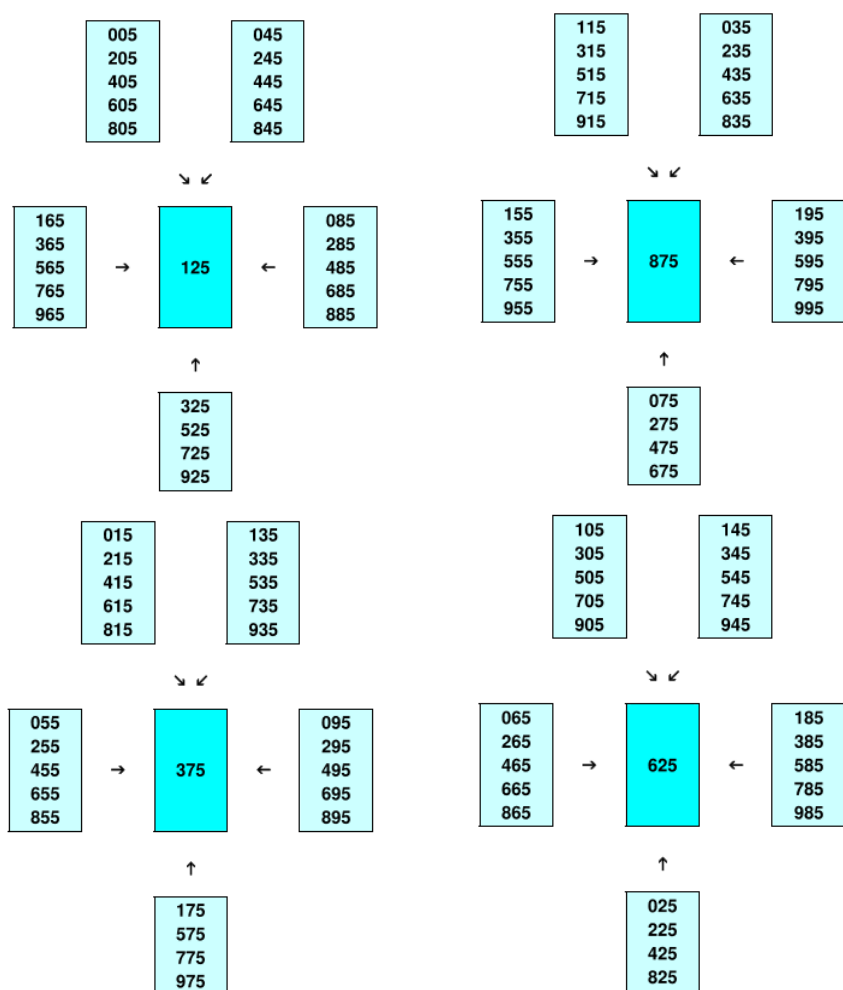


zu A 7.3:

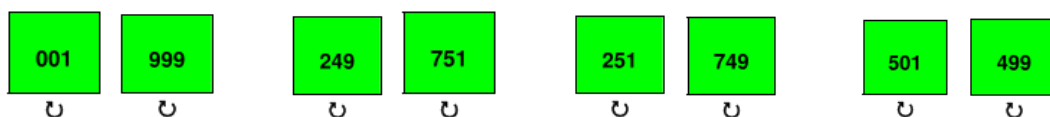


zu A 7.4

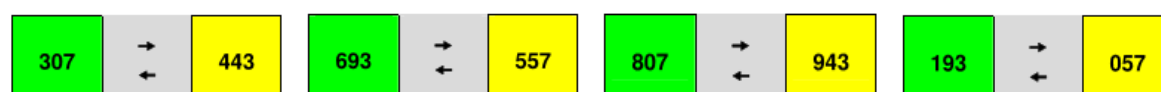
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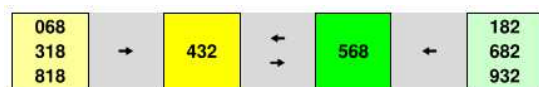
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(4)



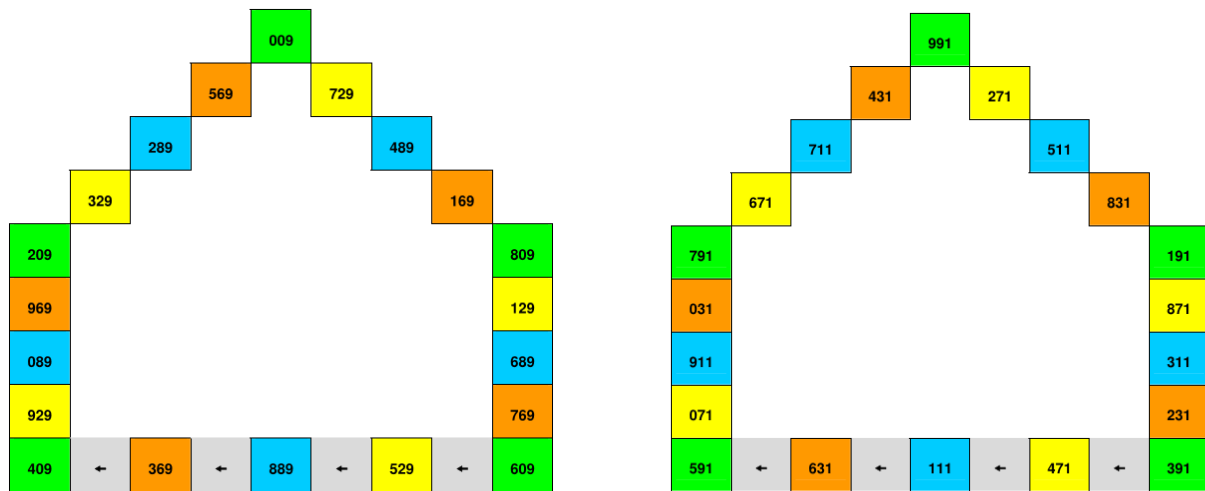
