

Part 4: "New Advanced Study of Magic Squares and Cubes"
Chapter 4: Commentary Articles No.2: by Kanji Setsuda
"Various Arts and Tools for Studying Magic Squares"

Section 3-2: How to make 'Complete Euler Squares' of Order 7

#1. What is the 'Complete Euler Square' like?

It is sometimes called "Greco-Latin Square". Basic idea of that type was mentioned first by Legendary Leonhard Euler(1707-1783). What does it look like?

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <table border="1" style="border-collapse: collapse; width: 100%; text-align: center;"> <tr><td>11</td><td>2</td><td>49</td><td>40</td><td>31</td><td>22</td><td>20</td><td>11</td><td>2</td><td>49</td><td>40</td><td>31</td><td>22</td></tr> <tr><td>28</td><td>19</td><td>10</td><td>1</td><td>48</td><td>39</td><td>30</td><td>28</td><td>19</td><td>10</td><td>1</td><td>48</td><td>39</td></tr> <tr><td>38</td><td>29</td><td>27</td><td>18</td><td>9</td><td>7</td><td>47</td><td>38</td><td>29</td><td>27</td><td>18</td><td>9</td><td>7</td></tr> <tr><td>6</td><td>46</td><td>37</td><td>35</td><td>26</td><td>17</td><td>8</td><td>6</td><td>46</td><td>37</td><td>35</td><td>26</td><td>17</td></tr> <tr><td>16</td><td>14</td><td>5</td><td>45</td><td>36</td><td>34</td><td>25</td><td>16</td><td>14</td><td>5</td><td>45</td><td>36</td><td>34</td></tr> <tr><td>33</td><td>24</td><td>15</td><td>13</td><td>4</td><td>44</td><td>42</td><td>33</td><td>24</td><td>15</td><td>13</td><td>4</td><td>44</td></tr> <tr><td>43</td><td>41</td><td>32</td><td>23</td><td>21</td><td>12</td><td>3</td><td>43</td><td>41</td><td>32</td><td>23</td><td>21</td><td>12</td></tr> <tr><td>11</td><td>2</td><td>49</td><td>40</td><td>31</td><td>22</td><td>20</td><td>11</td><td>2</td><td>49</td><td>40</td><td>31</td><td>22</td></tr> <tr><td>28</td><td>19</td><td>10</td><td>1</td><td>48</td><td>39</td><td>30</td><td>28</td><td>19</td><td>10</td><td>1</td><td>48</td><td>39</td></tr> </table> | 11 | 2 | 49 | 40 | 31 | 22 | 20 | 11 | 2 | 49 | 40 | 31 | 22 | 28 | 19 | 10 | 1 | 48 | 39 | 30 | 28 | 19 | 10 | 1 | 48 | 39 | 38 | 29 | 27 | 18 | 9 | 7 | 47 | 38 | 29 | 27 | 18 | 9 | 7 | 6 | 46 | 37 | 35 | 26 | 17 | 8 | 6 | 46 | 37 | 35 | 26 | 17 | 16 | 14 | 5 | 45 | 36 | 34 | 25 | 16 | 14 | 5 | 45 | 36 | 34 | 33 | 24 | 15 | 13 | 4 | 44 | 42 | 33 | 24 | 15 | 13 | 4 | 44 | 43 | 41 | 32 | 23 | 21 | 12 | 3 | 43 | 41 | 32 | 23 | 21 | 12 | 11 | 2 | 49 | 40 | 31 | 22 | 20 | 11 | 2 | 49 | 40 | 31 | 22 | 28 | 19 | 10 | 1 | 48 | 39 | 30 | 28 | 19 | 10 | 1 | 48 | 39 | <table border="1" style="border-collapse: collapse; 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| 38 | 29 | 27 | 18 | 9 | 7 | 47 | 38 | 29 | 27 | 18 | 9 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 46 | 37 | 35 | 26 | 17 | 8 | 6 | 46 | 37 | 35 | 26 | 17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | 14 | 5 | 45 | 36 | 34 | 25 | 16 | 14 | 5 | 45 | 36 | 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33 | 24 | 15 | 13 | 4 | 44 | 42 | 33 | 24 | 15 | 13 | 4 | 44 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43 | 41 | 32 | 23 | 21 | 12 | 3 | 43 | 41 | 32 | 23 | 21 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | 2 | 49 | 40 | 31 | 22 | 20 | 11 | 2 | 49 | 40 | 31 | 22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | 19 | 10 | 1 | 48 | 39 | 30 | 28 | 19 | 10 | 1 | 48 | 39 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 6 | 5 | 4 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 6 | 5 | 4 | 3 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 1 | 0 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 6 | 5 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 3 | 2 | 1 | 0 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 5 | 4 | 3 | 2 | 1 | 0 | 6 | 5 | 4 | 3 | 2 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 6 | 5 | 4 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 2 | 1 | 0 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 6 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 4 | 3 | 2 | 1 | 0 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 6 | 5 | 4 | 3 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 4 | 2 | 0 | 5 | 3 | 1 | 6 | 4 | 2 | 0 | 5 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 0 | 5 | 3 | 1 | 6 | 4 | 2 | 0 | 5 | 3 | 1 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 3 | 1 | 6 | 4 | 2 | 0 | 5 | 3 | 1 | 6 | 4 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 6 | 4 | 2 | 0 | 5 | 3 | 1 | 6 | 4 | 2 | 0 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 2 | 0 | 5 | 3 | 1 | 6 | 4 | 2 | 0 | 5 | 3 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 5 | 3 | 1 | 6 | 4 | 2 | 0 | 5 | 3 | 1 | 6 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 1 | 6 | 4 | 2 | 0 | 5 | 3 | 1 | 6 | 4 | 2 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 4 | 2 | 0 | 5 | 3 | 1 | 6 | 4 | 2 | 0 | 5 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 0 | 5 | 3 | 1 | 6 | 4 | 2 | 0 | 5 | 3 | 1 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 4 | 3 | 2 | 1 | 0 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 6 | 5 | 4 | 3 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 4 | 2 | 0 | 5 | 3 | 1 | 6 | 4 | 2 | 0 | 5 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <div style="display: flex; justify-content: space-around;"> [High] [Low] </div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Let me take the system of Base 7 for instance. Watch and study the figures above, especially the last two decomposed patterns of 'Complete Euler Square' 7x7.

Two positional layers for high values and low are drawn separately as shown above. At first you should always subtract 1 from any value of 49 numbers in the left form for object and then divide it by 7. Put the integer part of the quotient in the high layer and the remedy modulo(7) in the low one separately.

According to this system each sum of every column, of every row and even of every pan-diagonal in this example is always calculated by such the same form of equation:

$$(0+1+2+3+4+5+6) \times 7 + (0+1+2+3+4+5+6) = 21 \times 7 + 21 = 168 \text{ (Decimal)}$$

The equal sum means 'Magic Constant'.

Yes. It is certainly an example of 'Complete Euler Squares'.

The constant sum 168 of this example is equivalent to 175 in our classical notation, since modern system uses integers 0~48, instead of using natural numbers 1~49.

#2. Unique Properties of 'Complete Euler Squares'

The 'Complete Euler Square' has such beautiful properties as follows:

- (1) In each layer every column, every row and every pan-diagonal should consist of {0, 1, 2, 3, 4, 5 and 6} and have neither repetition, nor drop-off of any number.
- (2) Any value of {0, 1, 2, 3, 4, 5 or 6} should appear always 7 times in each layer.
- (3) The value combination of high layer and low one in any location should be any of {00, 01, 02, 03, 04, 05, 06, 10, 11, 12, . . . , 56, 60, 61, 62, 63, 64, 65 and 66(N7i)}.

Neither repetition nor drop-off of a certain combination should be found.

This property is logically equivalent to the basic promise of our classical magic squares, in which you must use any natural number of {1, 2, 3, 4, 5, 6, 7, 8, . . . , 47, 48 and 49} strictly once and you must not use any number twice or more often.

Why is the property(1) above always so important?

Watch the next equation again and try to think of its meaning, please.

$$(0+1+2+3+4+5+6) \times 7 + (0+1+2+3+4+5+6) = 21 \times 7 + 21 = 168 \text{ (Decimal)}$$

When the value pattern of any column, row and pan-diagonal is the same as the property(1), you will constantly have the same sum there. It means you will surely have got what you want, the Complete Euler type of pan-diagonal magic square.

Check and find that it has such beautiful properties in the example put above.

They say Euler did not mention about pan-diagonals, but I want all pan-diagonals also to have this property(1). I want to have those which have all the miraculous properties above and want to call them "**Complete Euler Squares**" from now on.

#3. How to compose such the 'Complete Euler Squares'

Can we make such a beautiful square as 'Complete Euler Square 7x7' directly?

Why don't we try to dictate our program simply expressing the idea literally after these beautiful definitions themselves?

[1] We usually want the variable N to take any value of 0~48 as dictated below.

But why don't you use two variables `N_high` and `N_low`, each of which takes any value of {0, 1, 2, 3, 4, 5 or 6}? Each variable is expected to stand for any value of its own positional layer.

How about dictating such a number generator program with double loops of `for(...){...}` sentences as follows?

```

/* Old *           | /* New *
for(n=0;n<49;n++){ | for(a=0;a<7;a++){ // a==d/7: for high
  nm[1]=n;         |   for(b=0;b<7;b++){ // b==d%7: for low
  // ...;         |     d=a*7+b;       // 'd' stands for N itself
}                 |     n[1]=d;
//               |     // ...;
                 |   }
                 | }
                 | //

```

[2] How do we realize that we must take any value of {0, 1, 2, 3, 4, 5 or 6} strictly once and must not use it twice or more often in any row, any column and any pan-diagonal of our object?

We have been usually using the so-called "used_flag" for this purpose.

When you use the value N, you should set the used_flag for it as 'true', meaning 'used'. And when you finish using N, you should reset the flag as 'false', meaning 'not-used', and may return to the former step.

Whenever you make a new job, you should always check if the used_flag is 'true' or 'false' before all.

```

/* Old *
for(n=0;n<49;n++){
  if(uflg[n]==0){ // Check if the value N is used or not
    nm[3]=n;     // If it is not used, then ...
    uflg[n]=1;  // Set Used_flag for the value N
    nextproc(); // Go to the next procedure
    uflg[n]=0;  // Reset Used_flag for the value N
  }
}
//

```

Why don't you remake it into the new style below to meet our double structure?

```

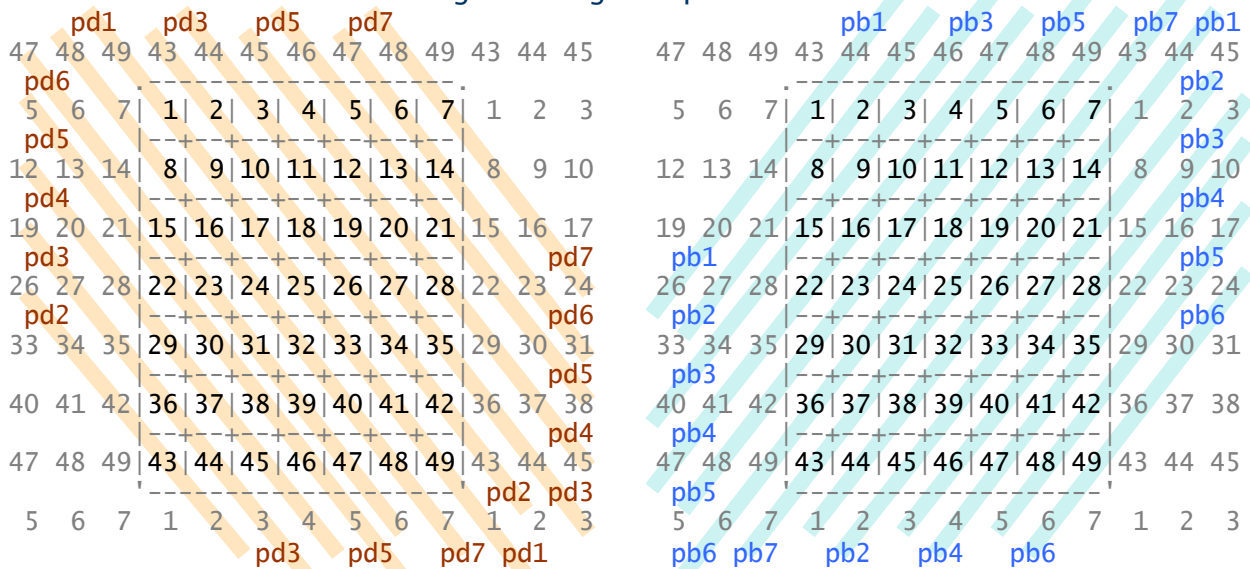
/** New *
for(a=0;a<7;a++){
  if(uflg_high[a]==0){ // Check if it is used or not
    for(b=0;b<7;b++){
      if(uflg_low[b]==0){ // Check if it is used or not
        n=a*7+b; nm[3]=n; // Produce N from a and b ...
        if(uflg[n]==0){ // Check if the value N is used or not
          uflg[n]=1; // Set Used_flag for the value N
          uflg_high[a]=1; // Set Used_flag_high for Value a
          uflg_low[b]=1; // Set Used_flag_low for Value b
          nextproc(); // Go to the next procedure
          uflg_high[a]=0; // Reset Used_flag_high for Value a
          uflg_low[b]=0; // Reset Used_flag_low for Value b
          uflg[n]=0; // Reset Used_flag for Value N
        }
      }
    }
  }
}
//

```

[3] How many sets of used_flags in all do we have to prepare, then?

We have to prepare 14 flags for 7 columns high and low, 14 for 7 rows high and low, and 28 for 14 pan-diagonals high and low: We need 56 flags in all!

**** Basic Forms for Pan-diagonal Magic Squares of Order 7 ****



*** Basic Conditions: C=175; ***

| | | | | | | |
|---------------------------------|-----|-----|--|--------------------------------|-----|----|
| $n1+n2+n3+n4+n5+n6+n7=C$ | ... | rw1 | | $n1+n8+n15+n22+n29+n36+n43=C$ | ... | c1 |
| $n8+n9+n10+n11+n12+n13+n14=C$ | ... | rw2 | | $n2+n9+n16+n23+n30+n37+n44=C$ | ... | c2 |
| $n15+n16+n17+n18+n19+n20+n21=C$ | ... | rw3 | | $n3+n10+n17+n24+n31+n38+n45=C$ | ... | c3 |
| $n22+n23+n24+n25+n26+n27+n28=C$ | ... | rw4 | | $n4+n11+n18+n25+n32+n39+n46=C$ | ... | c4 |
| $n29+n30+n31+n32+n33+n34+n35=C$ | ... | rw5 | | $n5+n12+n19+n26+n33+n40+n47=C$ | ... | c5 |
| $n36+n37+n38+n39+n40+n41+n42=C$ | ... | rw6 | | $n6+n13+n20+n27+n34+n41+n48=C$ | ... | c6 |
| $n43+n44+n45+n46+n47+n48+n49=C$ | ... | rw7 | | $n7+n14+n21+n28+n35+n42+n49=C$ | ... | c7 |

*** Pandiagonal Conditions: C=175; ***

| | | | | | | |
|--------------------------------|-----|-----|--|--------------------------------|-----|-----|
| $n1+n9+n17+n25+n33+n41+n49=C$ | ... | pd1 | | $n1+n14+n20+n26+n32+n38+n44=C$ | ... | pb1 |
| $n2+n10+n18+n26+n34+n42+n43=C$ | ... | pd2 | | $n2+n8+n21+n27+n33+n39+n45=C$ | ... | pb2 |
| $n3+n11+n19+n27+n35+n36+n44=C$ | ... | pd3 | | $n3+n9+n15+n28+n34+n40+n46=C$ | ... | pb3 |
| $n4+n12+n20+n28+n29+n37+n45=C$ | ... | pd4 | | $n4+n10+n16+n22+n35+n41+n47=C$ | ... | pb4 |
| $n5+n13+n21+n22+n30+n38+n46=C$ | ... | pd5 | | $n5+n11+n17+n23+n29+n42+n48=C$ | ... | pb5 |
| $n6+n14+n15+n23+n31+n39+n47=C$ | ... | pd6 | | $n6+n12+n18+n24+n30+n36+n49=C$ | ... | pb6 |
| $n7+n8+n16+n24+n32+n40+n48=C$ | ... | pd7 | | $n7+n13+n19+n25+n31+n37+n43=C$ | ... | pb7 |


```

short c11h[8],c11l[8],rw1h[8],rw1l[8],pd1h[8],pd1l[8],pb1h[8],pb1l[8];
short c12h[8],c12l[8],rw2h[8],rw2l[8],pd2h[8],pd2l[8],pb2h[8],pb2l[8];
short c13h[8],c13l[8],rw3h[8],rw3l[8],pd3h[8],pd3l[8],pb3h[8],pb3l[8];
short c14h[8],c14l[8],rw4h[8],rw4l[8],pd4h[8],pd4l[8],pb4h[8],pb4l[8];
short c15h[8],c15l[8],rw5h[8],rw5l[8],pd5h[8],pd5l[8],pb5h[8],pb5l[8];
short c16h[8],c16l[8],rw6h[8],rw6l[8],pd6h[8],pd6l[8],pb6h[8],pb6l[8];
short c17h[8],c17l[8],rw7h[8],rw7l[8],pd7h[8],pd7l[8],pb7h[8],pb7l[8];
//
/** Sub-Routiens *
void stp01(void), stp02(void), stp03(void), stp04(void);
void stp05(void), stp06(void), stp07(void), stp08(void);
void stp09(void), stp10(void), stp11(void), stp12(void);
void stp13(void), stp14(void), stp15(void), stp16(void);
void stp17(void), stp18(void), stp19(void), stp20(void);
void stp21(void), stp22(void), stp23(void), stp24(void);
void stp25(void), stp26(void), stp27(void), stp28(void);
void stp29(void), stp30(void), stp31(void);
void printans(void), print1p(void), print2p(void);
//
/** Main Program *
/** Set n25=24 *
int main(){
short n;
printf("\n");
printf("*** 'Complete Euler Squares' of Order 7 for the Simultaneous Type:\n");
printf("    Both Self-complementary and Pan-diagonal; **\n");
printf("    ** Compact List of 3456 Standard Solutions **\n");
printf("    [Normalizing Inequality Conditions: n1<n7, n1<n43, n1<n49 and n2>n8;]\n");
for(n=0;n<50;n++){nm[n]=0; uflg[n]=0;}
for(n=0;n<7;n++){
c11h[n]=0; rw1h[n]=0; pd1h[n]=0; pb1h[n]=0;
c11l[n]=0; rw1l[n]=0; pd1l[n]=0; pb1l[n]=0;
c12h[n]=0; rw2h[n]=0; pd2h[n]=0; pb2h[n]=0;
c12l[n]=0; rw2l[n]=0; pd2l[n]=0; pb2l[n]=0;
c13h[n]=0; rw3h[n]=0; pd3h[n]=0; pb3h[n]=0;
c13l[n]=0; rw3l[n]=0; pd3l[n]=0; pb3l[n]=0;
c14h[n]=0; rw4h[n]=0; pd4h[n]=0; pb4h[n]=0;
c14l[n]=0; rw4l[n]=0; pd4l[n]=0; pb4l[n]=0;
c15h[n]=0; rw5h[n]=0; pd5h[n]=0; pb5h[n]=0;
c15l[n]=0; rw5l[n]=0; pd5l[n]=0; pb5l[n]=0;
c16h[n]=0; rw6h[n]=0; pd6h[n]=0; pb6h[n]=0;
c16l[n]=0; rw6l[n]=0; pd6l[n]=0; pb6l[n]=0;
c17h[n]=0; rw7h[n]=0; pd7h[n]=0; pb7h[n]=0;
c17l[n]=0; rw7l[n]=0; pd7l[n]=0; pb7l[n]=0;
}
nm[25]=24; uflg[24]=1;
c14h[3]=1; c14l[3]=1; rw4h[3]=1; rw4l[3]=1;
pd1h[3]=1; pd1l[3]=1; pb7h[3]=1; pb7l[3]=1;
LSM=168; CC=48; S6N=144; cnt=0; cnt1=0; cnt3=0;
stp01();    /** Begin the Calculations *
if(cnt3==1){print1p();}
printf("\n");
printf(" [Total Count of Solutions(n1=1/All) = %d/%d] OK!\n",cnt1,cnt);
printf("\n");
printf("*** Recalculated and Listed by Kanji Setsuda on\n");
printf("    Feb.15, 2015 with MacOSX 10.10.2 & Xcode 6.1.1 **\n");
printf("\n");
return 0;
}
//
/** Begin the Calculations *
/** Set n1 & n49 & n1<n49 *
void stp01(){
short a,na,b,nb,d,nd;
for(a=0;a<7;a++){na=6-a;

