

NEARLY ORTHOGONAL LATIN HYPERCUBE DESIGNS FOR MANY DESIGN COLUMNS

Lin Wang¹, Jian-Feng Yang¹, Dennis K. J. Lin², Min-Qian Liu¹

¹*Nankai University and* ²*The Pennsylvania State University*

Supplementary Material

In this supplemental file, we provide the design matrices used in Examples 1, 2 and 3.

S1 Example 1: Design matrices of $2L$, $2X$ and $2H$

Table S1: Design matrix of $2L$ in Example 1.

1	2	3	4	5	6	7	8	9	10	11	12
15	-5	19	23	-21	17	-7	3	1	13	11	9
19	15	-5	-21	17	23	3	1	-7	11	9	13
-5	19	15	17	23	-21	1	-7	3	9	13	11
-23	21	-17	15	-5	19	-11	-13	-9	3	-7	1
21	-17	-23	19	15	-5	-13	-9	-11	-7	1	3
-17	-23	21	-5	19	15	-9	-11	-13	1	3	-7
7	-3	-1	11	13	9	15	-5	19	21	-23	-17
-3	-1	7	13	9	11	19	15	-5	-23	-17	21
-1	7	-3	9	11	13	-5	19	15	-17	21	-23
-13	-11	-9	-3	7	-1	-21	23	17	15	-5	19
-11	-9	-13	7	-1	-3	23	17	-21	19	15	-5
-9	-13	-11	-1	-3	7	17	-21	23	-5	19	15
-15	5	-19	-23	21	-17	7	-3	-1	-13	-11	-9
-19	-15	5	21	-17	-23	-3	-1	7	-11	-9	-13
5	-19	-15	-17	-23	21	-1	7	-3	-9	-13	-11
23	-21	17	-15	5	-19	11	13	9	-3	7	-1
-21	17	23	-19	-15	5	13	9	11	7	-1	-3
17	23	-21	5	-19	-15	9	11	13	-1	-3	7
-7	3	1	-11	-13	-9	-15	5	-19	-21	23	17
3	1	-7	-13	-9	-11	-19	-15	5	23	17	-21
1	-7	3	-9	-11	-13	5	-19	-15	17	-21	23
13	11	9	3	-7	1	21	-23	-17	-15	5	-19
11	9	13	-7	1	3	-23	-17	21	-19	-15	5
9	13	11	1	3	-7	-17	21	-23	5	-19	-15

Table S2: Design matrix of $2X$ in Example 1.

1	2	3	4	5	6	7	8	9	10	11
-11	3	-3	3	5	-1	7	11	-7	1	-11
5	1	-7	-9	-3	-9	9	-1	-9	-7	9
11	7	5	-7	-7	5	5	5	3	11	-5
-9	9	7	-3	3	-5	-9	-7	-5	9	7
-7	-3	9	-11	-1	7	1	-5	5	-11	-3
3	-11	-5	-5	7	-11	-5	-3	7	5	-9
9	-5	1	1	11	11	-7	3	-11	-1	3
7	11	-1	11	1	-3	-1	-9	1	-9	-7
-3	5	-11	-1	-5	3	-11	9	9	-5	5
1	-9	11	9	-11	-7	-3	7	-1	-3	1
-1	-1	3	7	9	1	11	1	11	3	11
-5	-7	-9	5	-9	9	3	-11	-3	7	-1

Table S3: Design matrix of $2H$ in Example 1.

1	2	3	4	5	6	7	8	9	10	11
-23	5	-7	5	9	-3	13	21	-15	1	-23
9	1	-15	-19	-7	-19	17	-3	-19	-15	17
21	13	9	-15	-15	9	9	9	5	21	-11
-19	17	13	-7	5	-11	-19	-15	-11	17	13
-15	-7	17	-23	-3	13	1	-11	9	-23	-7
5	-23	-11	-11	13	-23	-11	-7	13	9	-19
17	-11	1	1	21	21	-15	5	-23	-3	5
13	21	-3	21	1	-7	-3	-19	1	-19	-15
-7	9	-23	-3	-11	5	-23	17	17	-11	9
1	-19	21	17	-23	-15	-7	13	-3	-7	1
-3	-3	5	13	17	1	21	1	21	5	21
-11	-15	-19	9	-19	17	5	-23	-7	13	-3
-21	7	-5	7	11	-1	15	23	-13	3	-21
11	3	-13	-17	-5	-17	19	-1	-17	-13	19
23	15	11	-13	-13	11	11	11	7	23	-9
-17	19	15	-5	7	-9	-17	-13	-9	19	15
-13	-5	19	-21	-1	15	3	-9	11	-21	-5
7	-21	-9	-9	15	-21	-9	-5	15	11	-17
19	-9	3	3	23	23	-13	7	-21	-1	7
15	23	-1	23	3	-5	-1	-17	3	-17	-13
-5	11	-21	-1	-9	7	-21	19	19	-9	11
3	-17	23	19	-21	-13	-5	15	-1	-5	3
-1	-1	7	15	19	3	23	3	23	7	23
-9	-13	-17	11	-17	19	7	-21	-5	15	-1