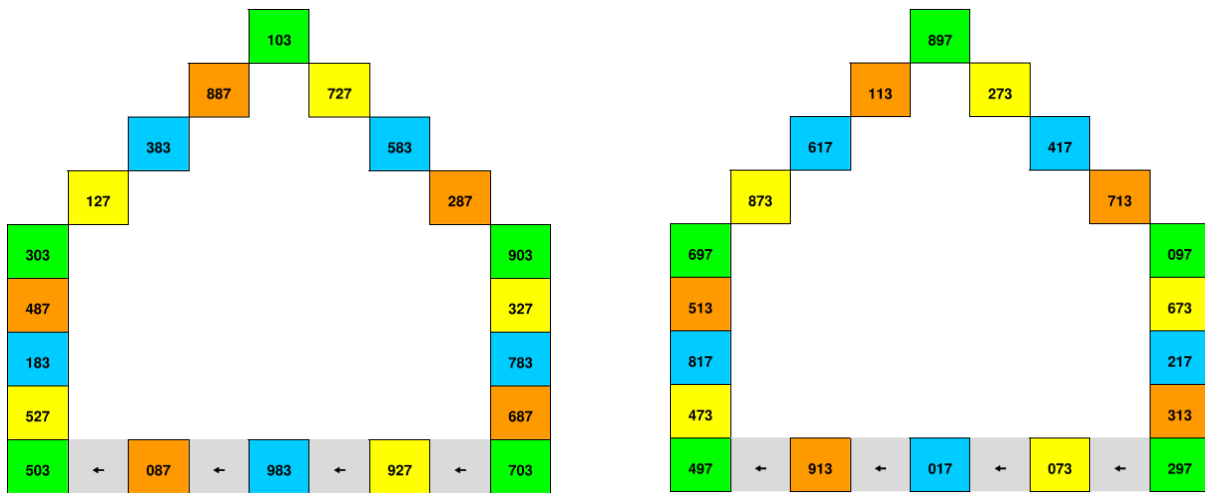
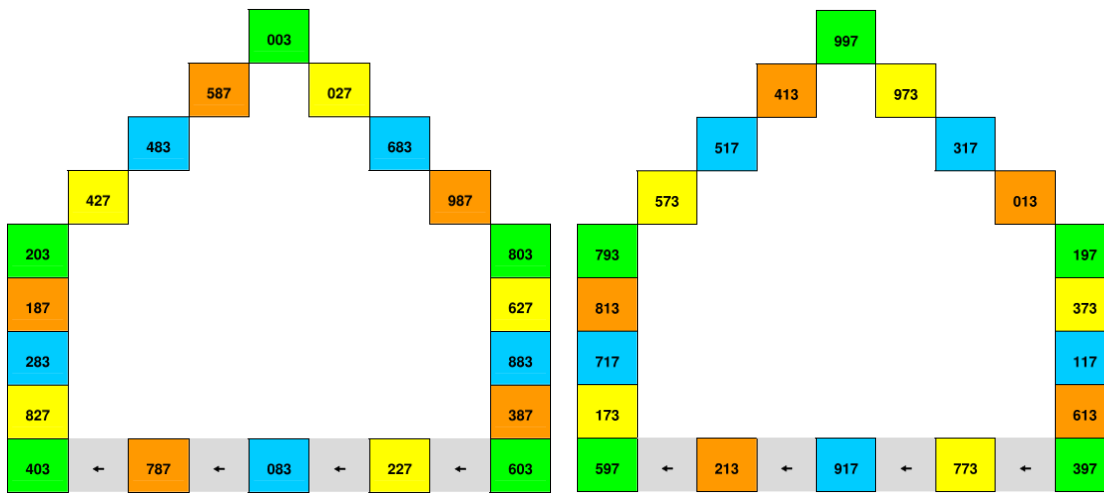
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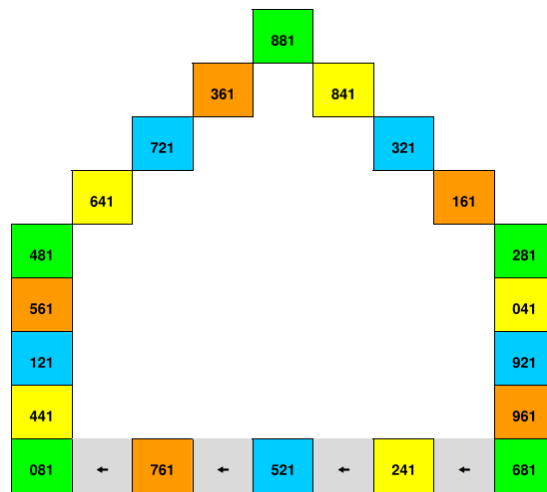
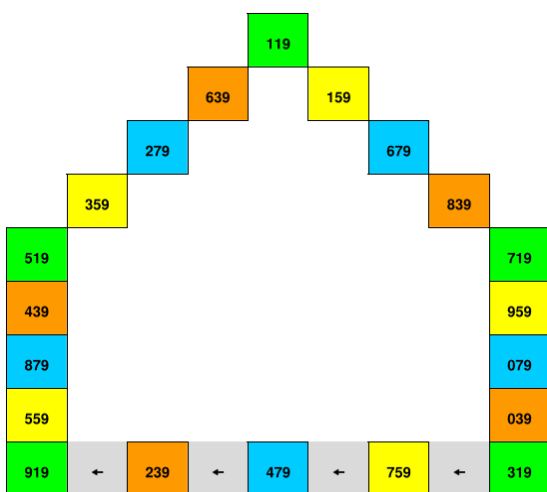
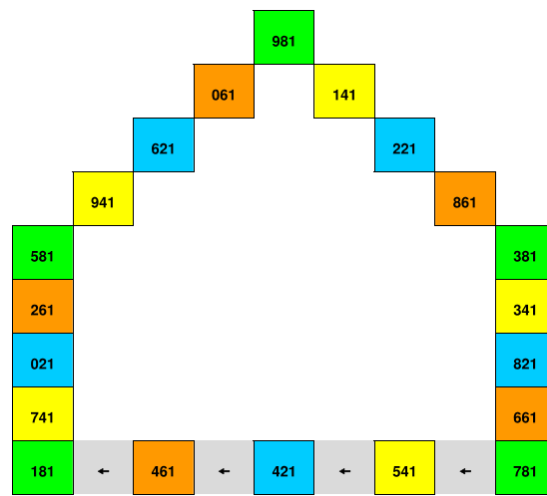
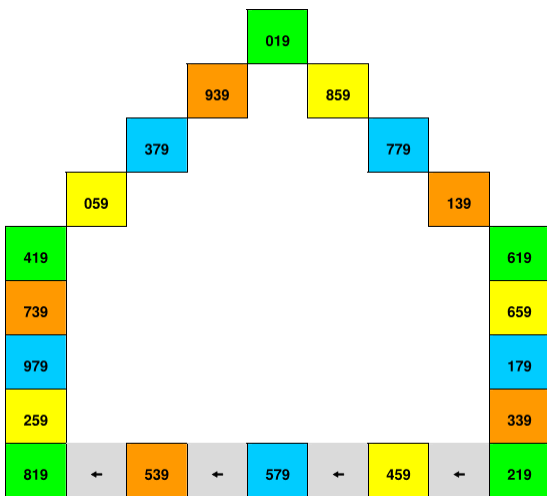
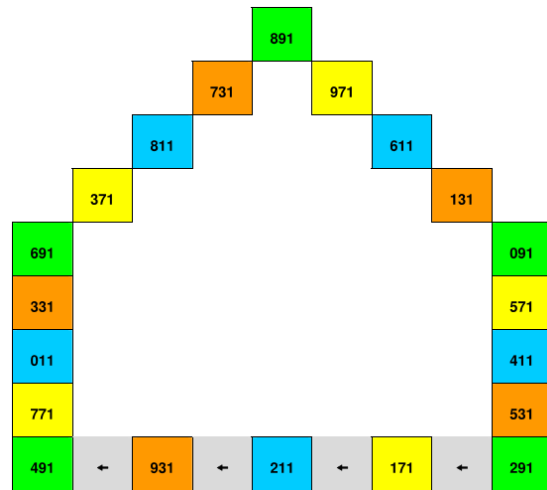