```

```

if((c11h[a]==0)&&(rw1h[a]==0)&&(pd1h[a]==0)&&(pb1h[a]==0)){
if((c17h[na]==0)&&(rw7h[na]==0)&&(pd1h[na]==0)&&(pb6h[na]==0)){
for(b=0;b<7;b++){nb=6-b; d=7*a+b; nd=CC-d;
if((uflg[d]==0)&&(uflg[nd]==0)&&(d<nd)){
if((c11l[b]==0)&&(rw1l[b]==0)&&(pd1l[b]==0)&&(pb1l[b]==0)){
if((c17l[nb]==0)&&(rw7l[nb]==0)&&(pd1l[nb]==0)&&(pb6l[nb]==0)){
nm[1]=d; nm[49]=nd; uflg[d]=1; uflg[nd]=1; cnt2=0;
c11h[a]=1; rw1h[a]=1; pd1h[a]=1; pb1h[a]=1;
c11l[b]=1; rw1l[b]=1; pd1l[b]=1; pb1l[b]=1;
c17h[na]=1; rw7h[na]=1; pd1h[na]=1; pb6h[na]=1;
c17l[nb]=1; rw7l[nb]=1; pd1l[nb]=1; pb6l[nb]=1;
stp02();
c11h[a]=0; rw1h[a]=0; pd1h[a]=0; pb1h[a]=0;
c11l[b]=0; rw1l[b]=0; pd1l[b]=0; pb1l[b]=0;
c17h[na]=0; rw7h[na]=0; pd1h[na]=0; pb6h[na]=0;
c17l[nb]=0; rw7l[nb]=0; pd1l[nb]=0; pb6l[nb]=0;
uflg[d]=0; uflg[nd]=0;}}}}
}}}
}
}
/* Set n9 & n41 *
void stp02(){
short a,na,b,nb,d,nd;
for(a=0;a<7;a++){na=6-a;
if((c12h[a]==0)&&(rw2h[a]==0)&&(pd1h[a]==0)&&(pb3h[a]==0)){
if((c16h[na]==0)&&(rw6h[na]==0)&&(pd1h[na]==0)&&(pb4h[na]==0)){
for(b=0;b<7;b++){nb=6-b; d=7*a+b; nd=CC-d;
if((uflg[d]==0)&&(uflg[nd]==0)){
if((c12l[b]==0)&&(rw2l[b]==0)&&(pd1l[b]==0)&&(pb3l[b]==0)){
if((c16l[nb]==0)&&(rw6l[nb]==0)&&(pd1l[nb]==0)&&(pb4l[nb]==0)){
nm[9]=d; nm[41]=nd; uflg[d]=1; uflg[nd]=1; if(nm[1]==0){cnt2=0;}
c12h[a]=1; rw2h[a]=1; pd1h[a]=1; pb3h[a]=1;
c12l[b]=1; rw2l[b]=1; pd1l[b]=1; pb3l[b]=1;
c16h[na]=1; rw6h[na]=1; pd1h[na]=1; pb4h[na]=1;
c16l[nb]=1; rw6l[nb]=1; pd1l[nb]=1; pb4l[nb]=1;
stp03();
c12h[a]=0; rw2h[a]=0; pd1h[a]=0; pb3h[a]=0;
c12l[b]=0; rw2l[b]=0; pd1l[b]=0; pb3l[b]=0;
c16h[na]=0; rw6h[na]=0; pd1h[na]=0; pb4h[na]=0;
c16l[nb]=0; rw6l[nb]=0; pd1l[nb]=0; pb4l[nb]=0;
uflg[d]=0; uflg[nd]=0;}}}}
}}}
}
}
/* Set n17 & n33 *
void stp03(){
short a,na,b,nb,d,nd;
for(a=0;a<7;a++){na=6-a;
if((c13h[a]==0)&&(rw3h[a]==0)&&(pd1h[a]==0)&&(pb5h[a]==0)){
if((c15h[na]==0)&&(rw5h[na]==0)&&(pd1h[na]==0)&&(pb2h[na]==0)){
for(b=0;b<7;b++){nb=6-b; d=7*a+b; nd=CC-d;
if((uflg[d]==0)&&(uflg[nd]==0)){
if((c13l[b]==0)&&(rw3l[b]==0)&&(pd1l[b]==0)&&(pb5l[b]==0)){
if((c15l[nb]==0)&&(rw5l[nb]==0)&&(pd1l[nb]==0)&&(pb2l[nb]==0)){
nm[17]=d; nm[33]=nd; uflg[d]=1; uflg[nd]=1;
c13h[a]=1; rw3h[a]=1; pd1h[a]=1; pb5h[a]=1;
c13l[b]=1; rw3l[b]=1; pd1l[b]=1; pb5l[b]=1;
c15h[na]=1; rw5h[na]=1; pd1h[na]=1; pb2h[na]=1;
c15l[nb]=1; rw5l[nb]=1; pd1l[nb]=1; pb2l[nb]=1;
stp04();
c13h[a]=0; rw3h[a]=0; pd1h[a]=0; pb5h[a]=0;
c13l[b]=0; rw3l[b]=0; pd1l[b]=0; pb5l[b]=0;
c15h[na]=0; rw5h[na]=0; pd1h[na]=0; pb2h[na]=0;
c15l[nb]=0; rw5l[nb]=0; pd1l[nb]=0; pb2l[nb]=0;
uflg[d]=0; uflg[nd]=0;}}}}
}}}
}
}

```



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        cl3l[nb]=1;  rw5l[nb]=1; pd6l[nb]=1; pb7l[nb]=1;
        stp07();
        cl5h[a]=0; rw3h[a]=0; pd3h[a]=0; pb7h[a]=0;
        cl5l[b]=0; rw3l[b]=0; pd3l[b]=0; pb7l[b]=0;
        cl3h[na]=0;  rw5h[na]=0; pd6h[na]=0; pb7h[na]=0;
        cl3l[nb]=0;  rw5l[nb]=0; pd6l[nb]=0; pb7l[nb]=0;
        uflg[d]=0; uflg[nd]=0;}}}}
    }
}
/* Level #2: *
/* Set n2 & n48 *
void stp07(){
    short a,na,b,nb,d,nd;
    for(a=6;a>=0;a--){na=6-a;
        if((cl2h[a]==0)&&(rw1h[a]==0)&&(pd2h[a]==0)&&(pb2h[a]==0)){
            if((cl6h[na]==0)&&(rw7h[na]==0)&&(pd7h[na]==0)&&(pb5h[na]==0)){
                for(b=6;b>=0;b--){nb=6-b; d=7*a+b; nd=CC-d;
                    if((uflg[d]==0)&&(uflg[nd]==0)){
                        if((cl2l[b]==0)&&(rw1l[b]==0)&&(pd2l[b]==0)&&(pb2l[b]==0)){
                            if((cl6l[nb]==0)&&(rw7l[nb]==0)&&(pd7l[nb]==0)&&(pb5l[nb]==0)){
                                nm[2]=d; nm[48]=nd; uflg[d]=1; uflg[nd]=1;
                                cl2h[a]=1; rw1h[a]=1; pd2h[a]=1; pb2h[a]=1;
                                cl2l[b]=1; rw1l[b]=1; pd2l[b]=1; pb2l[b]=1;
                                cl6h[na]=1;  rw7h[na]=1; pd7h[na]=1; pb5h[na]=1;
                                cl6l[nb]=1;  rw7l[nb]=1; pd7l[nb]=1; pb5l[nb]=1;
                                stp08();
                                cl2h[a]=0; rw1h[a]=0; pd2h[a]=0; pb2h[a]=0;
                                cl2l[b]=0; rw1l[b]=0; pd2l[b]=0; pb2l[b]=0;
                                cl6h[na]=0;  rw7h[na]=0; pd7h[na]=0; pb5h[na]=0;
                                cl6l[nb]=0;  rw7l[nb]=0; pd7l[nb]=0; pb5l[nb]=0;
                                uflg[d]=0; uflg[nd]=0;}}}}
                    }
                }
            }
        }
    }
}
/* Set n3 & n47 *
void stp08(){
    short a,na,b,nb,d,nd;
    for(a=6;a>=0;a--){na=6-a;
        if((cl3h[a]==0)&&(rw1h[a]==0)&&(pd3h[a]==0)&&(pb3h[a]==0)){
            if((cl5h[na]==0)&&(rw7h[na]==0)&&(pd6h[na]==0)&&(pb4h[na]==0)){
                for(b=6;b>=0;b--){nb=6-b; d=7*a+b; nd=CC-d;
                    if((uflg[d]==0)&&(uflg[nd]==0)){
                        if((cl3l[b]==0)&&(rw1l[b]==0)&&(pd3l[b]==0)&&(pb3l[b]==0)){
                            if((cl5l[nb]==0)&&(rw7l[nb]==0)&&(pd6l[nb]==0)&&(pb4l[nb]==0)){
                                nm[3]=d; nm[47]=nd; uflg[d]=1; uflg[nd]=1;
                                cl3h[a]=1; rw1h[a]=1; pd3h[a]=1; pb3h[a]=1;
                                cl3l[b]=1; rw1l[b]=1; pd3l[b]=1; pb3l[b]=1;
                                cl5h[na]=1;  rw7h[na]=1; pd6h[na]=1; pb4h[na]=1;
                                cl5l[nb]=1;  rw7l[nb]=1; pd6l[nb]=1; pb4l[nb]=1;
                                stp09();
                                cl3h[a]=0; rw1h[a]=0; pd3h[a]=0; pb3h[a]=0;
                                cl3l[b]=0; rw1l[b]=0; pd3l[b]=0; pb3l[b]=0;
                                cl5h[na]=0;  rw7h[na]=0; pd6h[na]=0; pb4h[na]=0;
                                cl5l[nb]=0;  rw7l[nb]=0; pd6l[nb]=0; pb4l[nb]=0;
                                uflg[d]=0; uflg[nd]=0;}}}}
                    }
                }
            }
        }
    }
}
/* Set n6 & n44 *
void stp09(){
    short a,na,b,nb,d,nd;
    for(a=0;a<7;a++){na=6-a;
        if((cl6h[a]==0)&&(rw1h[a]==0)&&(pd6h[a]==0)&&(pb6h[a]==0)){
            if((cl2h[na]==0)&&(rw7h[na]==0)&&(pd3h[na]==0)&&(pb1h[na]==0)){

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for(b=0;b<7;b++){nb=6-b; d=7*a+b; nd=CC-d;
  if((uflg[d]==0)&&(uflg[nd]==0)){
    if((cl6l[b]==0)&&(rw1l[b]==0)&&(pd6l[b]==0)&&(pb6l[b]==0)){
      if((cl2l[nb]==0)&&(rw7l[nb]==0)&&(pd3l[nb]==0)&&(pb1l[nb]==0)){
        nm[6]=d; nm[44]=nd; uflg[d]=1; uflg[nd]=1;
        cl6h[a]=1; rw1h[a]=1; pd6h[a]=1; pb6h[a]=1;
        cl6l[b]=1; rw1l[b]=1; pd6l[b]=1; pb6l[b]=1;
        cl2h[na]=1; rw7h[na]=1; pd3h[na]=1; pb1h[na]=1;
        cl2l[nb]=1; rw7l[nb]=1; pd3l[nb]=1; pb1l[nb]=1;
        stp10();
        cl6h[a]=0; rw1h[a]=0; pd6h[a]=0; pb6h[a]=0;
        cl6l[b]=0; rw1l[b]=0; pd6l[b]=0; pb6l[b]=0;
        cl2h[na]=0; rw7h[na]=0; pd3h[na]=0; pb1h[na]=0;
        cl2l[nb]=0; rw7l[nb]=0; pd3l[nb]=0; pb1l[nb]=0;
        uflg[d]=0; uflg[nd]=0;}}}}
  }
}
/* Set n5 & n45 *
void stp10(){
  short a,na,b,nb,d,nd;
  for(a=0;a<7;a++){na=6-a;
    if((cl5h[a]==0)&&(rw1h[a]==0)&&(pd5h[a]==0)&&(pb5h[a]==0)){
      if((cl3h[na]==0)&&(rw7h[na]==0)&&(pd4h[na]==0)&&(pb2h[na]==0)){
        for(b=0;b<7;b++){nb=6-b; d=7*a+b; nd=CC-d;
          if((uflg[d]==0)&&(uflg[nd]==0)){
            if((cl5l[b]==0)&&(rw1l[b]==0)&&(pd5l[b]==0)&&(pb5l[b]==0)){
              if((cl3l[nb]==0)&&(rw7l[nb]==0)&&(pd4l[nb]==0)&&(pb2l[nb]==0)){
                nm[5]=d; nm[45]=nd; uflg[d]=1; uflg[nd]=1;
                cl5h[a]=1; rw1h[a]=1; pd5h[a]=1; pb5h[a]=1;
                cl5l[b]=1; rw1l[b]=1; pd5l[b]=1; pb5l[b]=1;
                cl3h[na]=1; rw7h[na]=1; pd4h[na]=1; pb2h[na]=1;
                cl3l[nb]=1; rw7l[nb]=1; pd4l[nb]=1; pb2l[nb]=1;
                stp11();
                cl5h[a]=0; rw1h[a]=0; pd5h[a]=0; pb5h[a]=0;
                cl5l[b]=0; rw1l[b]=0; pd5l[b]=0; pb5l[b]=0;
                cl3h[na]=0; rw7h[na]=0; pd4h[na]=0; pb2h[na]=0;
                cl3l[nb]=0; rw7l[nb]=0; pd4l[nb]=0; pb2l[nb]=0;
                uflg[d]=0; uflg[nd]=0;}}}}
          }
        }
      }
    }
  }
}
/* Set n4 & n46 *
void stp11(){
  short a,na,b,nb,d,nd;
  for(a=0;a<7;a++){na=6-a;
    if((cl4h[a]==0)&&(rw1h[a]==0)&&(pd4h[a]==0)&&(pb4h[a]==0)){
      if((cl4h[na]==0)&&(rw7h[na]==0)&&(pd5h[na]==0)&&(pb3h[na]==0)){
        for(b=0;b<7;b++){nb=6-b; d=7*a+b; nd=CC-d;
          if((uflg[d]==0)&&(uflg[nd]==0)){
            if((cl4l[b]==0)&&(rw1l[b]==0)&&(pd4l[b]==0)&&(pb4l[b]==0)){
              if((cl4l[nb]==0)&&(rw7l[nb]==0)&&(pd5l[nb]==0)&&(pb3l[nb]==0)){
                nm[4]=d; nm[46]=nd; uflg[d]=1; uflg[nd]=1;
                cl4h[a]=1; rw1h[a]=1; pd4h[a]=1; pb4h[a]=1;
                cl4l[b]=1; rw1l[b]=1; pd4l[b]=1; pb4l[b]=1;
                cl4h[na]=1; rw7h[na]=1; pd5h[na]=1; pb3h[na]=1;
                cl4l[nb]=1; rw7l[nb]=1; pd5l[nb]=1; pb3l[nb]=1;
                stp12();
                cl4h[a]=0; rw1h[a]=0; pd4h[a]=0; pb4h[a]=0;
                cl4l[b]=0; rw1l[b]=0; pd4l[b]=0; pb4l[b]=0;
                cl4h[na]=0; rw7h[na]=0; pd5h[na]=0; pb3h[na]=0;
                cl4l[nb]=0; rw7l[nb]=0; pd5l[nb]=0; pb3l[nb]=0;
                uflg[d]=0; uflg[nd]=0;}}}}
          }
        }
      }
    }
  }
}

```

```

}
/* Set n8(<n2) & n42 *
void stp12(){
short a,na,b,nb,d,nd;
for(a=0;a<7;a++){na=6-a;
if((c11h[a]==0)&&(rw2h[a]==0)&&(pd7h[a]==0)&&(pb2h[a]==0)){
if((c17h[na]==0)&&(rw6h[na]==0)&&(pd2h[na]==0)&&(pb5h[na]==0)){
for(b=0;b<7;b++){nb=6-b; d=7*a+b; nd=CC-d;
if((uflg[d]==0)&&(uflg[nd]==0)&&(d<nm[2])){
if((c11l[b]==0)&&(rw2l[b]==0)&&(pd7l[b]==0)&&(pb2l[b]==0)){
if((c17l[nb]==0)&&(rw6l[nb]==0)&&(pd2l[nb]==0)&&(pb5l[nb]==0)){
nm[8]=d; nm[42]=nd; uflg[d]=1; uflg[nd]=1;
c11h[a]=1; rw2h[a]=1; pd7h[a]=1; pb2h[a]=1;
c11l[b]=1; rw2l[b]=1; pd7l[b]=1; pb2l[b]=1;
c17h[na]=1; rw6h[na]=1; pd2h[na]=1; pb5h[na]=1;
c17l[nb]=1; rw6l[nb]=1; pd2l[nb]=1; pb5l[nb]=1;
stp13();
c11h[a]=0; rw2h[a]=0; pd7h[a]=0; pb2h[a]=0;
c11l[b]=0; rw2l[b]=0; pd7l[b]=0; pb2l[b]=0;
c17h[na]=0; rw6h[na]=0; pd2h[na]=0; pb5h[na]=0;
c17l[nb]=0; rw6l[nb]=0; pd2l[nb]=0; pb5l[nb]=0;
uflg[d]=0; uflg[nd]=0;}}}}
}}}
}
}
/* Set n15 & n35 & n1+n2+n3+n8+n9+n15=S6N? *
void stp13(){
short a,na,b,nb,d,nd;
for(a=0;a<7;a++){na=6-a;
if((c11h[a]==0)&&(rw3h[a]==0)&&(pd6h[a]==0)&&(pb3h[a]==0)){
if((c17h[na]==0)&&(rw5h[na]==0)&&(pd3h[na]==0)&&(pb4h[na]==0)){
for(b=0;b<7;b++){nb=6-b; d=7*a+b; nd=CC-d;
if((uflg[d]==0)&&(uflg[nd]==0)){
if((c11l[b]==0)&&(rw3l[b]==0)&&(pd6l[b]==0)&&(pb3l[b]==0)){
if((c17l[nb]==0)&&(rw5l[nb]==0)&&(pd3l[nb]==0)&&(pb4l[nb]==0)){
if(nm[1]+nm[2]+nm[3]+nm[8]+nm[9]+d==S6N){
nm[15]=d; nm[35]=nd; uflg[d]=1; uflg[nd]=1;
c11h[a]=1; rw3h[a]=1; pd6h[a]=1; pb3h[a]=1;
c11l[b]=1; rw3l[b]=1; pd6l[b]=1; pb3l[b]=1;
c17h[na]=1; rw5h[na]=1; pd3h[na]=1; pb4h[na]=1;
c17l[nb]=1; rw5l[nb]=1; pd3l[nb]=1; pb4l[nb]=1;
stp14();
c11h[a]=0; rw3h[a]=0; pd6h[a]=0; pb3h[a]=0;
c11l[b]=0; rw3l[b]=0; pd6l[b]=0; pb3l[b]=0;
c17h[na]=0; rw5h[na]=0; pd3h[na]=0; pb4h[na]=0;
c17l[nb]=0; rw5l[nb]=0; pd3l[nb]=0; pb4l[nb]=0;
uflg[d]=0; uflg[nd]=0;}}}}}}
}}}
}
}
/* Set n14 & n36 *
void stp14(){
short a,na,b,nb,d,nd;
for(a=0;a<7;a++){na=6-a;
if((c17h[a]==0)&&(rw2h[a]==0)&&(pd6h[a]==0)&&(pb1h[a]==0)){
if((c11h[na]==0)&&(rw6h[na]==0)&&(pd3h[na]==0)&&(pb6h[na]==0)){
for(b=0;b<7;b++){nb=6-b; d=7*a+b; nd=CC-d;
if((uflg[d]==0)&&(uflg[nd]==0)){
if((c17l[b]==0)&&(rw2l[b]==0)&&(pd6l[b]==0)&&(pb1l[b]==0)){
if((c11l[nb]==0)&&(rw6l[nb]==0)&&(pd3l[nb]==0)&&(pb6l[nb]==0)){
nm[14]=d; nm[36]=nd; uflg[d]=1; uflg[nd]=1;
c17h[a]=1; rw2h[a]=1; pd6h[a]=1; pb1h[a]=1;
c17l[b]=1; rw2l[b]=1; pd6l[b]=1; pb1l[b]=1;
c11h[na]=1; rw6h[na]=1; pd3h[na]=1; pb6h[na]=1;
c11l[nb]=1; rw6l[nb]=1; pd3l[nb]=1; pb6l[nb]=1;