S2 Example 2: Design matrices of $2L$ and $2X$

Table S4: First 16 columns of the design matrix of $2L$ in Example 2.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31
3	-1	-7	5	11	-9	-15	13	19	-17	-23	21	27	-25	-31	29
5	7	-1	-3	-13	-15	9	11	21	23	-17	-19	-29	-31	25	27
7	-5	3	-1	-15	13	-11	9	23	-21	19	-17	-31	29	-27	25
9	11	13	15	-1	-3	-5	-7	-25	-27	-29	-31	17	19	21	23
11	-9	-15	13	-3	1	7	-5	-27	25	31	-29	19	-17	-23	21
13	15	-9	-11	5	7	-1	-3	-29	-31	25	27	-21	-23	17	19
15	-13	11	-9	7	-5	3	-1	-31	29	-27	25	-23	21	-19	17
17	19	21	23	25	27	29	31	-1	-3	-5	-7	-9	-11	-13	-15
19	-17	-23	21	27	-25	-31	29	-3	1	7	-5	-11	9	15	-13
21	23	-17	-19	-29	-31	25	27	-5	-7	1	3	13	15	-9	-11
23	-21	19	-17	-31	29	-27	25	-7	5	-3	1	15	-13	11	-9
25	27	29	31	-17	-19	-21	-23	9	11	13	15	-1	-3	-5	-7
27	-25	-31	29	-19	17	23	-21	11	-9	-15	13	-3	1	7	-5
29	31	-25	-27	21	23	-17	-19	13	15	-9	-11	5	7	-1	-3
31	-29	27	-25	23	-21	19	-17	15	-13	11	-9	7	-5	3	-1
33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63
35	-33	-39	37	43	-41	-47	45	51	-49	-55	53	59	-57	-63	61
37	39	-33	-35	-45	-47	41	43	53	55	-49	-51	-61	-63	57	59
39	-37	35	-33	-47	45	-43	41	55	-53	51	-49	-63	61	-59	57
41	43	45	47	-33	-35	-37	-39	-57	-59	-61	-63	49	51	53	55
43	-41	-47	45	-35	33	39	-37	-59	57	63	-61	51	-49	-55	53
45	47	-41	-43	37	39	-33	-35	-61	-63	57	59	-53	-55	49	51
47	-45	43	-41	39	-37	35	-33	-63	61	-59	57	-55	53	-51	49
49	51	53	55	57	59	61	63	-33	-35	-37	-39	-41	-43	-45	-47
51	-49	-55	53	59	-57	-63	61	-35	33	39	-37	-43	41	47	-45
53	55	-49	-51	-61	-63	57	59	-37	-39	33	35	45	47	-41	-43
55	-53	51	-49	-63	61	-59	57	-39	37	-35	33	47	-45	43	-41
57	59	61	63	-49	-51	-53	-55	41	43	45	47	-33	-35	-37	-39
59	-57	-63	61	-51	49	55	-53	43	-41	-47	45	-35	33	39	-37
61	63	-57	-59	53	55	-49	-51	45	47	-41	-43	37	39	-33	-35