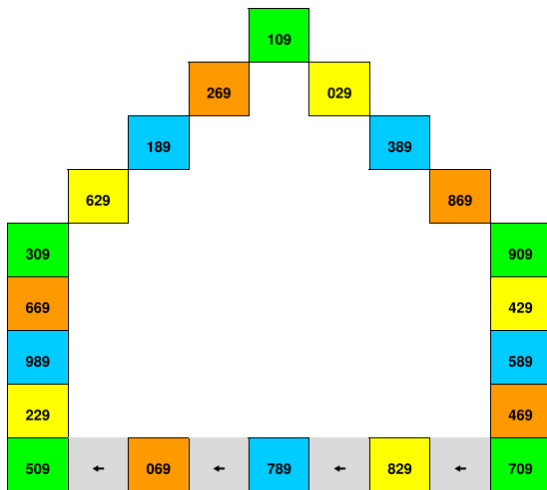


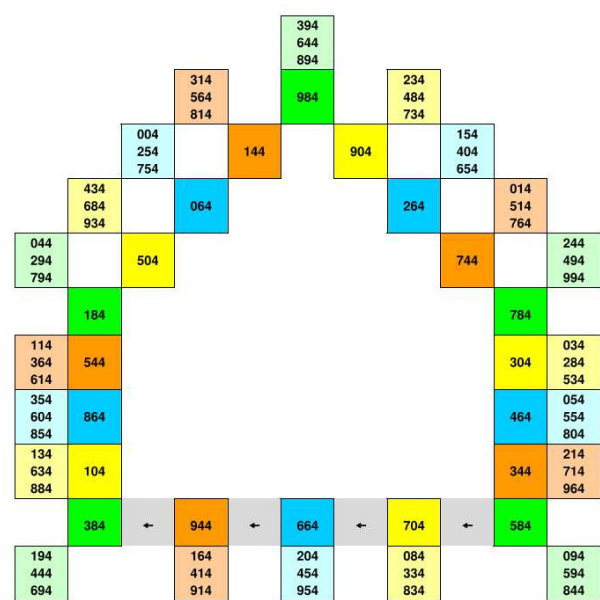
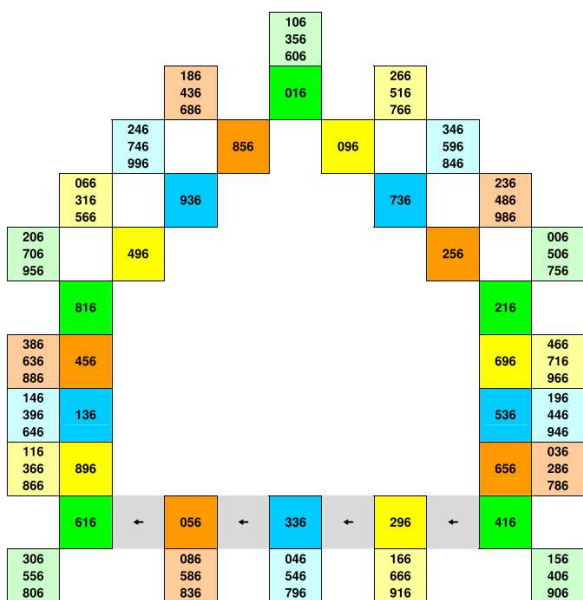
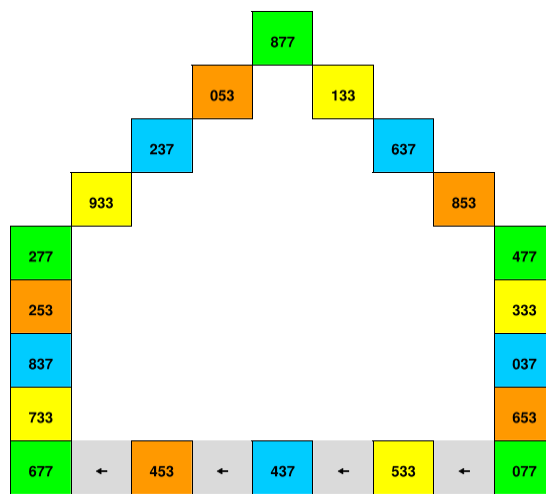
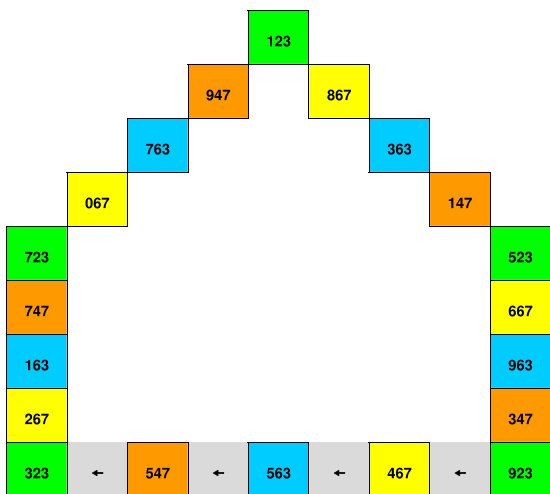
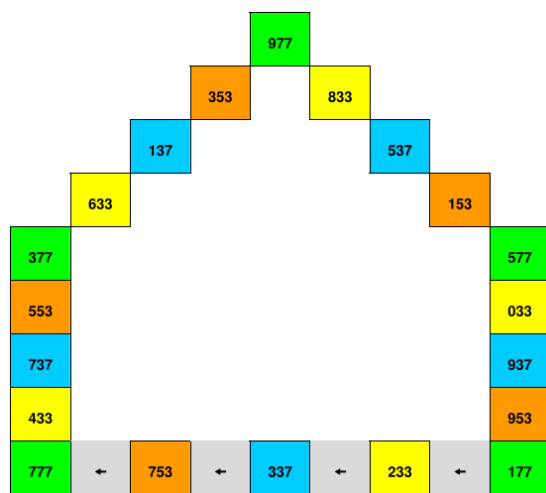
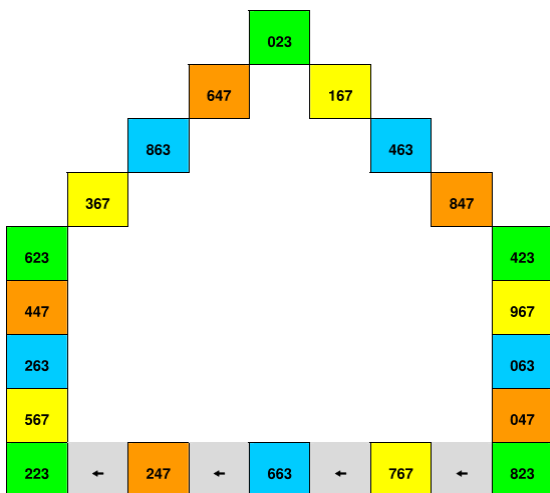
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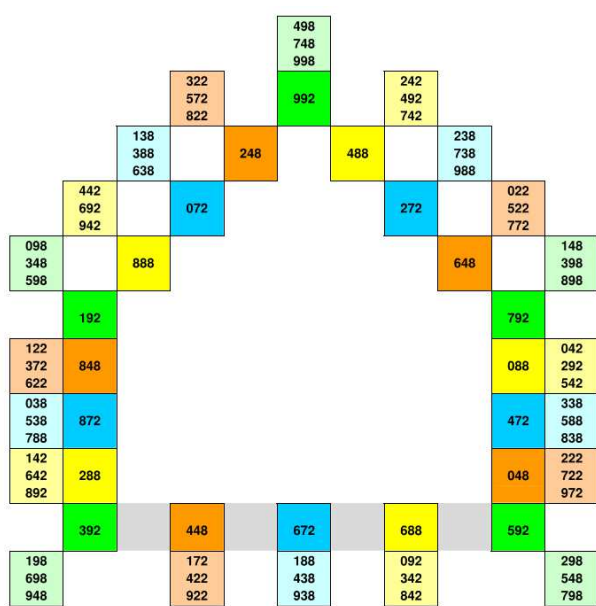