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        stp15();
        cl7h[a]=0; rw2h[a]=0; pd6h[a]=0; pb1h[a]=0;
        cl7l[b]=0; rw2l[b]=0; pd6l[b]=0; pb1l[b]=0;
        cl1h[na]=0; rw6h[na]=0; pd3h[na]=0; pb6h[na]=0;
        cl1l[nb]=0; rw6l[nb]=0; pd3l[nb]=0; pb6l[nb]=0;
        uflg[d]=0; uflg[nd]=0;}}
    }}}
}
}
/* Set n21 & n29 & n5+n6+n7+n13+n14+n21=S6N? *
void stp15(){
    short a,na,b,nb,d,nd;
    for(a=0;a<7;a++){na=6-a;
        if((cl7h[a]==0)&&(rw3h[a]==0)&&(pd5h[a]==0)&&(pb2h[a]==0)){
            if((cl1h[na]==0)&&(rw5h[na]==0)&&(pd4h[na]==0)&&(pb5h[na]==0)){
                for(b=0;b<7;b++){nb=6-b; d=7*a+b; nd=CC-d;
                    if((uflg[d]==0)&&(uflg[nd]==0)){
                        if((cl7l[b]==0)&&(rw3l[b]==0)&&(pd5l[b]==0)&&(pb2l[b]==0)){
                            if((cl1l[nb]==0)&&(rw5l[nb]==0)&&(pd4l[nb]==0)&&(pb5l[nb]==0)){
                                if(nm[5]+nm[6]+nm[7]+nm[13]+nm[14]+d==S6N){
                                    nm[21]=d; nm[29]=nd; uflg[d]=1; uflg[nd]=1;
                                    cl7h[a]=1; rw3h[a]=1; pd5h[a]=1; pb2h[a]=1;
                                    cl7l[b]=1; rw3l[b]=1; pd5l[b]=1; pb2l[b]=1;
                                    cl1h[na]=1; rw5h[na]=1; pd4h[na]=1; pb5h[na]=1;
                                    cl1l[nb]=1; rw5l[nb]=1; pd4l[nb]=1; pb5l[nb]=1;
                                    stp16();
                                    cl7h[a]=0; rw3h[a]=0; pd5h[a]=0; pb2h[a]=0;
                                    cl7l[b]=0; rw3l[b]=0; pd5l[b]=0; pb2l[b]=0;
                                    cl1h[na]=0; rw5h[na]=0; pd4h[na]=0; pb5h[na]=0;
                                    cl1l[nb]=0; rw5l[nb]=0; pd4l[nb]=0; pb5l[nb]=0;
                                    uflg[d]=0; uflg[nd]=0;}}}}
                            }}}
                    }
                }
            }
        }
    }
}
/* Set n22 & n28 *
void stp16(){
    short a,na,b,nb,d,nd;
    for(a=6;a>=0;a--){na=6-a;
        if((cl1h[a]==0)&&(rw4h[a]==0)&&(pd5h[a]==0)&&(pb4h[a]==0)){
            if((cl7h[na]==0)&&(rw4h[na]==0)&&(pd4h[na]==0)&&(pb3h[na]==0)){
                for(b=6;b>=0;b--){nb=6-b; d=7*a+b; nd=CC-d;
                    if((uflg[d]==0)&&(uflg[nd]==0)){
                        if((cl1l[b]==0)&&(rw4l[b]==0)&&(pd5l[b]==0)&&(pb4l[b]==0)){
                            if((cl7l[nb]==0)&&(rw4l[nb]==0)&&(pd4l[nb]==0)&&(pb3l[nb]==0)){
                                nm[22]=d; nm[28]=nd; uflg[d]=1; uflg[nd]=1;
                                cl1h[a]=1; rw4h[a]=1; pd5h[a]=1; pb4h[a]=1;
                                cl1l[b]=1; rw4l[b]=1; pd5l[b]=1; pb4l[b]=1;
                                cl7h[na]=1; rw4h[na]=1; pd4h[na]=1; pb3h[na]=1;
                                cl7l[nb]=1; rw4l[nb]=1; pd4l[nb]=1; pb3l[nb]=1;
                                stp17();
                                cl1h[a]=0; rw4h[a]=0; pd5h[a]=0; pb4h[a]=0;
                                cl1l[b]=0; rw4l[b]=0; pd5l[b]=0; pb4l[b]=0;
                                cl7h[na]=0; rw4h[na]=0; pd4h[na]=0; pb3h[na]=0;
                                cl7l[nb]=0; rw4l[nb]=0; pd4l[nb]=0; pb3l[nb]=0;
                                uflg[d]=0; uflg[nd]=0;}}}}
                            }}}
                    }
                }
            }
        }
    }
}
}
/* Level #3: *
/* Set n10 & n40 *
void stp17(){
    short a,na,b,nb,d,nd;
    for(a=0;a<7;a++){na=6-a;
        if((cl3h[a]==0)&&(rw2h[a]==0)&&(pd2h[a]==0)&&(pb4h[a]==0)){
            if((cl5h[na]==0)&&(rw6h[na]==0)&&(pd7h[na]==0)&&(pb3h[na]==0)){

```

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for(b=0;b<7;b++){nb=6-b; d=7*a+b; nd=CC-d;
  if((uflg[d]==0)&&(uflg[nd]==0)){
    if((c13l[b]==0)&&(rw2l[b]==0)&&(pd2l[b]==0)&&(pb4l[b]==0)){
      if((c15l[nb]==0)&&(rw6l[nb]==0)&&(pd7l[nb]==0)&&(pb3l[nb]==0)){
        nm[10]=d; nm[40]=nd; uflg[d]=1; uflg[nd]=1;
        c13h[a]=1; rw2h[a]=1; pd2h[a]=1; pb4h[a]=1;
        c13l[b]=1; rw2l[b]=1; pd2l[b]=1; pb4l[b]=1;
        c15h[na]=1; rw6h[na]=1; pd7h[na]=1; pb3h[na]=1;
        c15l[nb]=1; rw6l[nb]=1; pd7l[nb]=1; pb3l[nb]=1;
        stp18C);
        c13h[a]=0; rw2h[a]=0; pd2h[a]=0; pb4h[a]=0;
        c13l[b]=0; rw2l[b]=0; pd2l[b]=0; pb4l[b]=0;
        c15h[na]=0; rw6h[na]=0; pd7h[na]=0; pb3h[na]=0;
        c15l[nb]=0; rw6l[nb]=0; pd7l[nb]=0; pb3l[nb]=0;
        uflg[d]=0; uflg[nd]=0;}}}}
  }
}
/* Set n16 & n34 *
void stp18C){
  short a,na,b,nb,d,nd;
  for(a=0;a<7;a++){na=6-a;
    if((c12h[a]==0)&&(rw3h[a]==0)&&(pd7h[a]==0)&&(pb4h[a]==0)){
      if((c16h[na]==0)&&(rw5h[na]==0)&&(pd2h[na]==0)&&(pb3h[na]==0)){
        for(b=0;b<7;b++){nb=6-b; d=7*a+b; nd=CC-d;
          if((uflg[d]==0)&&(uflg[nd]==0)){
            if((c12l[b]==0)&&(rw3l[b]==0)&&(pd7l[b]==0)&&(pb4l[b]==0)){
              if((c16l[nb]==0)&&(rw5l[nb]==0)&&(pd2l[nb]==0)&&(pb3l[nb]==0)){
                nm[16]=d; nm[34]=nd; uflg[d]=1; uflg[nd]=1;
                c12h[a]=1; rw3h[a]=1; pd7h[a]=1; pb4h[a]=1;
                c12l[b]=1; rw3l[b]=1; pd7l[b]=1; pb4l[b]=1;
                c16h[na]=1; rw5h[na]=1; pd2h[na]=1; pb3h[na]=1;
                c16l[nb]=1; rw5l[nb]=1; pd2l[nb]=1; pb3l[nb]=1;
                stp19C);
                c12h[a]=0; rw3h[a]=0; pd7h[a]=0; pb4h[a]=0;
                c12l[b]=0; rw3l[b]=0; pd7l[b]=0; pb4l[b]=0;
                c16h[na]=0; rw5h[na]=0; pd2h[na]=0; pb3h[na]=0;
                c16l[nb]=0; rw5l[nb]=0; pd2l[nb]=0; pb3l[nb]=0;
                uflg[d]=0; uflg[nd]=0;}}}}
          }
        }
      }
    }
  }
}
/* Set n12 & n38 *
void stp19C){
  short a,na,b,nb,d,nd;
  for(a=0;a<7;a++){na=6-a;
    if((c15h[a]==0)&&(rw2h[a]==0)&&(pd4h[a]==0)&&(pb6h[a]==0)){
      if((c13h[na]==0)&&(rw6h[na]==0)&&(pd5h[na]==0)&&(pb1h[na]==0)){
        for(b=0;b<7;b++){nb=6-b; d=7*a+b; nd=CC-d;
          if((uflg[d]==0)&&(uflg[nd]==0)){
            if((c15l[b]==0)&&(rw2l[b]==0)&&(pd4l[b]==0)&&(pb6l[b]==0)){
              if((c13l[nb]==0)&&(rw6l[nb]==0)&&(pd5l[nb]==0)&&(pb1l[nb]==0)){
                nm[12]=d; nm[38]=nd; uflg[d]=1; uflg[nd]=1;
                c15h[a]=1; rw2h[a]=1; pd4h[a]=1; pb6h[a]=1;
                c15l[b]=1; rw2l[b]=1; pd4l[b]=1; pb6l[b]=1;
                c13h[na]=1; rw6h[na]=1; pd5h[na]=1; pb1h[na]=1;
                c13l[nb]=1; rw6l[nb]=1; pd5l[nb]=1; pb1l[nb]=1;
                stp20C);
                c15h[a]=0; rw2h[a]=0; pd4h[a]=0; pb6h[a]=0;
                c15l[b]=0; rw2l[b]=0; pd4l[b]=0; pb6l[b]=0;
                c13h[na]=0; rw6h[na]=0; pd5h[na]=0; pb1h[na]=0;
                c13l[nb]=0; rw6l[nb]=0; pd5l[nb]=0; pb1l[nb]=0;
                uflg[d]=0; uflg[nd]=0;}}}}
          }
        }
      }
    }
  }
}

```

```

}
/* Set n11 & n39 *
void stp20(){
  short a,na,b,nb,d,nd;
  for(a=6;a>=0;a--){na=6-a;
    if((c14h[a]==0)&&(rw2h[a]==0)&&(pd3h[a]==0)&&(pb5h[a]==0)){
      if((c14h[na]==0)&&(rw6h[na]==0)&&(pd6h[na]==0)&&(pb2h[na]==0)){
        for(b=6;b>=0;b--){nb=6-b; d=7*a+b; nd=CC-d;
          if((uflg[d]==0)&&(uflg[nd]==0)){
            if((c14l[b]==0)&&(rw2l[b]==0)&&(pd3l[b]==0)&&(pb5l[b]==0)){
              if((c14l[nb]==0)&&(rw6l[nb]==0)&&(pd6l[nb]==0)&&(pb2l[nb]==0)){
                nm[11]=d; nm[39]=nd; uflg[d]=1; uflg[nd]=1;
                c14h[a]=1; rw2h[a]=1; pd3h[a]=1; pb5h[a]=1;
                c14l[b]=1; rw2l[b]=1; pd3l[b]=1; pb5l[b]=1;
                c14h[na]=1; rw6h[na]=1; pd6h[na]=1; pb2h[na]=1;
                c14l[nb]=1; rw6l[nb]=1; pd6l[nb]=1; pb2l[nb]=1;
                stp21();
                c14h[a]=0; rw2h[a]=0; pd3h[a]=0; pb5h[a]=0;
                c14l[b]=0; rw2l[b]=0; pd3l[b]=0; pb5l[b]=0;
                c14h[na]=0; rw6h[na]=0; pd6h[na]=0; pb2h[na]=0;
                c14l[nb]=0; rw6l[nb]=0; pd6l[nb]=0; pb2l[nb]=0;
                uflg[d]=0; uflg[nd]=0;}}}}
          }}}
    }
}
/* Set n20 & n30 *
void stp21(){
  short a,na,b,nb,d,nd;
  for(a=0;a<7;a++){na=6-a;
    if((c16h[a]==0)&&(rw3h[a]==0)&&(pd4h[a]==0)&&(pb1h[a]==0)){
      if((c12h[na]==0)&&(rw5h[na]==0)&&(pd5h[na]==0)&&(pb6h[na]==0)){
        for(b=0;b<7;b++){nb=6-b; d=7*a+b; nd=CC-d;
          if((uflg[d]==0)&&(uflg[nd]==0)){
            if((c16l[b]==0)&&(rw3l[b]==0)&&(pd4l[b]==0)&&(pb1l[b]==0)){
              if((c12l[nb]==0)&&(rw5l[nb]==0)&&(pd5l[nb]==0)&&(pb6l[nb]==0)){
                nm[20]=d; nm[30]=nd; uflg[d]=1; uflg[nd]=1;
                c16h[a]=1; rw3h[a]=1; pd4h[a]=1; pb1h[a]=1;
                c16l[b]=1; rw3l[b]=1; pd4l[b]=1; pb1l[b]=1;
                c12h[na]=1; rw5h[na]=1; pd5h[na]=1; pb6h[na]=1;
                c12l[nb]=1; rw5l[nb]=1; pd5l[nb]=1; pb6l[nb]=1;
                stp22();
                c16h[a]=0; rw3h[a]=0; pd4h[a]=0; pb1h[a]=0;
                c16l[b]=0; rw3l[b]=0; pd4l[b]=0; pb1l[b]=0;
                c12h[na]=0; rw5h[na]=0; pd5h[na]=0; pb6h[na]=0;
                c12l[nb]=0; rw5l[nb]=0; pd5l[nb]=0; pb6l[nb]=0;
                uflg[d]=0; uflg[nd]=0;}}}}
          }}}
    }
}
/* Set n23 & n27 *
void stp22(){
  short a,na,b,nb,d,nd;
  for(a=0;a<7;a++){na=6-a;
    if((c12h[a]==0)&&(rw4h[a]==0)&&(pd6h[a]==0)&&(pb5h[a]==0)){
      if((c16h[na]==0)&&(rw4h[na]==0)&&(pd3h[na]==0)&&(pb2h[na]==0)){
        for(b=0;b<7;b++){nb=6-b; d=7*a+b; nd=CC-d;
          if((uflg[d]==0)&&(uflg[nd]==0)){
            if((c12l[b]==0)&&(rw4l[b]==0)&&(pd6l[b]==0)&&(pb5l[b]==0)){
              if((c16l[nb]==0)&&(rw4l[nb]==0)&&(pd3l[nb]==0)&&(pb2l[nb]==0)){
                nm[23]=d; nm[27]=nd; uflg[d]=1; uflg[nd]=1;
                c12h[a]=1; rw4h[a]=1; pd6h[a]=1; pb5h[a]=1;
                c12l[b]=1; rw4l[b]=1; pd6l[b]=1; pb5l[b]=1;
                c16h[na]=1; rw4h[na]=1; pd3h[na]=1; pb2h[na]=1;
                c16l[nb]=1; rw4l[nb]=1; pd3l[nb]=1; pb2l[nb]=1;
                stp23();