63	-61	59	-57	55	-53	51	-49	47	-45	43	-41	39	-37	35	-33
-1	-3	-5	-7	-9	-11	-13	-15	-17	-19	-21	-23	-25	-27	-29	-31
-3	1	7	5	-11	9	15	-13	-19	17	23	-21	-27	25	31	-29
-5	-7	1	3	13	15	-9	-11	-21	-23	17	19	29	31	-25	-27
-7	5	-3	1	15	-13	11	-9	-23	21	-19	17	31	-29	27	-25
-9	-11	-13	-15	1	3	5	7	25	27	29	31	-17	-19	-21	-23
-11	9	15	-13	3	-1	-7	5	27	-25	-31	29	-19	17	23	-21
-13	-15	9	11	-5	-7	1	3	29	31	-25	-27	21	23	-17	-19
-15	13	-11	9	-7	5	-3	1	31	-29	27	-25	23	-21	19	-17
-17	-19	-21	-23	-25	-27	-29	-31	1	3	5	7	9	11	13	15
-19	17	23	-21	-27	25	31	-29	3	-1	-7	5	11	-9	-15	13
-21	-23	17	19	29	31	-25	-27	5	7	-1	-3	-13	-15	9	11
-23	21	-19	17	31	-29	27	-25	7	-5	3	-1	-15	13	-11	9
-25	-27	-29	-31	17	19	21	23	-9	-11	-13	-15	1	3	5	7
-27	25	31	-29	19	-17	-23	21	-11	9	15	-13	3	-1	-7	5
-29	-31	25	27	-21	-23	17	19	-13	-15	9	11	-5	-7	1	3
-31	29	-27	25	-23	21	-19	17	-15	13	-11	9	-7	5	-3	1
-33	-35	-37	-39	-41	-43	-45	-47	-49	-51	-53	-55	-57	-59	-61	-63
-35	33	39	-37	-43	41	47	-45	-51	49	55	-53	-59	57	63	-61
-37	-39	33	35	45	47	-41	-43	-53	-55	49	51	61	63	-57	-59
-39	37	-35	33	47	-45	43	-41	-55	53	-51	49	63	-61	59	-57
-41	-43	-45	-47	33	35	37	39	57	59	61	63	-49	-51	-53	-55
-43	41	47	-45	35	-33	-39	37	59	-57	-63	61	-51	49	55	-53
-45	-47	41	43	-37	-39	33	35	61	63	-57	-59	53	55	-49	-51
-47	45	-43	41	-39	37	-35	33	63	-61	59	-57	55	-53	51	-49
-49	-51	-53	-55	-57	-59	-61	-63	33	35	37	39	41	43	45	47
-51	49	55	-53	-59	57	63	-61	35	-33	-39	37	43	-41	-47	45
-53	-55	49	51	61	63	-57	-59	37	39	-33	-35	-45	-47	41	43
-55	53	-51	49	63	-61	59	-57	39	-37	35	-33	-47	45	-43	41
-57	-59	-61	-63	49	51	53	55	-41	-43	-45	-47	33	35	37	39
-59	57	63	-61	51	-49	-55	53	-43	41	47	-45	35	-33	-39	37
-61	-63	57	59	-53	-55	49	51	-45	-47	41	43	-37	-39	33	35
-63	61	-59	57	-55	53	-51	49	-47	45	-43	41	-39	37	-35	33