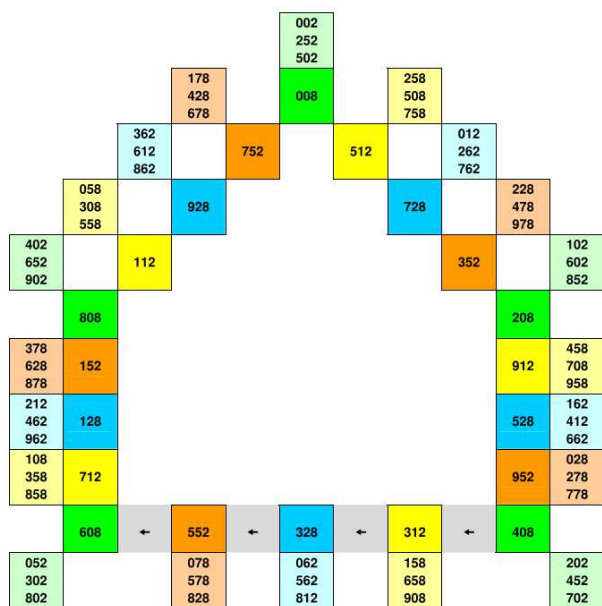
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949	→	349	051	→	651	049	→	649	951	→	351
↑		↓	↑		↓	↑		↓	↑		↓
149	←	549	851	←	451	849	←	449	151	←	551
007	→	343	993	→	657	107	→	043	893	→	957
↑		↓	↑		↓	↑		↓	↑		↓
543	←	607	457	←	393	843	←	507	157	←	493
207	→	743	793	→	257	707	→	243	293	→	757
↑		↓	↑		↓	↑		↓	↑		↓
143	←	407	857	←	593	643	←	907	357	←	093

282 532 782									018 268 518
	768	→		832					
	↑			↓					
	032	←		368					
118 618 868									082 332 582
174 674 924									274 524 774
	024	→		824					
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	424	←		224					
474 724 974									074 324 574
218 468 718									482 732 982
	232	→		168					
	↑			↓					
	968	←		632					
132 382 882									418 668 918
076 326 826									226 476 726
	976	→		176					
	↑			↓					
	576	←		776					
026 276 526									426 676 926









Mathematik ist schön

Anregungen zum Anschauen und Erforschen für
Menschen zwischen 9 und 99 Jahren

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