```

```

        c12h[a]=0; rw4h[a]=0; pd6h[a]=0; pb5h[a]=0;
        c12l[b]=0; rw4l[b]=0; pd6l[b]=0; pb5l[b]=0;
        c16h[na]=0; rw4h[na]=0; pd3h[na]=0; pb2h[na]=0;
        c16l[nb]=0; rw4l[nb]=0; pd3l[nb]=0; pb2l[nb]=0;
        uflg[d]=0; uflg[nd]=0;}}}
    }
}
}
/* Set n18 & n32 *
void stp23(){
    short a,na,b,nb,d,nd;
    for(a=0;a<7;a++){na=6-a;
        if((c14h[a]==0)&&(rw3h[a]==0)&&(pd2h[a]==0)&&(pb6h[a]==0)){
            if((c14h[na]==0)&&(rw5h[na]==0)&&(pd7h[na]==0)&&(pb1h[na]==0)){
                for(b=0;b<7;b++){nb=6-b; d=7*a+b; nd=CC-d;
                    if((uflg[d]==0)&&(uflg[nd]==0)){
                        if((c14l[b]==0)&&(rw3l[b]==0)&&(pd2l[b]==0)&&(pb6l[b]==0)){
                            if((c14l[nb]==0)&&(rw5l[nb]==0)&&(pd7l[nb]==0)&&(pb1l[nb]==0)){
                                nm[18]=d; nm[32]=nd; uflg[d]=1; uflg[nd]=1;
                                c14h[a]=1; rw3h[a]=1; pd2h[a]=1; pb6h[a]=1;
                                c14l[b]=1; rw3l[b]=1; pd2l[b]=1; pb6l[b]=1;
                                c14h[na]=1; rw5h[na]=1; pd7h[na]=1; pb1h[na]=1;
                                c14l[nb]=1; rw5l[nb]=1; pd7l[nb]=1; pb1l[nb]=1;
                                stp24();
                                c14h[a]=0; rw3h[a]=0; pd2h[a]=0; pb6h[a]=0;
                                c14l[b]=0; rw3l[b]=0; pd2l[b]=0; pb6l[b]=0;
                                c14h[na]=0; rw5h[na]=0; pd7h[na]=0; pb1h[na]=0;
                                c14l[nb]=0; rw5l[nb]=0; pd7l[nb]=0; pb1l[nb]=0;
                                uflg[d]=0; uflg[nd]=0;}}}
                    }
                }
            }
        }
    }
}
/* Set n24 & n26 *
void stp24(){
    short a,na,b,nb,d,nd;
    for(a=0;a<7;a++){na=6-a;
        if((c13h[a]==0)&&(rw4h[a]==0)&&(pd7h[a]==0)&&(pb6h[a]==0)){
            if((c15h[na]==0)&&(rw4h[na]==0)&&(pd2h[na]==0)&&(pb1h[na]==0)){
                for(b=0;b<7;b++){nb=6-b; d=7*a+b; nd=CC-d;
                    if((uflg[d]==0)&&(uflg[nd]==0)){
                        if((c13l[b]==0)&&(rw4l[b]==0)&&(pd7l[b]==0)&&(pb6l[b]==0)){
                            if((c15l[nb]==0)&&(rw4l[nb]==0)&&(pd2l[nb]==0)&&(pb1l[nb]==0)){
                                nm[24]=d; nm[26]=nd; uflg[d]=1; uflg[nd]=1;
                                c13h[a]=1; rw4h[a]=1; pd7h[a]=1; pb6h[a]=1;
                                c13l[b]=1; rw4l[b]=1; pd7l[b]=1; pb6l[b]=1;
                                c15h[na]=1; rw4h[na]=1; pd2h[na]=1; pb1h[na]=1;
                                c15l[nb]=1; rw4l[nb]=1; pd2l[nb]=1; pb1l[nb]=1;
                                printans();
                                c13h[a]=0; rw4h[a]=0; pd7h[a]=0; pb6h[a]=0;
                                c13l[b]=0; rw4l[b]=0; pd7l[b]=0; pb6l[b]=0;
                                c15h[na]=0; rw4h[na]=0; pd2h[na]=0; pb1h[na]=0;
                                c15l[nb]=0; rw4l[nb]=0; pd2l[nb]=0; pb1l[nb]=0;
                                uflg[d]=0; uflg[nd]=0;}}}
                    }
                }
            }
        }
    }
}
}
}
//
/* Print New Answer *
void printans(){
    short n;
    cnt++; if(nm[1]==0){cnt1++;}
    cnt2++;
    if(cnt2==1){
        anm[cnt3*2][0]=cnt;
        for(n=1;n<50;n++){anm[cnt3*2][n]=nm[n]+1; anm[cnt3*2+1][n]=nm[n];}
    }
}

```

```

        cnt3++; if(cnt3==2){print2p(); cnt3=0;}
    }
}
//
/** Print 1 Answer *
void print1p(){
short l,l7,n;
printf(" LU: H/      L/%21d#\n",anm[0][0]);
for(l=0;l<7;l++){l7=l*7;
printf(" ");
for(n=1;n<8;n++){printf("%d",anm[1][l7+n]/7);}
printf(" ");
for(n=1;n<8;n++){printf("%d",anm[1][l7+n]%7);}
printf(" ");
for(n=1;n<8;n++){printf("%3d",anm[0][l7+n]);}
printf("\n");
}
}
//
/** Print 2 Answers with their Decompositions *
void print2p(){
short l,l7,n;
printf(" LU: H/      L/%21d#  LU: H/      L/%21d#\n",anm[0][0],anm[2][0]);
for(l=0;l<7;l++){l7=l*7;
printf(" ");
for(n=1;n<8;n++){printf("%d",anm[1][l7+n]/7);}
printf(" ");
for(n=1;n<8;n++){printf("%d",anm[1][l7+n]%7);}
printf(" ");
for(n=1;n<8;n++){printf("%3d",anm[0][l7+n]);}
printf(" ");
for(n=1;n<8;n++){printf("%d",anm[3][l7+n]/7);}
printf(" ");
for(n=1;n<8;n++){printf("%d",anm[3][l7+n]%7);}
printf(" ");
for(n=1;n<8;n++){printf("%3d",anm[2][l7+n]);}
printf("\n");
}
}
}

```

#5. Result list of My Recent Computation

The next list shows one of the recent results of my computation for our new type of Simultaneous Magic Squares 7x7: Both Self-complementary and Pan-diagonal.

**** 'Complete Euler Squares' of Order 7 for the Simultaneous Type:
Both Self-complementary and Pan-diagonal; ****

**** Compact List of 3456 Standard Solutions ****

[Normalizing Inequality Conditions: $n_1 < n_7$, $n_1 < n_{43}$, $n_1 < n_{49}$ and $n_2 > n_8$;

| LU: H/ | L/ | | 1# | LU: H/ | L/ | 25# |
|---------|---------|---------------------|-----|---------|---------|---------------------|
| 0654321 | 0531642 | 1 48 39 30 28 19 10 | | 0654321 | 0432651 | 1 47 39 31 28 20 9 |
| 2106543 | 3164205 | 18 9 7 47 38 29 27 | | 2106543 | 3265104 | 18 10 7 48 37 29 26 |
| 4321065 | 6420531 | 35 26 17 8 6 46 37 | | 4321065 | 6510432 | 35 27 16 8 5 46 38 |
| 6543210 | 2053164 | 45 36 34 25 16 14 5 | | 6543210 | 1043265 | 44 36 33 25 17 14 6 |
| 1065432 | 5316420 | 13 4 44 42 33 24 15 | | 1065432 | 4326510 | 12 4 45 42 34 23 15 |
| 3210654 | 1642053 | 23 21 12 3 43 41 32 | | 3210654 | 2651043 | 24 21 13 2 43 40 32 |
| 5432106 | 4205316 | 40 31 22 20 11 2 49 | | 5432106 | 5104326 | 41 30 22 19 11 3 49 |
| LU: H/ | L/ | | 49# | LU: H/ | L/ | 73# |
| 0654321 | 0234651 | 1 45 39 33 28 20 9 | | 0654321 | 0246531 | 1 45 40 35 27 18 9 |
| 2106543 | 3465102 | 18 12 7 48 37 29 24 | | 2106543 | 6531024 | 21 13 4 44 36 31 26 |
| 4321065 | 6510234 | 35 27 16 8 3 46 40 | | 4321065 | 1024653 | 30 22 17 12 7 48 39 |
| 6543210 | 1023465 | 44 36 31 25 19 14 6 | | 6543210 | 4653102 | 47 42 34 25 16 8 3 |
| 1065432 | 2346510 | 10 4 47 42 34 23 15 | | 1065432 | 3102465 | 11 2 43 38 33 28 20 |
| 3210654 | 4651023 | 26 21 13 2 43 38 32 | | 3210654 | 2465310 | 24 19 14 6 46 37 29 |
| 5432106 | 5102346 | 41 30 22 17 11 5 49 | | 5432106 | 5310246 | 41 32 23 15 10 5 49 |

| | | | | | | | | | | | | | | | | | | | |
|---------|---------|----|----|----|----|----|----|----|-------|---------|---------|----|----|----|----|----|----|----|-------|
| LU: H/ | L/ | | | | | | | | 97# | LU: H/ | L/ | | | | | | | | 121# |
| 0432651 | 0654321 | 1 | 35 | 27 | 19 | 46 | 38 | 9 | | 0432651 | 0645312 | 1 | 35 | 26 | 20 | 46 | 37 | 10 | |
| 3265104 | 2106543 | 24 | 16 | 43 | 42 | 13 | 5 | 32 | | 3265104 | 1206453 | 23 | 17 | 43 | 42 | 12 | 6 | 32 | |
| 6510432 | 4321065 | 47 | 39 | 10 | 2 | 29 | 28 | 20 | | 6510432 | 5312064 | 48 | 39 | 9 | 3 | 29 | 28 | 19 | |
| 1043265 | 6543210 | 14 | 6 | 33 | 25 | 17 | 44 | 36 | | 1043265 | 6453120 | 14 | 5 | 34 | 25 | 16 | 45 | 36 | |
| 4326510 | 1065432 | 30 | 22 | 21 | 48 | 40 | 11 | 3 | | 4326510 | 2064531 | 31 | 22 | 21 | 47 | 41 | 11 | 2 | |
| 2651043 | 3210654 | 18 | 45 | 37 | 8 | 7 | 34 | 26 | | 2651043 | 3120645 | 18 | 44 | 38 | 8 | 7 | 33 | 27 | |
| 5104326 | 5432106 | 41 | 12 | 4 | 31 | 23 | 15 | 49 | | 5104326 | 4531206 | 40 | 13 | 4 | 30 | 24 | 15 | 49 | |
| LU: H/ | L/ | | | | | | | | 145# | LU: H/ | L/ | | | | | | | | 169# |
| 0432651 | 0156432 | 1 | 30 | 27 | 21 | 47 | 39 | 10 | | 0432651 | 0246531 | 1 | 31 | 26 | 21 | 48 | 39 | 9 | |
| 3265104 | 6432015 | 28 | 19 | 46 | 38 | 8 | 2 | 34 | | 3265104 | 6531024 | 28 | 20 | 46 | 37 | 8 | 3 | 33 | |
| 6510432 | 2015643 | 45 | 36 | 9 | 6 | 35 | 26 | 18 | | 6510432 | 1024653 | 44 | 36 | 10 | 5 | 35 | 27 | 18 | |
| 1043265 | 5643201 | 13 | 7 | 33 | 25 | 17 | 43 | 37 | | 1043265 | 4653102 | 12 | 7 | 34 | 25 | 16 | 43 | 38 | |
| 4326510 | 3201564 | 32 | 24 | 15 | 44 | 41 | 14 | 5 | | 4326510 | 3102465 | 32 | 23 | 15 | 45 | 40 | 14 | 6 | |
| 2651043 | 1564320 | 16 | 48 | 42 | 12 | 4 | 31 | 22 | | 2651043 | 2465310 | 17 | 47 | 42 | 13 | 4 | 30 | 22 | |
| 5104326 | 4320156 | 40 | 11 | 3 | 29 | 23 | 20 | 49 | | 5104326 | 5310246 | 41 | 11 | 2 | 29 | 24 | 19 | 49 | |
| LU: H/ | L/ | | | | | | | | 193# | LU: H/ | L/ | | | | | | | | 217# |
| 0625314 | 0531642 | 1 | 48 | 18 | 37 | 28 | 12 | 31 | | 0625314 | 0432651 | 1 | 47 | 18 | 38 | 28 | 13 | 30 | |
| 1406253 | 3164205 | 11 | 30 | 7 | 47 | 17 | 36 | 27 | | 1406253 | 3265104 | 11 | 31 | 7 | 48 | 16 | 36 | 26 | |
| 5314062 | 6420531 | 42 | 26 | 10 | 29 | 6 | 46 | 16 | | 5314062 | 6510432 | 42 | 27 | 9 | 29 | 5 | 46 | 17 | |
| 6253140 | 2053164 | 45 | 15 | 41 | 25 | 9 | 35 | 5 | | 6253140 | 1043265 | 44 | 15 | 40 | 25 | 10 | 35 | 6 | |
| 4062531 | 5316420 | 34 | 4 | 44 | 21 | 40 | 24 | 8 | | 4062531 | 4326510 | 33 | 4 | 45 | 21 | 41 | 23 | 8 | |
| 3140625 | 1642053 | 23 | 14 | 33 | 3 | 43 | 20 | 39 | | 3140625 | 2651043 | 24 | 14 | 34 | 2 | 43 | 19 | 39 | |
| 2531406 | 4205316 | 19 | 38 | 22 | 13 | 32 | 2 | 49 | | 2531406 | 5104326 | 20 | 37 | 22 | 12 | 32 | 3 | 49 | |
| LU: H/ | L/ | | | | | | | | 241# | LU: H/ | L/ | | | | | | | | 265# |
| 0625314 | 0234651 | 1 | 45 | 18 | 40 | 28 | 13 | 30 | | 0625314 | 0246531 | 1 | 45 | 19 | 42 | 27 | 11 | 30 | |
| 1406253 | 3465102 | 11 | 33 | 7 | 48 | 16 | 36 | 24 | | 1406253 | 6531024 | 14 | 34 | 4 | 44 | 15 | 38 | 26 | |
| 5314062 | 6510234 | 42 | 27 | 9 | 29 | 3 | 46 | 19 | | 5314062 | 1024653 | 37 | 22 | 10 | 33 | 7 | 48 | 18 | |
| 6253140 | 1023465 | 44 | 15 | 38 | 25 | 12 | 35 | 6 | | 6253140 | 4653102 | 47 | 21 | 41 | 25 | 9 | 29 | 3 | |
| 4062531 | 2346510 | 31 | 4 | 47 | 21 | 41 | 23 | 8 | | 4062531 | 3102465 | 32 | 2 | 43 | 17 | 40 | 28 | 13 | |
| 3140625 | 4651023 | 26 | 14 | 34 | 2 | 43 | 17 | 39 | | 3140625 | 2465310 | 24 | 12 | 35 | 6 | 46 | 16 | 36 | |
| 2531406 | 5102346 | 20 | 37 | 22 | 10 | 32 | 5 | 49 | | 2531406 | 5310246 | 20 | 39 | 23 | 8 | 31 | 5 | 49 | |
| LU: H/ | L/ | | | | | | | | 289# | LU: H/ | L/ | | | | | | | | 313# |
| 0362154 | 0654321 | 1 | 28 | 48 | 19 | 11 | 38 | 30 | | 0362154 | 0432651 | 1 | 26 | 46 | 17 | 14 | 41 | 30 | |
| 1540362 | 2106543 | 10 | 37 | 29 | 7 | 27 | 47 | 18 | | 1540362 | 3265104 | 11 | 38 | 35 | 6 | 23 | 43 | 19 | |
| 3621540 | 4321065 | 26 | 46 | 17 | 9 | 36 | 35 | 6 | | 3621540 | 6510432 | 28 | 48 | 16 | 8 | 40 | 32 | 3 | |
| 5403621 | 6543210 | 42 | 34 | 5 | 25 | 45 | 16 | 8 | | 5403621 | 1043265 | 37 | 29 | 5 | 25 | 45 | 21 | 13 | |
| 6215403 | 1065432 | 44 | 15 | 14 | 41 | 33 | 4 | 24 | | 6215403 | 4326510 | 47 | 18 | 10 | 42 | 34 | 2 | 22 | |
| 4036215 | 3210654 | 32 | 3 | 23 | 43 | 21 | 13 | 40 | | 4036215 | 2651043 | 31 | 7 | 27 | 44 | 15 | 12 | 39 | |
| 2154036 | 5432106 | 20 | 12 | 39 | 31 | 2 | 22 | 49 | | 2154036 | 5104326 | 20 | 9 | 36 | 33 | 4 | 24 | 49 | |
| LU: H/ | L/ | | | | | | | | 337# | LU: H/ | L/ | | | | | | | | 361# |
| 0362154 | 0234651 | 1 | 24 | 46 | 19 | 14 | 41 | 30 | | 0362154 | 0246531 | 1 | 24 | 47 | 21 | 13 | 39 | 30 | |
| 1540362 | 3465102 | 11 | 40 | 35 | 6 | 23 | 43 | 17 | | 1540362 | 6531024 | 14 | 41 | 32 | 2 | 22 | 45 | 19 | |
| 3621540 | 6510234 | 28 | 48 | 16 | 8 | 38 | 32 | 5 | | 3621540 | 1024653 | 23 | 43 | 17 | 12 | 42 | 34 | 4 | |
| 5403621 | 1023465 | 37 | 29 | 3 | 25 | 47 | 21 | 13 | | 5403621 | 4653102 | 40 | 35 | 6 | 25 | 44 | 15 | 10 | |
| 6215403 | 2346510 | 45 | 18 | 12 | 42 | 34 | 2 | 22 | | 6215403 | 3102465 | 46 | 16 | 8 | 38 | 33 | 7 | 27 | |
| 4036215 | 4651023 | 33 | 7 | 27 | 44 | 15 | 10 | 39 | | 4036215 | 2465310 | 31 | 5 | 28 | 48 | 18 | 9 | 36 | |
| 2154036 | 5102346 | 20 | 9 | 36 | 31 | 4 | 26 | 49 | | 2154036 | 5310246 | 20 | 11 | 37 | 29 | 3 | 26 | 49 | |
| LU: H/ | L/ | | | | | | | | 385# | LU: H/ | L/ | | | | | | | | 769# |
| 0654321 | 1630542 | 2 | 49 | 39 | 29 | 27 | 19 | 10 | | 0654321 | 2630451 | 3 | 49 | 39 | 29 | 26 | 20 | 9 | |
| 2106543 | 3054216 | 18 | 8 | 6 | 47 | 38 | 30 | 28 | | 2106543 | 3045126 | 18 | 8 | 5 | 48 | 37 | 31 | 28 | |
| 4321065 | 5421630 | 34 | 26 | 17 | 9 | 7 | 46 | 36 | | 4321065 | 4512630 | 33 | 27 | 16 | 10 | 7 | 46 | 36 | |
| 6543210 | 2163054 | 45 | 37 | 35 | 25 | 15 | 13 | 5 | | 6543210 | 1263045 | 44 | 38 | 35 | 25 | 15 | 12 | 6 | |
| 1065432 | 6305421 | 14 | 4 | 43 | 41 | 33 | 24 | 16 | | 1065432 | 6304512 | 14 | 4 | 43 | 40 | 34 | 23 | 17 | |
| 3210654 | 0542163 | 22 | 20 | 12 | 3 | 44 | 42 | 32 | | 3210654 | 0451263 | 22 | 19 | 13 | 2 | 45 | 42 | 32 | |
| 5432106 | 4216305 | 40 | 31 | 23 | 21 | 11 | 1 | 48 | | 5432106 | 5126304 | 41 | 30 | 24 | 21 | 11 | 1 | 47 | |
| LU: H/ | L/ | | | | | | | | 1153# | LU: H/ | L/ | | | | | | | | 1537# |
| 0654321 | 4630251 | 5 | 49 | 39 | 29 | 24 | 20 | 9 | | 0654321 | 5630142 | 6 | 49 | 39 | 29 | 23 | 19 | 10 | |
| 2106543 | 3025146 | 18 | 8 | 3 | 48 | 37 | 33 | 28 | | 2106543 | 3014256 | 18 | 8 | 2 | 47 | 38 | 34 | 28 | |
| 4321065 | 2514630 | 31 | 27 | 16 | 12 | 7 | 46 | 36 | | 4321065 | 1425630 | 30 | 26 | 17 | 13 | 7 | 46 | 36 | |
| 6543210 | 1463025 | 44 | 40 | 35 | 25 | 15 | 10 | 6 | | 6543210 | 2563014 | 45 | 41 | 35 | 25 | 15 | 9 | 5 | |
| 1065432 | 6302514 | 14 | 4 | 43 | 38 | 34 | 23 | 19 | | 1065432 | 6301425 | 14 | 4 | 43 | 37 | 33 | 24 | 20 | |
| 3210654 | 0251463 | 22 | 17 | 13 | 2 | 47 | 42 | 32 | | 3210654 | 0142563 | 22 | 16 | 12 | 3 | 48 | 42 | 32 | |
| 5432106 | 5146302 | 41 | 30 | 26 | 21 | 11 | 1 | 45 | | 5432106 | 4256301 | 40 | 31 | 27 | 21 | 11 | 1 | 44 | |