Table S5: Last 16 columns of the design matrix of $2L$ in Example 2.

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63
35	-33	-39	37	43	-41	-47	45	51	-49	-55	53	59	-57	-63	61
37	39	-33	-35	-45	-47	41	43	53	55	-49	-51	-61	-63	57	59
39	-37	35	-33	-47	45	-43	41	55	-53	51	-49	-63	61	-59	57
41	43	45	47	-33	-35	-37	-39	-57	-59	-61	-63	49	51	53	55
43	-41	-47	45	-35	33	39	-37	-59	57	63	-61	51	-49	-55	53
45	47	-41	-43	37	39	-33	-35	-61	-63	57	59	-53	-55	49	51
47	-45	43	-41	39	-37	35	-33	-63	61	-59	57	-55	53	-51	49
-49	-51	-53	-55	-57	-59	-61	-63	33	35	37	39	41	43	45	47
-51	49	55	-53	-59	57	63	-61	35	-33	-39	37	43	-41	-47	45
-53	-55	49	51	61	63	-57	-59	37	39	-33	-35	-45	-47	41	43
-55	53	-51	49	63	-61	59	-57	39	-37	35	-33	-47	45	-43	41
-57	-59	-61	-63	49	51	53	55	-41	-43	-45	-47	33	35	37	39
-59	57	63	-61	51	-49	-55	53	-43	41	47	-45	35	-33	-39	37
-61	-63	57	59	-53	-55	49	51	-45	-47	41	43	-37	-39	33	35
-63	61	-59	57	-55	53	-51	49	-47	45	-43	41	-39	37	-35	33
-1	-3	-5	-7	-9	-11	-13	-15	-17	-19	-21	-23	-25	-27	-29	-31
-3	1	7	-5	-11	9	15	-13	-19	17	23	-21	-27	25	31	-29
-5	-7	1	3	13	15	-9	-11	-21	-23	17	19	29	31	-25	-27
-7	5	-3	1	15	-13	11	-9	-23	21	-19	17	31	-29	27	-25
-9	-11	-13	-15	1	3	5	7	25	27	29	31	-17	-19	-21	-23
-11	9	15	-13	3	-1	-7	5	27	-25	-31	29	-19	17	23	-21
-13	-15	9	11	-5	-7	1	3	29	31	-25	-27	21	23	-17	-19
-15	13	-11	9	-7	5	-3	1	31	-29	27	-25	23	-21	19	-17
17	19	21	23	25	27	29	31	-1	-3	-5	-7	-9	-11	-13	-15
19	-17	-23	21	27	-25	-31	29	-3	1	7	-5	-11	9	15	-13
21	23	-17	-19	-29	-31	25	27	-5	-7	1	3	13	15	-9	-11
23	-21	19	-17	-31	29	-27	25	-7	5	-3	1	15	-13	11	-9
25	27	29	31	-17	-19	-21	-23	9	11	13	15	-1	-3	-5	-7
27	-25	-31	29	-19	17	23	-21	11	-9	-15	13	-3	1	7	-5
29	31	-25	-27	21	23	-17	-19	13	15	-9	-11	5	7	-1	-3
31	-29	27	-25	23	-21	19	-17	15	-13	11	-9	7	-5	3	-1
-33	-35	-37	-39	-41	-43	-45	-47	-49	-51	-53	-55	-57	-59	-61	-63
-35	33	39	-37	-43	41	47	-45	-51	49	55	-53	-59	57	63	-61
-37	-39	33	35	45	47	-41	-43	-53	-55	49	51	61	63	-57	-59
-39	37	-35	33	47	-45	43	-41	-55	53	-51	49	63	-61	59	-57
-41	-43	-45	-47	33	35	37	39	57	59	61	63	-49	-51	-53	-55
-43	41	47	-45	35	-33	-39	37	59	-57	-63	61	-51	49	55	-53
-45	-47	41	43	-37	-39	33	35	61	63	-57	-59	53	55	-49	-51
-47	45	-43	41	-39	37	-35	33	63	-61	59	-57	55	-53	51	-49
49	51	53	55	57	59	61	63	-33	-35	-37	-39	-41	-43	-45	-47
51	-49	-55	53	59	-57	-63	61	-35	33	39	-37	-43	41	47	-45
53	55	-49	-51	-61	-63	57	59	-37	-39	33	35	45	47	-41	-43
55	-53	51	-49	-63	61	-59	57	-39	37	-35	33	47	-45	43	-41
57	59	61	63	-49	-51	-53	-55	41	43	45	47	-33	-35	-37	-39
59	-57	-63	61	-51	49	55	-53	43	-41	-47	45	-35	33	39	-37
61	63	-57	-59	53	55	-49	-51	45	47	-41	-43	37	39	-33	-35
63	-61	59	-57	55	-53	51	-49	47	-45	43	-41	39	-37	35	-33
1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31
3	-1	-7	5	11	-9	-15	13	19	-17	-23	21	27	-25	-31	29
5	7	-1	-3	-13	-15	9	11	21	23	-17	-19	-29	-31	25	27
7	-5	3	-1	-15	13	-11	9	23	-21	19	-17	-31	29	-27	25
9	11	13	15	-1	-3	-5	-7	-25	-27	-29	-31	17	19	21	23
11	-9	-15	13	-3	1	7	-5	-27	25	31	-29	19	-17	-23	21
13	15	-9	-11	5	7	-1	-3	-29	-31	25	27	-21	-23	17	19
15	-13	11	-9	7	-5	3	-1	-31	29	-27	25	-23	21	-19	17
-17	-19	-21	-23	-25	-27	-29	-31	1	3	5	7	9	11	13	15
-19	17	23	-21	-27	25	31	-29	3	-1	-7	5	11	-9	-15	13
-21	-23	17	19	29	31	-25	-27	5	7	-1	-3	-13	-15	9	11
-23	21	-19	17	31	-29	27	-25	7	-5	3	-1	-15	13	-11	9
-25	-27	-29	-31	17	19	21	23	-9	-11	-13	-15	1	3	5	7
-27	25	31	-29	19	-17	-23	21	-11	9	15	-13	3	-1	-7	5
-29	-31	25	27	-21	-23	17	19	-13	-15	9	11	-5	-7	1	3
-31	29	-27	25	-23	21	-19	17	-15	13	-11	9	-7	5	-3	1