| | | | | | | | |
|---------|---------|---------------------|-------|---------|---------|---------------------|-------|
| LU: H/ | L/ | | 1921# | LU: H/ | L/ | | 2305# |
| 0654321 | 6531042 | 7 48 39 30 22 19 10 | | 1630542 | 0654321 | 8 49 27 5 39 31 16 | |
| 2106543 | 3104265 | 18 9 1 47 38 35 27 | | 3054216 | 2106543 | 24 2 36 35 20 12 46 | |
| 4321065 | 0426531 | 29 26 17 14 6 46 37 | | 5421630 | 4321065 | 40 32 17 9 43 28 6 | |
| 6543210 | 2653104 | 45 42 34 25 16 8 5 | | 2163054 | 6543210 | 21 13 47 25 3 37 29 | |
| 1065432 | 5310426 | 13 4 44 36 33 24 21 | | 6305421 | 1065432 | 44 22 7 41 33 18 10 | |
| 3210654 | 1042653 | 23 15 12 3 49 41 32 | | 0542163 | 3210654 | 4 38 30 15 14 48 26 | |
| 5432106 | 4265310 | 40 31 28 20 11 2 43 | | 4216305 | 5432106 | 34 19 11 45 23 1 42 | |
| LU: H/ | L/ | | 2497# | LU: H/ | L/ | | 2689# |
| 1630542 | 1564320 | 9 48 28 5 39 31 15 | | 1630542 | 2465310 | 10 47 28 6 39 30 15 | |
| 3054216 | 2015643 | 24 1 37 34 21 12 46 | | 3054216 | 1024653 | 23 1 38 33 21 13 46 | |
| 5421630 | 4320156 | 40 32 17 8 44 27 7 | | 5421630 | 5310246 | 41 32 16 8 45 26 7 | |
| 2163054 | 5643201 | 20 14 47 25 3 36 30 | | 2163054 | 4653102 | 19 14 48 25 2 36 31 | |
| 6305421 | 0156432 | 43 23 6 42 33 18 10 | | 6305421 | 0246531 | 43 24 5 42 34 18 9 | |
| 0542163 | 3201564 | 4 38 29 16 13 49 26 | | 0542163 | 3102465 | 4 37 29 17 12 49 27 | |
| 4216305 | 6432015 | 35 19 11 45 22 2 41 | | 4216305 | 6531024 | 35 20 11 44 22 3 40 | |
| LU: H/ | L/ | | 2881# | LU: H/ | L/ | | 3073# |
| 1630542 | 4265310 | 12 45 28 6 39 30 15 | | 1630542 | 5164320 | 13 44 28 5 39 31 15 | |
| 3054216 | 1042653 | 23 1 40 31 21 13 46 | | 3054216 | 2051643 | 24 1 41 30 21 12 46 | |
| 5421630 | 5310426 | 41 32 16 8 47 24 7 | | 5421630 | 4320516 | 40 32 17 8 48 23 7 | |
| 2163054 | 2653104 | 17 14 48 25 2 36 33 | | 2163054 | 1643205 | 16 14 47 25 3 36 34 | |
| 6305421 | 0426531 | 43 26 3 42 34 18 9 | | 6305421 | 0516432 | 43 27 2 42 33 18 10 | |
| 0542163 | 3104265 | 4 37 29 19 10 49 27 | | 0542163 | 3205164 | 4 38 29 20 9 49 26 | |
| 4216305 | 6531042 | 35 20 11 44 22 5 38 | | 4216305 | 6432051 | 35 19 11 45 22 6 37 | |
| LU: H/ | L/ | | 3265# | | | | |
| 1630542 | 6054321 | 14 43 27 5 39 31 16 | | | | | |
| 3054216 | 2160543 | 24 2 42 29 20 12 46 | | | | | |
| 5421630 | 4321605 | 40 32 17 9 49 22 6 | | | | | |
| 2163054 | 0543216 | 15 13 47 25 3 37 35 | | | | | |
| 6305421 | 1605432 | 44 28 1 41 33 18 10 | | | | | |
| 0542163 | 3216054 | 4 38 30 21 8 48 26 | | | | | |
| 4216305 | 5432160 | 34 19 11 45 23 7 36 | | | | | |

[Total Count of Solutions(n1=1/A11) = 384/3456] OK!

** Recalculated and Listed by Kanji Setsuda on
Feb.15, 2015 with MacOSX 10.10.2 & Xcode 6.1.1 **

It was a big surprise to me that we could take only a few minutes to make all.

How happy I am to have known about the total counts of 3456 solutions!

But I was afraid for the first time if it might be too small, though it might look so many to you. When I tried to count up the simultaneous type of MS77 through before, I often gave it up, because it always took too long a time for me to go on. I remember I once stopped when I counted them more than 50000.

Why could we have such a small number of solutions as many as 3456 here?

Watch the next list of example solutions of general Simultaneous MS77 with /D7i and check if they are 'Complete Euler Type' or not, please.

** Examples of 'Non-Euler Type' of Simultaneous **
Magic Squares 7x7: Both Self-Complementary and Pan-Diagonal **

| | | | | 1/ | /D7i | | | | | 2/ | /D7i | | | | | | |
|----|----|----|----|----|------|----|---------|---------|----|----|------|----|----|----|----|---------|---------|
| 1 | 48 | 47 | 32 | 27 | 16 | 4 | 0664320 | 0543513 | 1 | 48 | 47 | 31 | 32 | 12 | 4 | 0664410 | 0542343 |
| 12 | 6 | 5 | 29 | 39 | 41 | 43 | 1004556 | 4540350 | 21 | 9 | 5 | 16 | 44 | 43 | 37 | 2102665 | 6141101 |
| 36 | 35 | 22 | 10 | 20 | 33 | 19 | 5431242 | 0602544 | 24 | 27 | 33 | 10 | 20 | 39 | 22 | 3341253 | 2542530 |
| 42 | 26 | 37 | 25 | 13 | 24 | 8 | 5353131 | 6413520 | 42 | 35 | 36 | 25 | 14 | 15 | 8 | 5453121 | 6603600 |
| 31 | 17 | 30 | 40 | 28 | 15 | 14 | 4245321 | 2214606 | 28 | 11 | 30 | 40 | 17 | 23 | 26 | 3145233 | 6314214 |
| 7 | 9 | 11 | 21 | 45 | 44 | 38 | 0112665 | 6136212 | 13 | 7 | 6 | 34 | 45 | 41 | 29 | 1004654 | 5655250 |
| 46 | 34 | 23 | 18 | 3 | 2 | 49 | 6432006 | 3513216 | 46 | 38 | 18 | 19 | 3 | 2 | 49 | 6522006 | 3234216 |

| | | | | | | | | | | | | | | | | | |
|----|----|------|----|----|----|----|---------|---------|------|------|----|----|----|----|----|---------|---------|
| | 3/ | /D7i | | | | | | 4/ | /D7i | | | | | | | | |
| 1 | 48 | 47 | 31 | 23 | 12 | 13 | 0664311 | 0542145 | 1 | 48 | 47 | 31 | 21 | 18 | 9 | 0664221 | 0542631 |
| 15 | 5 | 8 | 29 | 40 | 46 | 32 | 2014564 | 0400433 | 13 | 6 | 10 | 22 | 39 | 42 | 43 | 1013556 | 5520360 |
| 34 | 28 | 17 | 11 | 20 | 41 | 24 | 4321253 | 5623552 | 35 | 27 | 26 | 4 | 36 | 30 | 17 | 4330542 | 6543012 |
| 44 | 43 | 36 | 25 | 14 | 7 | 6 | 6653100 | 1003665 | 45 | 34 | 38 | 25 | 12 | 16 | 5 | 6453120 | 2523414 |
| 26 | 9 | 30 | 39 | 33 | 22 | 16 | 3145432 | 4113401 | 33 | 20 | 14 | 46 | 24 | 23 | 15 | 4216332 | 4563210 |
| 18 | 4 | 10 | 21 | 42 | 45 | 35 | 2012564 | 3326626 | 7 | 8 | 11 | 28 | 40 | 44 | 37 | 0113565 | 6036411 |
| 37 | 38 | 27 | 19 | 3 | 2 | 49 | 5532006 | 1254216 | 41 | 32 | 29 | 19 | 3 | 2 | 49 | 5442006 | 5304216 |
| | 5/ | /D7i | | | | | | | 6/ | /D7i | | | | | | | |
| 1 | 48 | 47 | 31 | 18 | 23 | 7 | 0664230 | 0542316 | 1 | 48 | 47 | 29 | 34 | 9 | 7 | 0664410 | 0540516 |
| 14 | 6 | 11 | 24 | 33 | 45 | 42 | 1013465 | 6532426 | 23 | 5 | 6 | 14 | 46 | 42 | 39 | 3001655 | 1456363 |
| 34 | 30 | 22 | 4 | 41 | 29 | 15 | 4430542 | 5103500 | 26 | 28 | 37 | 12 | 18 | 35 | 19 | 3351242 | 4614364 |
| 40 | 38 | 37 | 25 | 13 | 12 | 10 | 5553111 | 4213542 | 40 | 30 | 33 | 25 | 17 | 20 | 10 | 5443221 | 4143252 |
| 35 | 21 | 9 | 46 | 28 | 20 | 16 | 4216322 | 6613651 | 31 | 15 | 32 | 38 | 13 | 22 | 24 | 4245133 | 2032502 |
| 8 | 5 | 17 | 26 | 39 | 44 | 36 | 1023565 | 0424310 | 11 | 8 | 4 | 36 | 44 | 45 | 27 | 1105663 | 3030125 |
| 43 | 27 | 32 | 19 | 3 | 2 | 49 | 6342006 | 0534216 | 43 | 41 | 16 | 21 | 3 | 2 | 49 | 6522006 | 0516216 |
| | 7/ | /D7i | | | | | | | 8/ | /D7i | | | | | | | |
| 1 | 48 | 47 | 29 | 33 | 12 | 5 | 0664410 | 0540444 | 1 | 48 | 47 | 29 | 33 | 12 | 5 | 0664410 | 0540444 |
| 28 | 6 | 4 | 18 | 43 | 39 | 37 | 3002655 | 6533031 | 15 | 7 | 9 | 22 | 46 | 40 | 36 | 2013655 | 0610340 |
| 20 | 23 | 34 | 14 | 19 | 41 | 24 | 2341253 | 5156452 | 32 | 31 | 27 | 6 | 16 | 39 | 24 | 4430253 | 3255132 |
| 42 | 40 | 35 | 25 | 15 | 10 | 8 | 5543211 | 6463020 | 42 | 30 | 37 | 25 | 13 | 20 | 8 | 5453121 | 6113550 |
| 26 | 9 | 31 | 36 | 16 | 27 | 30 | 3145234 | 4120151 | 26 | 11 | 34 | 44 | 23 | 19 | 18 | 3146322 | 4351143 |
| 13 | 11 | 7 | 32 | 46 | 44 | 22 | 1104663 | 5363310 | 14 | 10 | 4 | 28 | 41 | 43 | 35 | 1103564 | 6236506 |
| 45 | 38 | 17 | 21 | 3 | 2 | 49 | 6522006 | 2226216 | 45 | 38 | 17 | 21 | 3 | 2 | 49 | 6522006 | 2226216 |
| | 9/ | /D7i | | | | | | | 10/ | /D7i | | | | | | | |
| 1 | 48 | 47 | 29 | 30 | 16 | 4 | 0664420 | 0540113 | 1 | 48 | 47 | 29 | 26 | 15 | 9 | 0664321 | 0540401 |
| 17 | 5 | 9 | 31 | 37 | 36 | 40 | 2014555 | 2412104 | 18 | 5 | 11 | 12 | 43 | 44 | 42 | 2011665 | 3434016 |
| 32 | 28 | 15 | 11 | 23 | 42 | 24 | 4321353 | 3603162 | 31 | 28 | 37 | 4 | 34 | 27 | 14 | 4350431 | 2613556 |
| 43 | 38 | 44 | 25 | 6 | 12 | 7 | 6563010 | 0213546 | 40 | 30 | 33 | 25 | 17 | 20 | 10 | 5443221 | 4143252 |
| 26 | 8 | 27 | 39 | 35 | 22 | 18 | 3135432 | 4053603 | 36 | 23 | 16 | 46 | 13 | 22 | 19 | 5326132 | 0113504 |
| 10 | 14 | 13 | 19 | 41 | 45 | 33 | 1112564 | 2654524 | 8 | 6 | 7 | 38 | 39 | 45 | 32 | 1005564 | 0562323 |
| 46 | 34 | 20 | 21 | 3 | 2 | 49 | 6422006 | 3556216 | 41 | 35 | 24 | 21 | 3 | 2 | 49 | 5432006 | 5626216 |

In the case of order 7, there exist so many "Non-Euler Type" of solutions, say, far more than Complete Euler Type. Why! How embarrassing it is!

But we must accept the fact we have got all the solutions of Complete Euler Type of Simultaneous MS77: Both Self-complementary and Pan-diagonal as many as 3456.

In the case of higher orders than six, "Greco-Latinian Method" seems to be capable of composing only the rare and precious jewels among many kinds of magic squares.

#6. How about the Case of Pan-diagonal Magic Squares 7x7?

Can we compose 'Complete Euler Type' of Pan-diagonal MS77 in the same way?

Making any Pan-diagonal MS77 is one of the most difficult problems we have ever had. It really takes too long a time for us to count them up.

We have not yet known how many solutions of any type of Order 7 do really exist.

I myself used to try counting them up many times, but I gave it up every time, for it took too much energy to go on through. My computer seemed almost sleeping down.

I made up my mind to try counting them up again, since we have just got a new art of programming. Let's have a real challenge to make the Pan-diagonal Magic type.

Let's make and count only the fundamental type of solutions with $n_1=1$ then, for we can guess we may have too many solutions. Fortunately we know how to reconstruct

all the standard solutions of pan-diagonal MS77 from those fundamental ones.

#7. Program List for the Pan-diagonal Type

```
/** 'Complete Euler Squares' of Oder 7 for the Pan-diagonal Type: **
/** Compact List of Fundamental Solutions **
/** File: 'CEuler7PDF.c' Dictated by Kanji Setsuda **
/** on Mar.19, 2003; Revised on Feb.17, 2007; **
/** Recompiled on Feb.15, 2015 with MacOSX 10.10.2 and Xcode 6.1.1 **
//
#include <stdio.h>
//
/** Global Variables *
long int cnt, cnt2, cntr[3];
short cnt3;
short S6N, S62N;
short nm[50], uflg[50];
short anm[5][50];
short c11h[8], c11l[8], rw1h[8], rw1l[8], pd1h[8], pd1l[8], pb1h[8], pb1l[8];
short c12h[8], c12l[8], rw2h[8], rw2l[8], pd2h[8], pd2l[8], pb2h[8], pb2l[8];
short c13h[8], c13l[8], rw3h[8], rw3l[8], pd3h[8], pd3l[8], pb3h[8], pb3l[8];
short c14h[8], c14l[8], rw4h[8], rw4l[8], pd4h[8], pd4l[8], pb4h[8], pb4l[8];
short c15h[8], c15l[8], rw5h[8], rw5l[8], pd5h[8], pd5l[8], pb5h[8], pb5l[8];
short c16h[8], c16l[8], rw6h[8], rw6l[8], pd6h[8], pd6l[8], pb6h[8], pb6l[8];
short c17h[8], c17l[8], rw7h[8], rw7l[8], pd7h[8], pd7l[8], pb7h[8], pb7l[8];
//
/** Sub-Routiens *
void stp01(void), stp02(void), stp03(void), stp04(void);
void stp05(void), stp06(void), stp07(void), stp08(void);
void stp09(void), stp10(void), stp11(void), stp12(void);
void stp13(void), stp14(void), stp15(void), stp16(void);
void stp17(void), stp18(void), stp19(void), stp20(void);
void stp21(void), stp22(void), stp23(void), stp24(void);
void stp25(void), stp26(void), stp27(void), stp28(void);
void stp29(void), stp30(void), stp31(void), stp32(void);
void stp33(void), stp34(void), stp35(void), stp36(void);
void stp37(void), stp38(void), stp39(void), stp40(void);
void stp41(void), stp42(void), stp43(void), stp44(void);
void stp45(void), stp46(void), stp47(void), stp48(void);
void stp49(void), stp50(void), stp51(void), stp52(void);
void printans(void), print1p(void), print2p(void);
//
/** Main Program *
/** Reset All Memories and flags *
int main(){
short m,n;
printf("\n");
printf("** 'Complete Euler Squares' of Order 7 for the Pan-diagonal Type **\n");
printf(" ** Compact List of Fundamental Solutions **\n");
printf(" [Selecting Inequality Conditions: n1=1, n2>n7 and n2>n8>n43;]\n");
for(n=0;n<50;n++){nm[n]=0; uflg[n]=0;}
for(m=0;m<5;m++){for(n=0;n<50;n++){anm[m][n]=0;}}
for(n=0; n<7;n++){
c11h[n]=0; rw1h[n]=0; pd1h[n]=0; pb1h[n]=0;
c11l[n]=0; rw1l[n]=0; pd1l[n]=0; pb1l[n]=0;
c12h[n]=0; rw2h[n]=0; pd2h[n]=0; pb2h[n]=0;
c12l[n]=0; rw2l[n]=0; pd2l[n]=0; pb2l[n]=0;
c13h[n]=0; rw3h[n]=0; pd3h[n]=0; pb3h[n]=0;
c13l[n]=0; rw3l[n]=0; pd3l[n]=0; pb3l[n]=0;
c14h[n]=0; rw4h[n]=0; pd4h[n]=0; pb4h[n]=0;
c14l[n]=0; rw4l[n]=0; pd4l[n]=0; pb4l[n]=0;
c15h[n]=0; rw5h[n]=0; pd5h[n]=0; pb5h[n]=0;
c15l[n]=0; rw5l[n]=0; pd5l[n]=0; pb5l[n]=0;
c16h[n]=0; rw6h[n]=0; pd6h[n]=0; pb6h[n]=0;
c16l[n]=0; rw6l[n]=0; pd6l[n]=0; pb6l[n]=0;
```



```

        cl2l[b]=0; rw1l[b]=0; pd2l[b]=0; pb2l[b]=0;
        uflg[d]=0;}}
    }}
}
}
}
/* Set n3 *
void stp04(){
short a,b,d;
for(a=6;a>=0;a--){
if((cl3h[a]==0)&&(rw1h[a]==0)&&(pd3h[a]==0)&&(pb3h[a]==0)){
for(b=6;b>=0;b--){d=7*a+b;
if(uflg[d]==0){
if((cl3l[b]==0)&&(rw1l[b]==0)&&(pd3l[b]==0)&&(pb3l[b]==0)){
nm[3]=d; uflg[d]=1;
cl3h[a]=1; rw1h[a]=1; pd3h[a]=1; pb3h[a]=1;
cl3l[b]=1; rw1l[b]=1; pd3l[b]=1; pb3l[b]=1;
stp05();
cl3h[a]=0; rw1h[a]=0; pd3h[a]=0; pb3h[a]=0;
cl3l[b]=0; rw1l[b]=0; pd3l[b]=0; pb3l[b]=0;
uflg[d]=0;}}
}}}
}
}
}
/* Set n6 *
void stp05(){
short a,b,d;
for(a=0;a<7;a++){
if((cl6h[a]==0)&&(rw1h[a]==0)&&(pd6h[a]==0)&&(pb6h[a]==0)){
for(b=0;b<7;b++){d=7*a+b;
if(uflg[d]==0){
if((cl6l[b]==0)&&(rw1l[b]==0)&&(pd6l[b]==0)&&(pb6l[b]==0)){
nm[6]=d; uflg[d]=1;
cl6h[a]=1; rw1h[a]=1; pd6h[a]=1; pb6h[a]=1;
cl6l[b]=1; rw1l[b]=1; pd6l[b]=1; pb6l[b]=1;
stp06();
cl6h[a]=0; rw1h[a]=0; pd6h[a]=0; pb6h[a]=0;
cl6l[b]=0; rw1l[b]=0; pd6l[b]=0; pb6l[b]=0;
uflg[d]=0;}}
}}}
}
}
}
/* Set n5 *
void stp06(){
short a,b,d;
for(a=0;a<7;a++){
if((cl5h[a]==0)&&(rw1h[a]==0)&&(pd5h[a]==0)&&(pb5h[a]==0)){
for(b=0;b<7;b++){d=7*a+b;
if(uflg[d]==0){
if((cl5l[b]==0)&&(rw1l[b]==0)&&(pd5l[b]==0)&&(pb5l[b]==0)){
nm[5]=d; uflg[d]=1;
cl5h[a]=1; rw1h[a]=1; pd5h[a]=1; pb5h[a]=1;
cl5l[b]=1; rw1l[b]=1; pd5l[b]=1; pb5l[b]=1;
stp07();
cl5h[a]=0; rw1h[a]=0; pd5h[a]=0; pb5h[a]=0;
cl5l[b]=0; rw1l[b]=0; pd5l[b]=0; pb5l[b]=0;
uflg[d]=0;}}
}}}
}
}
}
/* Set n4 *
void stp07(){
short a,b,d;
for(a=6;a>=0;a--){
if((cl4h[a]==0)&&(rw1h[a]==0)&&(pd4h[a]==0)&&(pb4h[a]==0)){
for(b=6;b>=0;b--){d=7*a+b;

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        if((cl4l[b]==0)&&(rw1l[b]==0)&&(pd4l[b]==0)&&(pb4l[b]==0)){
            if(uflg[d]==0){
                nm[4]=d; uflg[d]=1;
                cl4h[a]=1; rw1h[a]=1; pd4h[a]=1; pb4h[a]=1;
                cl4l[b]=1; rw1l[b]=1; pd4l[b]=1; pb4l[b]=1;
                stp08();
                cl4h[a]=0; rw1h[a]=0; pd4h[a]=0; pb4h[a]=0;
                cl4l[b]=0; rw1l[b]=0; pd4l[b]=0; pb4l[b]=0;
                uflg[d]=0;}}
        }}
    }
}
/* Set n43 & n1<n43 *
void stp08(){
    short a,b,d;
    for(a=0;a<7;a++){
        if((cl1h[a]==0)&&(rw7h[a]==0)&&(pd2h[a]==0)&&(pb7h[a]==0)){
            for(b=0;b<7;b++){d=7*a+b;
                if((nm[1]<d)&&(uflg[d]==0)){
                    if((cl1l[b]==0)&&(rw7l[b]==0)&&(pd2l[b]==0)&&(pb7l[b]==0)){
                        nm[43]=d; uflg[d]=1;
                        cl1h[a]=1; rw7h[a]=1; pd2h[a]=1; pb7h[a]=1;
                        cl1l[b]=1; rw7l[b]=1; pd2l[b]=1; pb7l[b]=1;
                        stp09();
                        cl1h[a]=0; rw7h[a]=0; pd2h[a]=0; pb7h[a]=0;
                        cl1l[b]=0; rw7l[b]=0; pd2l[b]=0; pb7l[b]=0;
                        uflg[d]=0;}}}
                }}
        }
}
/* Set n8 & (n2>n8)&(n8>n43) *
void stp09(){
    short a,b,d;
    for(a=6;a>=0;a--){
        if((cl1h[a]==0)&&(rw2h[a]==0)&&(pd7h[a]==0)&&(pb2h[a]==0)){
            for(b=6;b>=0;b--){d=7*a+b;
                if((nm[2]>d)&&(d>nm[43])&&(uflg[d]==0)){
                    if((cl1l[b]==0)&&(rw2l[b]==0)&&(pd7l[b]==0)&&(pb2l[b]==0)){
                        nm[8]=d; uflg[d]=1;
                        cl1h[a]=1; rw2h[a]=1; pd7h[a]=1; pb2h[a]=1;
                        cl1l[b]=1; rw2l[b]=1; pd7l[b]=1; pb2l[b]=1;
                        stp10();
                        cl1h[a]=0; rw2h[a]=0; pd7h[a]=0; pb2h[a]=0;
                        cl1l[b]=0; rw2l[b]=0; pd7l[b]=0; pb2l[b]=0;
                        uflg[d]=0;}}}
                }}
        }
}
/* Set n15 *
void stp10(){
    short a,b,d;
    for(a=0;a<7;a++){
        if((cl1h[a]==0)&&(rw3h[a]==0)&&(pd6h[a]==0)&&(pb3h[a]==0)){
            for(b=0;b<7;b++){d=7*a+b;
                if(uflg[d]==0){
                    if((cl1l[b]==0)&&(rw3l[b]==0)&&(pd6l[b]==0)&&(pb3l[b]==0)){
                        nm[15]=d; uflg[d]=1;
                        cl1h[a]=1; rw3h[a]=1; pd6h[a]=1; pb3h[a]=1;
                        cl1l[b]=1; rw3l[b]=1; pd6l[b]=1; pb3l[b]=1;
                        stp11();
                        cl1h[a]=0; rw3h[a]=0; pd6h[a]=0; pb3h[a]=0;
                        cl1l[b]=0; rw3l[b]=0; pd6l[b]=0; pb3l[b]=0;
                        uflg[d]=0;}}}
                }}
        }
}

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}
/** Set n36 *
void stp11(){
short a,b,d;
for(a=6;a>=0;a--){
if((c11h[a]==0)&&(rw6h[a]==0)&&(pd3h[a]==0)&&(pb6h[a]==0)){
for(b=6;b>=0;b--){d=7*a+b;
if(uflg[d]==0){
if((c11l[b]==0)&&(rw6l[b]==0)&&(pd3l[b]==0)&&(pb6l[b]==0)){
nm[36]=d; uflg[d]=1;
c11h[a]=1; rw6h[a]=1; pd3h[a]=1; pb6h[a]=1;
c11l[b]=1; rw6l[b]=1; pd3l[b]=1; pb6l[b]=1;
stp12();
c11h[a]=0; rw6h[a]=0; pd3h[a]=0; pb6h[a]=0;
c11l[b]=0; rw6l[b]=0; pd3l[b]=0; pb6l[b]=0;
uflg[d]=0;}}
}}
}
}
/** Set n29 *
void stp12(){
short a,b,d;
for(a=6;a>=0;a--){
if((c11h[a]==0)&&(rw5h[a]==0)&&(pd4h[a]==0)&&(pb5h[a]==0)){
for(b=6;b>=0;b--){d=7*a+b;
if(uflg[d]==0){
if((c11l[b]==0)&&(rw5l[b]==0)&&(pd4l[b]==0)&&(pb5l[b]==0)){
nm[29]=d; uflg[d]=1;
c11h[a]=1; rw5h[a]=1; pd4h[a]=1; pb5h[a]=1;
c11l[b]=1; rw5l[b]=1; pd4l[b]=1; pb5l[b]=1;
stp13();
c11h[a]=0; rw5h[a]=0; pd4h[a]=0; pb5h[a]=0;
c11l[b]=0; rw5l[b]=0; pd4l[b]=0; pb5l[b]=0;
uflg[d]=0;}}
}}
}
}
/** Set n22 *
void stp13(){
short a,b,d;
for(a=0;a<7;a++){
if((c11h[a]==0)&&(rw4h[a]==0)&&(pd5h[a]==0)&&(pb4h[a]==0)){
for(b=0;b<7;b++){d=7*a+b;
if((c11l[b]==0)&&(rw4l[b]==0)&&(pd5l[b]==0)&&(pb4l[b]==0)){
if(uflg[d]==0){
nm[22]=d; uflg[d]=1;
c11h[a]=1; rw4h[a]=1; pd5h[a]=1; pb4h[a]=1;
c11l[b]=1; rw4l[b]=1; pd5l[b]=1; pb4l[b]=1;
stp14();
c11h[a]=0; rw4h[a]=0; pd5h[a]=0; pb4h[a]=0;
c11l[b]=0; rw4l[b]=0; pd5l[b]=0; pb4l[b]=0;
uflg[d]=0;}}
}}
}
}
/** Set n49 & n1<n49 *
void stp14(){
short a,b,d;
for(a=6;a>=0;a--){
if((c17h[a]==0)&&(rw7h[a]==0)&&(pd1h[a]==0)&&(pb6h[a]==0)){
for(b=6;b>=0;b--){d=7*a+b;
if((nm[1]<d)&&(uflg[d]==0)){
if((c17l[b]==0)&&(rw7l[b]==0)&&(pd1l[b]==0)&&(pb6l[b]==0)){
nm[49]=d; uflg[d]=1;
c17h[a]=1; rw7h[a]=1; pd1h[a]=1; pb6h[a]=1;

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        c17l[b]=1; rw7l[b]=1; pd1l[b]=1; pb6l[b]=1;
        stp15();
        c17h[a]=0; rw7h[a]=0; pd1h[a]=0; pb6h[a]=0;
        c17l[b]=0; rw7l[b]=0; pd1l[b]=0; pb6l[b]=0;
        uflg[d]=0;}}
    }}
}
}
/** Set n14 *
void stp15(){
    short a,b,d;
    for(a=6;a>=0;a--){
        if((c17h[a]==0)&&(rw2h[a]==0)&&(pd6h[a]==0)&&(pb1h[a]==0)){
            for(b=6;b>=0;b--){d=7*a+b;
                if(uflg[d]==0){
                    if((c17l[b]==0)&&(rw2l[b]==0)&&(pd6l[b]==0)&&(pb1l[b]==0)){
                        nm[14]=d; uflg[d]=1;
                        c17h[a]=1; rw2h[a]=1; pd6h[a]=1; pb1h[a]=1;
                        c17l[b]=1; rw2l[b]=1; pd6l[b]=1; pb1l[b]=1;
                        stp16();
                        c17h[a]=0; rw2h[a]=0; pd6h[a]=0; pb1h[a]=0;
                        c17l[b]=0; rw2l[b]=0; pd6l[b]=0; pb1l[b]=0;
                        uflg[d]=0;}}
                    }}
            }
        }
}
/** Set n21 *
void stp16(){
    short a,b,d;
    for(a=0;a<7;a++){
        if((c17h[a]==0)&&(rw3h[a]==0)&&(pd5h[a]==0)&&(pb2h[a]==0)){
            for(b=0;b<7;b++){d=7*a+b;
                if(uflg[d]==0){
                    if((c17l[b]==0)&&(rw3l[b]==0)&&(pd5l[b]==0)&&(pb2l[b]==0)){
                        nm[21]=d; uflg[d]=1;
                        c17h[a]=1; rw3h[a]=1; pd5h[a]=1; pb2h[a]=1;
                        c17l[b]=1; rw3l[b]=1; pd5l[b]=1; pb2l[b]=1;
                        stp17();
                        c17h[a]=0; rw3h[a]=0; pd5h[a]=0; pb2h[a]=0;
                        c17l[b]=0; rw3l[b]=0; pd5l[b]=0; pb2l[b]=0;
                        uflg[d]=0;}}
                    }}
            }
        }
}
/** Set n42 *
void stp17(){
    short a,b,d;
    for(a=0;a<7;a++){
        if((c17h[a]==0)&&(rw6h[a]==0)&&(pd2h[a]==0)&&(pb5h[a]==0)){
            for(b=0;b<7;b++){d=7*a+b;
                if(uflg[d]==0){
                    if((c17l[b]==0)&&(rw6l[b]==0)&&(pd2l[b]==0)&&(pb5l[b]==0)){
                        nm[42]=d; uflg[d]=1;
                        c17h[a]=1; rw6h[a]=1; pd2h[a]=1; pb5h[a]=1;
                        c17l[b]=1; rw6l[b]=1; pd2l[b]=1; pb5l[b]=1;
                        stp18();
                        c17h[a]=0; rw6h[a]=0; pd2h[a]=0; pb5h[a]=0;
                        c17l[b]=0; rw6l[b]=0; pd2l[b]=0; pb5l[b]=0;
                        uflg[d]=0;}}
                    }}
            }
        }
}
}
/** Set n35 *
void stp18(){
    short a,b,d;

```



```

for(a=0;a<7;a++){
  if((c17h[a]==0)&&(rw5h[a]==0)&&(pd3h[a]==0)&&(pb4h[a]==0)){
    for(b=0;b<7;b++){d=7*a+b;
      if(uflg[d]==0){
        if((c17l[b]==0)&&(rw5l[b]==0)&&(pd3l[b]==0)&&(pb4l[b]==0)){
          nm[35]=d; uflg[d]=1;
          c17h[a]=1; rw5h[a]=1; pd3h[a]=1; pb4h[a]=1;
          c17l[b]=1; rw5l[b]=1; pd3l[b]=1; pb4l[b]=1;
          stp19();
          c17h[a]=0; rw5h[a]=0; pd3h[a]=0; pb4h[a]=0;
          c17l[b]=0; rw5l[b]=0; pd3l[b]=0; pb4l[b]=0;
          uflg[d]=0;}}
        }}
    }
}
/* Set n28 *
void stp19(){
  short a,b,d;
  for(a=0;a<7;a++){
    if((c17h[a]==0)&&(rw4h[a]==0)&&(pd4h[a]==0)&&(pb3h[a]==0)){
      for(b=0;b<7;b++){d=7*a+b;
        if((c17l[b]==0)&&(rw4l[b]==0)&&(pd4l[b]==0)&&(pb3l[b]==0)){
          if(uflg[d]==0){
            nm[28]=d; uflg[d]=1;
            c17h[a]=1; rw4h[a]=1; pd4h[a]=1; pb3h[a]=1;
            c17l[b]=1; rw4l[b]=1; pd4l[b]=1; pb3l[b]=1;
            stp20();
            c17h[a]=0; rw4h[a]=0; pd4h[a]=0; pb3h[a]=0;
            c17l[b]=0; rw4l[b]=0; pd4l[b]=0; pb3l[b]=0;
            uflg[d]=0;}}
          }}
    }
}
/* Set n44 *
void stp20(){
  short a,b,d;
  for(a=0;a<7;a++){
    if((c12h[a]==0)&&(rw7h[a]==0)&&(pd3h[a]==0)&&(pb1h[a]==0)){
      for(b=0;b<7;b++){d=7*a+b;
        if(uflg[d]==0){
          if((c12l[b]==0)&&(rw7l[b]==0)&&(pd3l[b]==0)&&(pb1l[b]==0)){
            nm[44]=d; uflg[d]=1;
            c12h[a]=1; rw7h[a]=1; pd3h[a]=1; pb1h[a]=1;
            c12l[b]=1; rw7l[b]=1; pd3l[b]=1; pb1l[b]=1;
            stp21();
            c12h[a]=0; rw7h[a]=0; pd3h[a]=0; pb1h[a]=0;
            c12l[b]=0; rw7l[b]=0; pd3l[b]=0; pb1l[b]=0;
            uflg[d]=0;}}
          }}
    }
}
/* Set n45 *
void stp21(){
  short a,b,d;
  for(a=0;a<7;a++){
    if((c13h[a]==0)&&(rw7h[a]==0)&&(pd4h[a]==0)&&(pb2h[a]==0)){
      for(b=0;b<7;b++){d=7*a+b;
        if(uflg[d]==0){
          if((c13l[b]==0)&&(rw7l[b]==0)&&(pd4l[b]==0)&&(pb2l[b]==0)){
            nm[45]=d; uflg[d]=1;
            c13h[a]=1; rw7h[a]=1; pd4h[a]=1; pb2h[a]=1;
            c13l[b]=1; rw7l[b]=1; pd4l[b]=1; pb2l[b]=1;
            stp22();
            c13h[a]=0; rw7h[a]=0; pd4h[a]=0; pb2h[a]=0;
            c13l[b]=0; rw7l[b]=0; pd4l[b]=0; pb2l[b]=0;

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        uflg[d]=0;}}
    }}
}
}
}
/* Set n48 *
void stp22(){
short a,b,d;
for(a=0;a<7;a++){
if((c16h[a]==0)&&(rw7h[a]==0)&&(pd7h[a]==0)&&(pb5h[a]==0)){
for(b=0;b<7;b++){d=7*a+b;
if(uflg[d]==0){
if((c16l[b]==0)&&(rw7l[b]==0)&&(pd7l[b]==0)&&(pb5l[b]==0)){
nm[48]=d; uflg[d]=1;
c16h[a]=1; rw7h[a]=1; pd7h[a]=1; pb5h[a]=1;
c16l[b]=1; rw7l[b]=1; pd7l[b]=1; pb5l[b]=1;
stp23();
c16h[a]=0; rw7h[a]=0; pd7h[a]=0; pb5h[a]=0;
c16l[b]=0; rw7l[b]=0; pd7l[b]=0; pb5l[b]=0;
uflg[d]=0;}}}
}}
}
}
}
/* Set n47 *
void stp23(){
short a,b,d;
for(a=0;a<7;a++){
if((c15h[a]==0)&&(rw7h[a]==0)&&(pd6h[a]==0)&&(pb4h[a]==0)){
for(b=0;b<7;b++){d=7*a+b;
if((c15l[b]==0)&&(rw7l[b]==0)&&(pd6l[b]==0)&&(pb4l[b]==0)){
if(uflg[d]==0){
nm[47]=d; uflg[d]=1;
c15h[a]=1; rw7h[a]=1; pd6h[a]=1; pb4h[a]=1;
c15l[b]=1; rw7l[b]=1; pd6l[b]=1; pb4l[b]=1;
stp24();
c15h[a]=0; rw7h[a]=0; pd6h[a]=0; pb4h[a]=0;
c15l[b]=0; rw7l[b]=0; pd6l[b]=0; pb4l[b]=0;
uflg[d]=0;}}}
}}
}
}
}
/* Set n46 *
void stp24(){
short a,b,d;
for(a=0;a<7;a++){
if((c14h[a]==0)&&(rw7h[a]==0)&&(pd5h[a]==0)&&(pb3h[a]==0)){
for(b=0;b<7;b++){d=7*a+b;
if((c14l[b]==0)&&(rw7l[b]==0)&&(pd5l[b]==0)&&(pb3l[b]==0)){
if(uflg[d]==0){
nm[46]=d; uflg[d]=1;
c14h[a]=1; rw7h[a]=1; pd5h[a]=1; pb3h[a]=1;
c14l[b]=1; rw7l[b]=1; pd5l[b]=1; pb3l[b]=1;
stp25();
c14h[a]=0; rw7h[a]=0; pd5h[a]=0; pb3h[a]=0;
c14l[b]=0; rw7l[b]=0; pd5l[b]=0; pb3l[b]=0;
uflg[d]=0;}}}
}}
}
}
}
/* Level #2: *
/* Set n9 *
void stp25(){
short a,b,d;
for(a=0;a<7;a++){
if((c12h[a]==0)&&(rw2h[a]==0)&&(pd1h[a]==0)&&(pb3h[a]==0)){
for(b=0;b<7;b++){d=7*a+b;

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        if(uflg[d]==0){
            if((cl2l[b]==0)&&(rw2l[b]==0)&&(pd1l[b]==0)&&(pb3l[b]==0)){
                nm[9]=d; uflg[d]=1;
                S6N=nm[1]+nm[2]+nm[3]+nm[8]+nm[9]+nm[15];
                cl2h[a]=1; rw2h[a]=1; pd1h[a]=1; pb3h[a]=1;
                cl2l[b]=1; rw2l[b]=1; pd1l[b]=1; pb3l[b]=1;
                stp26();
                cl2h[a]=0; rw2h[a]=0; pd1h[a]=0; pb3h[a]=0;
                cl2l[b]=0; rw2l[b]=0; pd1l[b]=0; pb3l[b]=0;
                uflg[d]=0;}}
        }}
    }
}
/* Set n41 *
void stp26(){
    short a,b,d;
    for(a=6;a>=0;a--){
        if((cl6h[a]==0)&&(rw6h[a]==0)&&(pd1h[a]==0)&&(pb4h[a]==0)){
            for(b=6;b>=0;b--){d=7*a+b;
                if((nm[35]+d+nm[42]+nm[47]+nm[48]+nm[49]==S6N)&&(uflg[d]==0)){
                    if((cl6l[b]==0)&&(rw6l[b]==0)&&(pd1l[b]==0)&&(pb4l[b]==0)){
                        nm[41]=d; uflg[d]=1;
                        cl6h[a]=1; rw6h[a]=1; pd1h[a]=1; pb4h[a]=1;
                        cl6l[b]=1; rw6l[b]=1; pd1l[b]=1; pb4l[b]=1;
                        stp27();
                        cl6h[a]=0; rw6h[a]=0; pd1h[a]=0; pb4h[a]=0;
                        cl6l[b]=0; rw6l[b]=0; pd1l[b]=0; pb4l[b]=0;
                        uflg[d]=0;}}
                    }}
            }
        }
}
/* Set n13 *
void stp27(){
    short a,b,d;
    for(a=0;a<7;a++){
        if((cl6h[a]==0)&&(rw2h[a]==0)&&(pd5h[a]==0)&&(pb7h[a]==0)){
            for(b=0;b<7;b++){d=7*a+b;
                if(uflg[d]==0){
                    if((cl6l[b]==0)&&(rw2l[b]==0)&&(pd5l[b]==0)&&(pb7l[b]==0)){
                        nm[13]=d; uflg[d]=1;
                        S62N=nm[5]+nm[6]+nm[7]+nm[13]+nm[14]+nm[21];
                        cl6h[a]=1; rw2h[a]=1; pd5h[a]=1; pb7h[a]=1;
                        cl6l[b]=1; rw2l[b]=1; pd5l[b]=1; pb7l[b]=1;
                        stp28();
                        cl6h[a]=0; rw2h[a]=0; pd5h[a]=0; pb7h[a]=0;
                        cl6l[b]=0; rw2l[b]=0; pd5l[b]=0; pb7l[b]=0;
                        uflg[d]=0;}}
                    }}
            }
        }
}
/* Set n37 *
void stp28(){
    short a,b,d;
    for(a=0;a<7;a++){
        if((cl2h[a]==0)&&(rw6h[a]==0)&&(pd4h[a]==0)&&(pb7h[a]==0)){
            for(b=0;b<7;b++){d=7*a+b;
                if((cl2l[b]==0)&&(rw6l[b]==0)&&(pd4l[b]==0)&&(pb7l[b]==0)){
                    if((nm[29]+nm[36]+d+nm[43]+nm[44]+nm[45]==S62N)&&(uflg[d]==0)){
                        nm[37]=d; uflg[d]=1;
                        cl2h[a]=1; rw6h[a]=1; pd4h[a]=1; pb7h[a]=1;
                        cl2l[b]=1; rw6l[b]=1; pd4l[b]=1; pb7l[b]=1;
                        stp29();
                        cl2h[a]=0; rw6h[a]=0; pd4h[a]=0; pb7h[a]=0;
                        cl2l[b]=0; rw6l[b]=0; pd4l[b]=0; pb7l[b]=0;
                        uflg[d]=0;}}
                    }}
            }
        }
}