Table S6: The design matrix of $2X$ in Example 2.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31
3	-1	-7	5	11	-9	-15	13	19	-17	-23	21	27	-25	-31	29
5	7	-1	-3	-13	-15	9	11	21	23	-17	-19	-29	-31	25	27
7	-5	3	-1	-15	13	-11	9	23	-21	19	-17	-31	29	-27	25
9	11	13	15	-1	-3	-5	-7	-25	-27	-29	-31	17	19	21	23
11	-9	-15	13	-3	1	7	-5	-27	25	31	-29	19	-17	-23	21
13	15	-9	-11	5	7	-1	-3	-29	-31	25	27	-21	-23	17	19
15	-13	11	-9	7	-5	3	-1	-31	29	-27	25	-23	21	-19	17
17	19	21	23	25	27	29	31	-1	-3	-5	-7	-9	-11	-13	-15
19	-17	-23	21	27	-25	-31	29	-3	1	7	-5	-11	9	15	-13
21	23	-17	-19	-29	-31	25	27	-5	-7	1	3	13	15	-9	-11
23	-21	19	-17	-31	29	-27	25	-7	5	-3	1	15	-13	11	-9
25	27	29	31	-17	-19	-21	-23	9	11	13	15	-1	-3	-5	-7
27	-25	-31	29	-19	17	23	-21	11	-9	-15	13	-3	1	7	-5
29	31	-25	-27	21	23	-17	-19	13	15	-9	-11	5	7	-1	-3
31	-29	27	-25	23	-21	19	-17	15	-13	11	-9	7	-5	3	-1
-1	-3	-5	-7	-9	-11	-13	-15	-17	-19	-21	-23	-25	-27	-29	-31
-3	1	7	-5	-11	9	15	-13	-19	17	23	-21	-27	25	31	-29
-5	-7	1	3	13	15	-9	-11	-21	-23	17	19	29	31	-25	-27
-7	5	-3	1	15	-13	11	-9	-23	21	-19	17	31	-29	27	-25
-9	-11	-13	-15	1	3	5	7	25	27	29	31	-17	-19	-21	-23
-11	9	15	-13	3	-1	-7	5	27	-25	-31	29	-19	17	23	-21
-13	-15	9	11	-5	-7	1	3	29	31	-25	-27	21	23	-17	-19
-15	13	-11	9	-7	5	-3	1	31	-29	27	-25	23	-21	19	-17
-17	-19	-21	-23	-25	-27	-29	-31	1	3	5	7	9	11	13	15
-19	17	23	-21	-27	25	31	-29	3	-1	-7	5	11	-9	-15	13
-21	-23	17	19	29	31	-25	-27	5	7	-1	-3	-13	-15	9	11
-23	21	-19	17	31	-29	27	-25	7	-5	3	-1	-15	13	-11	9
-25	-27	-29	-31	17	19	21	23	-9	-11	-13	-15	1	3	5	7
-27	25	31	-29	19	-17	-23	21	-11	9	15	-13	3	-1	-7	5
-29	-31	25	27	-21	-23	17	19	-13	-15	9	11	-5	-7	1	3
-31	29	-27	25	-23	21	-19	17	-15	13	-11	9	-7	5	-3	1