```



```

        nm[11]=d; uflg[d]=1;
        cl4h[a]=1; rw2h[a]=1; pd3h[a]=1; pb5h[a]=1;
        cl4l[b]=1; rw2l[b]=1; pd3l[b]=1; pb5l[b]=1;
        stp33();
        cl4h[a]=0; rw2h[a]=0; pd3h[a]=0; pb5h[a]=0;
        cl4l[b]=0; rw2l[b]=0; pd3l[b]=0; pb5l[b]=0;
        uflg[d]=0;}}
    }}
}
}
/* Set n20 *
void stp33(){
short a,b,d;
for(a=0;a<7;a++){
if((cl6h[a]==0)&&(rw3h[a]==0)&&(pd4h[a]==0)&&(pb1h[a]==0)){
for(b=0;b<7;b++){d=7*a+b;
if((cl6l[b]==0)&&(rw3l[b]==0)&&(pd4l[b]==0)&&(pb1l[b]==0)){
if(uflg[d]==0){
nm[20]=d; uflg[d]=1;
cl6h[a]=1; rw3h[a]=1; pd4h[a]=1; pb1h[a]=1;
cl6l[b]=1; rw3l[b]=1; pd4l[b]=1; pb1l[b]=1;
stp34();
cl6h[a]=0; rw3h[a]=0; pd4h[a]=0; pb1h[a]=0;
cl6l[b]=0; rw3l[b]=0; pd4l[b]=0; pb1l[b]=0;
uflg[d]=0;}}
}}
}
}
/* Set n30 *
void stp34(){
short a,b,d;
for(a=0;a<7;a++){
if((cl2h[a]==0)&&(rw5h[a]==0)&&(pd5h[a]==0)&&(pb6h[a]==0)){
for(b=0;b<7;b++){d=7*a+b;
if(uflg[d]==0){
if((cl2l[b]==0)&&(rw5l[b]==0)&&(pd5l[b]==0)&&(pb6l[b]==0)){
nm[30]=d; uflg[d]=1;
cl2h[a]=1; rw5h[a]=1; pd5h[a]=1; pb6h[a]=1;
cl2l[b]=1; rw5l[b]=1; pd5l[b]=1; pb6l[b]=1;
stp35();
cl2h[a]=0; rw5h[a]=0; pd5h[a]=0; pb6h[a]=0;
cl2l[b]=0; rw5l[b]=0; pd5l[b]=0; pb6l[b]=0;
uflg[d]=0;}}
}}
}
}
/* Set n23 *
void stp35(){
short a,b,d;
for(a=0;a<7;a++){
if((cl2h[a]==0)&&(rw4h[a]==0)&&(pd6h[a]==0)&&(pb5h[a]==0)){
for(b=0;b<7;b++){d=7*a+b;
if((cl2l[b]==0)&&(rw4l[b]==0)&&(pd6l[b]==0)&&(pb5l[b]==0)){
if(uflg[d]==0){
nm[23]=d; uflg[d]=1;
cl2h[a]=1; rw4h[a]=1; pd6h[a]=1; pb5h[a]=1;
cl2l[b]=1; rw4l[b]=1; pd6l[b]=1; pb5l[b]=1;
stp36();
cl2h[a]=0; rw4h[a]=0; pd6h[a]=0; pb5h[a]=0;
cl2l[b]=0; rw4l[b]=0; pd6l[b]=0; pb5l[b]=0;
uflg[d]=0;}}
}}
}
}
/* Set n17 *

```

```

void stp36(){
short a,b,d;
for(a=0;a<7;a++){
if((c13h[a]==0)&&(rw3h[a]==0)&&(pd1h[a]==0)&&(pb5h[a]==0)){
for(b=0;b<7;b++){d=7*a+b;
if((c13l[b]==0)&&(rw3l[b]==0)&&(pd1l[b]==0)&&(pb5l[b]==0)){
if(uflg[d]==0){
nm[17]=d; uflg[d]=1;
c13h[a]=1; rw3h[a]=1; pd1h[a]=1; pb5h[a]=1;
c13l[b]=1; rw3l[b]=1; pd1l[b]=1; pb5l[b]=1;
stp37();
c13h[a]=0; rw3h[a]=0; pd1h[a]=0; pb5h[a]=0;
c13l[b]=0; rw3l[b]=0; pd1l[b]=0; pb5l[b]=0;
uflg[d]=0;}}
}}
}
}
/* Set n38 *
void stp37(){
short a,b,d;
for(a=0;a<7;a++){
if((c13h[a]==0)&&(rw6h[a]==0)&&(pd5h[a]==0)&&(pb1h[a]==0)){
for(b=0;b<7;b++){d=7*a+b;
if((c13l[b]==0)&&(rw6l[b]==0)&&(pd5l[b]==0)&&(pb1l[b]==0)){
if(uflg[d]==0){
nm[38]=d; uflg[d]=1;
c13h[a]=1; rw6h[a]=1; pd5h[a]=1; pb1h[a]=1;
c13l[b]=1; rw6l[b]=1; pd5l[b]=1; pb1l[b]=1;
stp38();
c13h[a]=0; rw6h[a]=0; pd5h[a]=0; pb1h[a]=0;
c13l[b]=0; rw6l[b]=0; pd5l[b]=0; pb1l[b]=0;
uflg[d]=0;}}
}}
}
}
/* Set n19 *
void stp38(){
short a,b,d;
for(a=0;a<7;a++){
if((c15h[a]==0)&&(rw3h[a]==0)&&(pd3h[a]==0)&&(pb7h[a]==0)){
for(b=0;b<7;b++){d=7*a+b;
if(uflg[d]==0){
if((c15l[b]==0)&&(rw3l[b]==0)&&(pd3l[b]==0)&&(pb7l[b]==0)){
nm[19]=d; uflg[d]=1;
c15h[a]=1; rw3h[a]=1; pd3h[a]=1; pb7h[a]=1;
c15l[b]=1; rw3l[b]=1; pd3l[b]=1; pb7l[b]=1;
stp39();
c15h[a]=0; rw3h[a]=0; pd3h[a]=0; pb7h[a]=0;
c15l[b]=0; rw3l[b]=0; pd3l[b]=0; pb7l[b]=0;
uflg[d]=0;}}
}}
}
}
/* Set n18 *
void stp39(){
short a,b,d;
for(a=0;a<7;a++){
if((c14h[a]==0)&&(rw3h[a]==0)&&(pd2h[a]==0)&&(pb6h[a]==0)){
for(b=0;b<7;b++){d=7*a+b;
if((c14l[b]==0)&&(rw3l[b]==0)&&(pd2l[b]==0)&&(pb6l[b]==0)){
if(uflg[d]==0){
nm[18]=d; uflg[d]=1;
c14h[a]=1; rw3h[a]=1; pd2h[a]=1; pb6h[a]=1;
c14l[b]=1; rw3l[b]=1; pd2l[b]=1; pb6l[b]=1;
stp40();
}
}
}
}
}

```

```

        c14h[a]=0; rw3h[a]=0; pd2h[a]=0; pb6h[a]=0;
        c14l[b]=0; rw3l[b]=0; pd2l[b]=0; pb6l[b]=0;
        uflg[d]=0;}}
    }}
}
}
/* Set n24 *
void stp40(){
    short a,b,d;
    for(a=0;a<7;a++){
        if((c13h[a]==0)&&(rw4h[a]==0)&&(pd7h[a]==0)&&(pb6h[a]==0)){
            for(b=0;b<7;b++){d=7*a+b;
                if((c13l[b]==0)&&(rw4l[b]==0)&&(pd7l[b]==0)&&(pb6l[b]==0)){
                    if(uflg[d]==0){
                        nm[24]=d; uflg[d]=1;
                        c13h[a]=1; rw4h[a]=1; pd7h[a]=1; pb6h[a]=1;
                        c13l[b]=1; rw4l[b]=1; pd7l[b]=1; pb6l[b]=1;
                        stp41();
                        c13h[a]=0; rw4h[a]=0; pd7h[a]=0; pb6h[a]=0;
                        c13l[b]=0; rw4l[b]=0; pd7l[b]=0; pb6l[b]=0;
                        uflg[d]=0;}}
                }}
            }
        }
}
/* Set n27 *
void stp41(){
    short a,b,d;
    for(a=0;a<7;a++){
        if((c16h[a]==0)&&(rw4h[a]==0)&&(pd3h[a]==0)&&(pb2h[a]==0)){
            for(b=0;b<7;b++){d=7*a+b;
                if((c16l[b]==0)&&(rw4l[b]==0)&&(pd3l[b]==0)&&(pb2l[b]==0)){
                    if(uflg[d]==0){
                        nm[27]=d; uflg[d]=1;
                        c16h[a]=1; rw4h[a]=1; pd3h[a]=1; pb2h[a]=1;
                        c16l[b]=1; rw4l[b]=1; pd3l[b]=1; pb2l[b]=1;
                        stp42();
                        c16h[a]=0; rw4h[a]=0; pd3h[a]=0; pb2h[a]=0;
                        c16l[b]=0; rw4l[b]=0; pd3l[b]=0; pb2l[b]=0;
                        uflg[d]=0;}}
                }}
            }
        }
}
/* Set n31 *
void stp42(){
    short a,b,d;
    for(a=0;a<7;a++){
        if((c13h[a]==0)&&(rw5h[a]==0)&&(pd6h[a]==0)&&(pb7h[a]==0)){
            for(b=0;b<7;b++){d=7*a+b;
                if((c13l[b]==0)&&(rw5l[b]==0)&&(pd6l[b]==0)&&(pb7l[b]==0)){
                    if(uflg[d]==0){
                        nm[31]=d; uflg[d]=1;
                        c13h[a]=1; rw5h[a]=1; pd6h[a]=1; pb7h[a]=1;
                        c13l[b]=1; rw5l[b]=1; pd6l[b]=1; pb7l[b]=1;
                        stp43();
                        c13h[a]=0; rw5h[a]=0; pd6h[a]=0; pb7h[a]=0;
                        c13l[b]=0; rw5l[b]=0; pd6l[b]=0; pb7l[b]=0;
                        uflg[d]=0;}}
                }}
            }
        }
}
}
/* Set n25 *
void stp43(){
    short a,b,d;
    for(a=0;a<7;a++){
        if((c14h[a]==0)&&(rw4h[a]==0)&&(pd1h[a]==0)&&(pb7h[a]==0)){

```

```

    for(b=0;b<7;b++){d=7*a+b;
      if((c14l[b]==0)&&(rw4l[b]==0)&&(pd1l[b]==0)&&(pb7l[b]==0)){
        if(uflg[d]==0){
          nm[25]=d; uflg[d]=1;
          c14h[a]=1; rw4h[a]=1; pd1h[a]=1; pb7h[a]=1;
          c14l[b]=1; rw4l[b]=1; pd1l[b]=1; pb7l[b]=1;
          stp44();
          c14h[a]=0; rw4h[a]=0; pd1h[a]=0; pb7h[a]=0;
          c14l[b]=0; rw4l[b]=0; pd1l[b]=0; pb7l[b]=0;
          uflg[d]=0;}}
    }
  }
}
/* Set n26 *
void stp44(){
  short a,b,d;
  for(a=0;a<7;a++){
    if((c15h[a]==0)&&(rw4h[a]==0)&&(pd2h[a]==0)&&(pb1h[a]==0)){
      for(b=0;b<7;b++){d=7*a+b;
        if((c15l[b]==0)&&(rw4l[b]==0)&&(pd2l[b]==0)&&(pb1l[b]==0)){
          if(uflg[d]==0){
            nm[26]=d; uflg[d]=1;
            c15h[a]=1; rw4h[a]=1; pd2h[a]=1; pb1h[a]=1;
            c15l[b]=1; rw4l[b]=1; pd2l[b]=1; pb1l[b]=1;
            stp45();
            c15h[a]=0; rw4h[a]=0; pd2h[a]=0; pb1h[a]=0;
            c15l[b]=0; rw4l[b]=0; pd2l[b]=0; pb1l[b]=0;
            uflg[d]=0;}}
        }
      }
    }
}
/* Set n32 *
void stp45(){
  short a,b,d;
  for(a=0;a<7;a++){
    if((c14h[a]==0)&&(rw5h[a]==0)&&(pd7h[a]==0)&&(pb1h[a]==0)){
      for(b=0;b<7;b++){d=7*a+b;
        if((c14l[b]==0)&&(rw5l[b]==0)&&(pd7l[b]==0)&&(pb1l[b]==0)){
          if(uflg[d]==0){
            nm[32]=d; uflg[d]=1;
            c14h[a]=1; rw5h[a]=1; pd7h[a]=1; pb1h[a]=1;
            c14l[b]=1; rw5l[b]=1; pd7l[b]=1; pb1l[b]=1;
            stp46();
            c14h[a]=0; rw5h[a]=0; pd7h[a]=0; pb1h[a]=0;
            c14l[b]=0; rw5l[b]=0; pd7l[b]=0; pb1l[b]=0;
            uflg[d]=0;}}
        }
      }
    }
}
/* Set n34 *
void stp46(){
  short a,b,d;
  for(a=0;a<7;a++){
    if((c16h[a]==0)&&(rw5h[a]==0)&&(pd2h[a]==0)&&(pb3h[a]==0)){
      for(b=0;b<7;b++){d=7*a+b;
        if((c16l[b]==0)&&(rw5l[b]==0)&&(pd2l[b]==0)&&(pb3l[b]==0)){
          if(uflg[d]==0){
            nm[34]=d; uflg[d]=1;
            c16h[a]=1; rw5h[a]=1; pd2h[a]=1; pb3h[a]=1;
            c16l[b]=1; rw5l[b]=1; pd2l[b]=1; pb3l[b]=1;
            stp47();
            c16h[a]=0; rw5h[a]=0; pd2h[a]=0; pb3h[a]=0;
            c16l[b]=0; rw5l[b]=0; pd2l[b]=0; pb3l[b]=0;
            uflg[d]=0;}}
        }
      }
    }
}

```



```

}
}
}
/** Set n33 *
void stp47(){
short a,b,d;
for(a=6;a>=0;a--){
if((c15h[a]==0)&&(rw5h[a]==0)&&(pd1h[a]==0)&&(pb2h[a]==0)){
for(b=6;b>=0;b--){d=7*a+b;
if((c15l[b]==0)&&(rw5l[b]==0)&&(pd1l[b]==0)&&(pb2l[b]==0)){
if(uflg[d]==0){
nm[33]=d; uflg[d]=1;
c15h[a]=1; rw5h[a]=1; pd1h[a]=1; pb2h[a]=1;
c15l[b]=1; rw5l[b]=1; pd1l[b]=1; pb2l[b]=1;
stp48();
c15h[a]=0; rw5h[a]=0; pd1h[a]=0; pb2h[a]=0;
c15l[b]=0; rw5l[b]=0; pd1l[b]=0; pb2l[b]=0;
uflg[d]=0;}}
}}
}
}
/** Set n39 *
void stp48(){
short a,b,d;
for(a=0;a<7;a++){
if((c14h[a]==0)&&(rw6h[a]==0)&&(pd6h[a]==0)&&(pb2h[a]==0)){
for(b=0;b<7;b++){d=7*a+b;
if((c14l[b]==0)&&(rw6l[b]==0)&&(pd6l[b]==0)&&(pb2l[b]==0)){
if(uflg[d]==0){
nm[39]=d; uflg[d]=1;
c14h[a]=1; rw6h[a]=1; pd6h[a]=1; pb2h[a]=1;
c14l[b]=1; rw6l[b]=1; pd6l[b]=1; pb2l[b]=1;
stp49();
c14h[a]=0; rw6h[a]=0; pd6h[a]=0; pb2h[a]=0;
c14l[b]=0; rw6l[b]=0; pd6l[b]=0; pb2l[b]=0;
uflg[d]=0;}}
}}
}
}
}
/** Set n40 *
void stp49(){
short a,b,d;
for(a=0;a<7;a++){
if((c15h[a]==0)&&(rw6h[a]==0)&&(pd7h[a]==0)&&(pb3h[a]==0)){
for(b=0;b<7;b++){d=7*a+b;
if((c15l[b]==0)&&(rw6l[b]==0)&&(pd7l[b]==0)&&(pb3l[b]==0)){
if(uflg[d]==0){
nm[40]=d; uflg[d]=1;
c15h[a]=1; rw6h[a]=1; pd7h[a]=1; pb3h[a]=1;
c15l[b]=1; rw6l[b]=1; pd7l[b]=1; pb3l[b]=1;
printans();
c15h[a]=0; rw6h[a]=0; pd7h[a]=0; pb3h[a]=0;
c15l[b]=0; rw6l[b]=0; pd7l[b]=0; pb3l[b]=0;
uflg[d]=0;}}
}}
}
}
}
//
/** Print New Answer *
void printans(){
short n;
cnt++; cnt2++;
if(cnt2==1){
cntr[cnt3]=cnt;
for(n=1;n<50;n++){anm[cnt3*2][n]=nm[n]+1; anm[cnt3*2+1][n]=nm[n];}
cnt3++; if(cnt3==2){print2p(); cnt3=0;}
}
}

```

```

}
}
//
/** Print 1 Answer *
void print1p(){
short l,l7,n;
printf(" LU: H/      L/%21ld#\n",cntr[0]);
for(l=0;l<7;l++){l7=l*7;
printf(" ");
for(n=1;n<8;n++){printf("%d",anm[1][l7+n]/7);}
printf(" ");
for(n=1;n<8;n++){printf("%d",anm[1][l7+n]%7);}
printf(" ");
for(n=1;n<8;n++){printf("%3d",anm[0][l7+n]);}
printf("\n");
}
}
//
/** Print 2 Answers with their Decompositions *
void print2p(){
short l,l7,n;
printf(" LU: H/      L/%21ld#  LU: H/      L/%21ld#\n",cntr[0],cntr[1]);
for(l=0;l<7;l++){l7=l*7;
printf(" ");
for(n=1;n<8;n++){printf("%d",anm[1][l7+n]/7);}
printf(" ");
for(n=1;n<8;n++){printf("%d",anm[1][l7+n]%7);}
printf(" ");
for(n=1;n<8;n++){printf("%3d",anm[0][l7+n]);}
printf(" ");
for(n=1;n<8;n++){printf("%d",anm[3][l7+n]/7);}
printf(" ");
for(n=1;n<8;n++){printf("%d",anm[3][l7+n]%7);}
printf(" ");
for(n=1;n<8;n++){printf("%3d",anm[2][l7+n]);}
printf("\n");
}
}
//

```

I put the next selecting inequality condition complex to this program:

{ $n_1 < n_{49}$; $n_1 < n_7$; $n_1 < n_{43}$; $n_2 > n_8$; $n_2 > n_7$; and $n_8 > n_{43}$; },

because we have to make and count only the fundamental solutions of that type.

It took about four hours to count them up to the last by my old machine.

I was really surprised at this extreme speed. I have never imagined I could really count up the whole solutions of that type through while I am living.

The extract data of my result is listed as below:

#8. Result List of My Recent Computation

**** 'Complete Euler Squares' of Order 7 for the Pan-diagonal Type ****

**** Compact List of Fundamental Solutions ****

[Selecting Inequality Conditions: $n_1=1$, $n_2 > n_7$ and $n_2 > n_8 > n_{43}$;

| LU: | H/ | L/ | | | | | | 1# | LU: | H/ | L/ | | | | | | 28801# | | |
|---------|---------|----|----|----|----|----|----|----|-----|---------|---------|--|----|----|----|----|--------|----|----|
| 0654321 | 0654321 | | 1 | 49 | 41 | 33 | 25 | 17 | 9 | 0654321 | 0654312 | | 1 | 49 | 41 | 33 | 25 | 16 | 10 |
| 5432106 | 4321065 | | 40 | 32 | 24 | 16 | 8 | 7 | 48 | 5432106 | 4312065 | | 40 | 32 | 23 | 17 | 8 | 7 | 48 |
| 3210654 | 1065432 | | 23 | 15 | 14 | 6 | 47 | 39 | 31 | 3210654 | 2065431 | | 24 | 15 | 14 | 6 | 47 | 39 | 30 |
| 1065432 | 5432106 | | 13 | 5 | 46 | 38 | 30 | 22 | 21 | 1065432 | 5431206 | | 13 | 5 | 46 | 37 | 31 | 22 | 21 |
| 6543210 | 2106543 | | 45 | 37 | 29 | 28 | 20 | 12 | 4 | 6543210 | 1206543 | | 44 | 38 | 29 | 28 | 20 | 12 | 4 |
| 4321065 | 6543210 | | 35 | 27 | 19 | 11 | 3 | 44 | 36 | 4321065 | 6543120 | | 35 | 27 | 19 | 11 | 2 | 45 | 36 |
| 2106543 | 3210654 | | 18 | 10 | 2 | 43 | 42 | 34 | 26 | 2106543 | 3120654 | | 18 | 9 | 3 | 43 | 42 | 34 | 26 |

| | | | |
|-----------------|---------------------|-----------------|---------------------|
| LU: H/ L/ | 57601# | LU: H/ L/ | 86401# |
| 0654321 0654213 | 1 49 41 33 24 16 11 | 0654321 0653214 | 1 49 41 32 24 16 12 |
| 5432106 4213065 | 40 31 23 18 8 7 48 | 5432106 3214065 | 39 31 23 19 8 7 48 |
| 3210654 3065421 | 25 15 14 6 47 38 30 | 3210654 4065321 | 26 15 14 6 46 38 30 |
| 1065432 5421306 | 13 5 45 37 32 22 21 | 1065432 5321406 | 13 4 45 37 33 22 21 |
| 6543210 1306542 | 44 39 29 28 20 12 3 | 6543210 1406532 | 44 40 29 28 20 11 3 |
| 4321065 6542130 | 35 27 19 10 2 46 36 | 4321065 6532140 | 35 27 18 10 2 47 36 |
| 2106543 2130654 | 17 9 4 43 42 34 26 | 2106543 2140653 | 17 9 5 43 42 34 25 |
| LU: H/ L/ | 115201# | LU: H/ L/ | 144001# |
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| 5432106 3215064 | 39 31 23 20 8 7 47 | 5432106 3216054 | 39 31 23 21 8 6 47 |
| 3210654 5064321 | 27 15 14 5 46 38 30 | 3210654 6054321 | 28 15 13 5 46 38 30 |
| 1065432 4321506 | 12 4 45 37 34 22 21 | 1065432 4321605 | 12 4 45 37 35 22 20 |
| 6543210 1506432 | 44 41 29 28 19 11 3 | 6543210 1605432 | 44 42 29 27 19 11 3 |
| 4321065 6432150 | 35 26 18 10 2 48 36 | 4321065 5432160 | 34 26 18 10 2 49 36 |
| 2106543 2150643 | 17 9 6 43 42 33 25 | 2106543 2160543 | 17 9 7 43 41 33 25 |
| LU: H/ L/ | 172801# | LU: H/ L/ | 201601# |
| 0654312 0654321 | 1 49 41 33 25 10 16 | 0654312 0654312 | 1 49 41 33 25 9 17 |
| 5431206 4321065 | 40 32 24 9 15 7 48 | 5431206 4312065 | 40 32 23 10 15 7 48 |
| 3120654 1065432 | 23 8 21 6 47 39 31 | 3120654 2065431 | 24 8 21 6 47 39 30 |
| 2065431 5432106 | 20 5 46 38 30 22 14 | 2065431 5431206 | 20 5 46 37 31 22 14 |
| 6543120 2106543 | 45 37 29 28 13 19 4 | 6543120 1206543 | 44 38 29 28 13 19 4 |
| 4312065 6543210 | 35 27 12 18 3 44 36 | 4312065 6543120 | 35 27 12 18 2 45 36 |
| 1206543 3210654 | 11 17 2 43 42 34 26 | 1206543 3120654 | 11 16 3 43 42 34 26 |
| LU: H/ L/ | 230401# | LU: H/ L/ | 259201# |
| 0654312 0654213 | 1 49 41 33 24 9 18 | 0654312 0653214 | 1 49 41 32 24 9 19 |
| 5431206 4213065 | 40 31 23 11 15 7 48 | 5431206 3214065 | 39 31 23 12 15 7 48 |
| 3120654 3065421 | 25 8 21 6 47 38 30 | 3120654 4065321 | 26 8 21 6 46 38 30 |
| 2065431 5421306 | 20 5 45 37 32 22 14 | 2065431 5321406 | 20 4 45 37 33 22 14 |
| 6543120 1306542 | 44 39 29 28 13 19 3 | 6543120 1406532 | 44 40 29 28 13 18 3 |
| 4312065 6542130 | 35 27 12 17 2 46 36 | 4312065 6532140 | 35 27 11 17 2 47 36 |
| 1206543 2130654 | 10 16 4 43 42 34 26 | 1206543 2140653 | 10 16 5 43 42 34 25 |
| LU: H/ L/ | 288001# | LU: H/ L/ | 316801# |
| 0654312 0643215 | 1 49 40 32 24 9 20 | 0654312 0543216 | 1 48 40 32 24 9 21 |
| 5431206 3215064 | 39 31 23 13 15 7 47 | 5431206 3216054 | 39 31 23 14 15 6 47 |
| 3120654 5064321 | 27 8 21 5 46 38 30 | 3120654 6054321 | 28 8 20 5 46 38 30 |
| 2065431 4321506 | 19 4 45 37 34 22 14 | 2065431 4321605 | 19 4 45 37 35 22 13 |
| 6543120 1506432 | 44 41 29 28 12 18 3 | 6543120 1605432 | 44 42 29 27 12 18 3 |
| 4312065 6432150 | 35 26 11 17 2 48 36 | 4312065 5432160 | 34 26 11 17 2 49 36 |
| 1206543 2150643 | 10 16 6 43 42 33 25 | 1206543 2160543 | 10 16 7 43 41 33 25 |
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| 5421306 4321065 | 40 32 17 9 22 7 48 | 5421306 4312065 | 40 32 16 10 22 7 48 |
| 2130654 1065432 | 16 8 28 6 47 39 31 | 2130654 2065431 | 17 8 28 6 47 39 30 |
| 3065421 5432106 | 27 5 46 38 30 15 14 | 3065421 5431206 | 27 5 46 37 31 15 14 |
| 6542130 2106543 | 45 37 29 21 13 26 4 | 6542130 1206543 | 44 38 29 21 13 26 4 |
| 4213065 6543210 | 35 20 12 25 3 44 36 | 4213065 6543120 | 35 20 12 25 2 45 36 |
| 1306542 3210654 | 11 24 2 43 42 34 19 | 1306542 3120654 | 11 23 3 43 42 34 19 |
| LU: H/ L/ | 403201# | LU: H/ L/ | 432001# |
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| 5421306 4213065 | 40 31 16 11 22 7 48 | 5421306 3214065 | 39 31 16 12 22 7 48 |
| 2130654 3065421 | 18 8 28 6 47 38 30 | 2130654 4065321 | 19 8 28 6 46 38 30 |
| 3065421 5421306 | 27 5 45 37 32 15 14 | 3065421 5321406 | 27 4 45 37 33 15 14 |
| 6542130 1306542 | 44 39 29 21 13 26 3 | 6542130 1406532 | 44 40 29 21 13 25 3 |
| 4213065 6542130 | 35 20 12 24 2 46 36 | 4213065 6532140 | 35 20 11 24 2 47 36 |
| 1306542 2130654 | 10 23 4 43 42 34 19 | 1306542 2140653 | 10 23 5 43 42 34 18 |

| | | | | | | | |
|---------|---------|----|-------------------|---------|---------|----|------------------|
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| 5421306 | 3215064 | 39 | 31 16 13 22 7 47 | 5421306 | 3216054 | 39 | 31 16 14 22 6 47 |
| 2130654 | 5064321 | 20 | 8 28 5 46 38 30 | 2130654 | 6054321 | 21 | 8 27 5 46 38 30 |
| 3065421 | 4321506 | 26 | 4 45 37 34 15 14 | 3065421 | 4321605 | 26 | 4 45 37 35 15 13 |
| 6542130 | 1506432 | 44 | 41 29 21 12 25 3 | 6542130 | 1605432 | 44 | 42 29 20 12 25 3 |
| 4213065 | 6432150 | 35 | 19 11 24 2 48 36 | 4213065 | 5432160 | 34 | 19 11 24 2 49 36 |
| 1306542 | 2150643 | 10 | 23 6 43 42 33 18 | 1306542 | 2160543 | 10 | 23 7 43 41 33 18 |
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| 4065321 | 5432106 | 34 | 5 46 38 23 15 14 | 4065321 | 5431206 | 34 | 5 46 37 24 15 14 |
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| 2140653 | 3065421 | 18 | 8 35 6 47 38 23 | 2140653 | 4065321 | 19 | 8 35 6 46 38 23 |
| 4065321 | 5421306 | 34 | 5 45 37 25 15 14 | 4065321 | 5321406 | 34 | 4 45 37 26 15 14 |
| 6532140 | 1306542 | 44 | 39 22 21 13 33 3 | 6532140 | 1406532 | 44 | 40 22 21 13 32 3 |
| 3214065 | 6542130 | 28 | 20 12 31 2 46 36 | 3214065 | 6532140 | 28 | 20 11 31 2 47 36 |
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| 5321406 | 3215064 | 39 | 24 16 13 29 7 47 | 5321406 | 3216054 | 39 | 24 16 14 29 6 47 |
| 2140653 | 5064321 | 20 | 8 35 5 46 38 23 | 2140653 | 6054321 | 21 | 8 34 5 46 38 23 |
| 4065321 | 4321506 | 33 | 4 45 37 27 15 14 | 4065321 | 4321605 | 33 | 4 45 37 28 15 13 |
| 6532140 | 1506432 | 44 | 41 22 21 12 32 3 | 6532140 | 1605432 | 44 | 42 22 20 12 32 3 |
| 3214065 | 6432150 | 28 | 19 11 31 2 48 36 | 3214065 | 5432160 | 27 | 19 11 31 2 49 36 |
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| LU: H/ | L/ | | 673921# | LU: H/ | L/ | | 691201# |
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| 2150643 | 1065432 | 16 | 8 42 6 47 32 24 | 2150643 | 2065431 | 17 | 8 42 6 47 32 23 |
| 5064321 | 5432106 | 41 | 5 46 31 23 15 14 | 5064321 | 5431206 | 41 | 5 46 30 24 15 14 |
| 6432150 | 2106543 | 45 | 30 22 21 13 40 4 | 6432150 | 1206543 | 44 | 31 22 21 13 40 4 |
| 3215064 | 6543210 | 28 | 20 12 39 3 44 29 | 3215064 | 6543120 | 28 | 20 12 39 2 45 29 |
| 1506432 | 3210654 | 11 | 38 2 43 35 27 19 | 1506432 | 3120654 | 11 | 37 3 43 35 27 19 |
| LU: H/ | L/ | | 708481# | LU: H/ | L/ | | 725761# |
| 0643215 | 0654213 | 1 | 49 34 26 17 9 39 | 0643215 | 0653214 | 1 | 49 34 25 17 9 40 |
| 4321506 | 4213065 | 33 | 24 16 11 36 7 48 | 4321506 | 3214065 | 32 | 24 16 12 36 7 48 |
| 2150643 | 3065421 | 18 | 8 42 6 47 31 23 | 2150643 | 4065321 | 19 | 8 42 6 46 31 23 |
| 5064321 | 5421306 | 41 | 5 45 30 25 15 14 | 5064321 | 5321406 | 41 | 4 45 30 26 15 14 |
| 6432150 | 1306542 | 44 | 32 22 21 13 40 3 | 6432150 | 1406532 | 44 | 33 22 21 13 39 3 |
| 3215064 | 6542130 | 28 | 20 12 38 2 46 29 | 3215064 | 6532140 | 28 | 20 11 38 2 47 29 |
| 1506432 | 2130654 | 10 | 37 4 43 35 27 19 | 1506432 | 2140653 | 10 | 37 5 43 35 27 18 |
| LU: H/ | L/ | | 743041# | LU: H/ | L/ | | 760321# |
| 0643215 | 0643215 | 1 | 49 33 25 17 9 41 | 0643215 | 0543216 | 1 | 48 33 25 17 9 42 |
| 4321506 | 3215064 | 32 | 24 16 13 36 7 47 | 4321506 | 3216054 | 32 | 24 16 14 36 6 47 |
| 2150643 | 5064321 | 20 | 8 42 5 46 31 23 | 2150643 | 6054321 | 21 | 8 41 5 46 31 23 |
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| 6432150 | 1506432 | 44 | 34 22 21 12 39 3 | 6432150 | 1605432 | 44 | 35 22 20 12 39 3 |
| 3215064 | 6432150 | 28 | 19 11 38 2 48 29 | 3215064 | 5432160 | 27 | 19 11 38 2 49 29 |
| 1506432 | 2150643 | 10 | 37 6 43 35 26 18 | 1506432 | 2160543 | 10 | 37 7 43 34 26 18 |

[Total Count of Solutions = 777600] OK!

** Recalculated and Listed by Kanji Setsuda on
Feb.15, 2015 with MacOSX 10.10.2 & Xcode 6.1.1 **

The total count of Standard Solutions of that type is logically calculated to be $777600 \times 7 \times 7 = 38102400$. You can reconstruct all of them by the fundamental solutions we have just got, using the typical transformations of Pan-magic Rotation and Shift of every row and column of them.

Of course, there exist lots of "Non-Euler Type" of PDMS77, say, far more than our Complete Euler Type. We can not even guess how many of them might really exist.

Anyhow it makes me really happy that we have come to know how many solutions of 'Complete Euler Squares' of order 7 for pan-diagonal type do really exist.

#9. Comment

This is the first successful result of my elaborate computation to try to make any Complete Euler type of Pan-diagonal Magic Squares of Order 7. I am proud of my experience I could surely have got some skills to solve the typical problems and could have any special key in my hand to open the door for the new world.

On top of that I could have fortunately invented another two ways of composing Complete Euler Squares: "**Composition by Knight's Tour**", and "**New Euler's Method**".

I want you to read my articles I explained about them in the following sections.

You can do your job very fast by these new methods, faster than anything else.

#10. How about the Cases of 'Complete Euler Squares' of any other Orders?

You may want to go on up to order 9, but you may not try to make 'Complete Euler Squares' 9x9 of any pan-diagonal type, even of the simultaneous one.

Number system of base 9 does not seem to work very well for this object. Anything like 'Complete Euler Square' has not yet been found.

Base 3 might work well instead. But four positional layers of base 3 may force you too many conditions in your program, and I am sure you cannot help feeling this method is too heavy to hold on.

Number system of Base 4 does not work perfect for all pan-diagonal magic squares of order 4. But Base 2, that means, Binary Number System works perfect instead.

You cannot make any 'Complete Euler Square' 6x6 at all. It is logically proved that any pan-diagonal type of magic square is impossible to be constructed.

You can make all Complete Euler Squares of order 8 only by Binary Number System.

Only "Composite and Pan-diagonal" type of Magic Squares of order 8 (including "Composite and Complete" type) are all 'Complete Euler Squares.'

"Greco-Latinian Method" will be able to work well for order 11, 13, 17, , I guess.

(The Original Written in English on March 27, 2003 by Kanji Setsuda
Retyped Edition on February 22, 2007 with MacOSX and Xcode2.2
Recompiled on February 17, 2015 with MacOSX 10.10.2 and Xcode 6.1.1)

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