S3 Example 3: Design matrix of $2L$

Table S7: Design matrix of $2L$ in Example 3.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	-2	3	13-14	15-18-17-16	6	-5	4	-21	20	19	-9	8	7	-24-23	22-12-11-10								
3	1	-2	15	13-14-17-16-18	-5	4	6	20	19-21	8	7	-9	-23	22-24-11-10-12									
-2	3	1	-14	15	13-16-18-17	4	6	-5	19-21	20	7	-9	8	22-24-23-10-12-11									
-13	14-15	1	-2	3	6	-5	4	18	17	16	-9	8	7	21-20-19-12-11-10	24	23-22							
-15	-13	14	3	1	-2	-5	4	6	17	16	18	8	7	-9	-20-19	21	-11	-10	-12	23	-22	24	
14	-15	-13	-2	3	1	4	6	-5	16	18	17	7	-9	8	-19	21	-20	-10	-12	-11	-22	24	23
18	17	16	-6	5	-4	1	-2	3	13-14	15	23	24	-22	-11	-12	-10	20	-21	19	-8	9	-7	
17	16	18	5	-4	-6	3	1	-2	15	13-14	24	-22	23	-12	-10	-11	-21	19	20	9	-7	-8	
16	18	17	-4	-6	5	-2	3	1	-14	15	13	-22	23	24	-10	-11	-12	19	20	-21	-7	-8	9
-6	5	-4	-18	-17	-16	-13	14	-15	1	-2	3	-11	-12	-10	-23	-24	22	-8	9	-7	-20	21	-19
5	-4	-6	-17	-16	-18	-15	-13	14	3	1	-2	-12	-10	-11	-24	22	-23	9	-7	-8	21	-19	-20
-4	-6	5	-16	-18	-17	14	-15	-13	-2	3	1	-10	-11	-12	22	-23	-24	-7	-8	9	-19	-20	21
21	-20	-19	9	-8	-7	-23	-24	22	11	12	10	1	-2	3	13	-14	15	17	18	16	-5	6	4
-20	-19	21	-8	-7	9	-24	22	-23	12	10	11	3	1	-2	15	13	-14	18	16	17	6	4	-5
-19	21	-20	-7	9	-8	22	-23	-24	10	11	12	-2	3	1	-14	15	13	16	17	18	4	-5	6
9	-8	-7	-21	20	19	11	12	10	23	24	-22	-13	14	-15	1	-2	3	-5	6	4	-17	-18	-16
-8	-7	9	20	19	-21	12	10	11	24	-22	23	-15	-13	14	3	1	-2	6	4	-5	-18	-16	-17
-7	9	-8	19	-21	20	10	11	12	-22	23	24	14	-15	-13	-2	3	1	4	-5	6	-16	-17	-18
24	23	-22	12	11	10	-20	21	-19	8	-9	7	-17	-18	-16	5	-6	-4	1	-2	3	13	-14	15
23	-22	24	11	10	12	21	-19	-20	-9	7	8	-18	-16	-17	-6	-4	5	3	1	-2	15	13	-14
-22	24	23	10	12	11	-19	-20	21	7	8	-9	-16	-17	-18	-4	5	-6	-2	3	1	-14	15	13
12	11	10	-24	-23	22	8	-9	7	20	-21	19	5	-6	-4	17	18	16	-13	14	-15	1	-2	3
11	10	12	-23	22	-24	-9	7	8	-21	19	20	-6	-4	5	18	16	17	-15	-13	14	3	1	-2
10	12	11	22	-24	-23	7	8	-9	19	20	-21	-4	5	-6	16	17	18	14	-15	-13	-2	3	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-1	2	-3	-13	14	-15	18	17	16	-6	5	-4	21	-20	-19	9	-8	-7	24	23	-22	12	11	10
-3	-1	2	-15	-13	14	17	16	18	5	-4	-6	-20	-19	21	-8	-7	9	23	-22	24	11	10	12
2	-3	-1	14	-15	-13	16	18	17	-4	-6	5	-19	21	-20	-7	9	-8	-22	24	23	10	12	11
13	-14	15	-1	2	-3	-6	5	-4	-18	-17	-16	9	-8	-7	-21	20	19	12	11	10	-24	-23	22
15	13	-14	-3	-1	2	5	-4	-6	-17	-16	-18	-8	-7	9	20	19	-21	11	10	12	-23	22	-24
-14	15	13	2	-3	-1	-4	-6	5	-16	-18	-17	-7	9	-8	19	-21	20	10	12	11	22	-24	-23
-18	-17	-16	6	-5	4	-1	2	-3	-13	14	-15	-23	-24	22	11	12	10	-20	21	-19	8	-9	7
-17	-16	-18	-5	4	6	-3	-1	2	-15	-13	14	-24	22	-23	12	10	11	21	-19	-20	-9	7	8
-16	-18	-17	4	6	-5	2	-3	-1	14	-15	-13	22	-23	-24	10	11	12	-19	-20	21	7	8	-9
6	-5	4	18	17	16	13	-14	15	-1	2	-3	11	12	10	23	24	-22	8	-9	7	20	-21	19
-5	4	6	17	16	18	15	13	-14	-3	-1	2	12	10	11	24	-22	23	-9	7	8	-21	19	20
4	6	-5	16	18	17	-14	15	13	2	-3	-1	10	11	12	-22	23	24	7	8	-9	19	20	-21
-21	20	19	-9	8	7	23	24	-22	-11	-12	-10	-1	2	-3	-13	14	-15	-17	-18	-16	5	-6	-4
20	19	-21	8	7	-9	24	-22	23	-12	-10	-11	-3	-1	2	-15	-13	14	-18	-16	-17	-6	-4	5
19	-21	20	7	-9	8	-22	23	24	-10	-11	-12	2	-3	-1	14	-15	-13	-16	-17	-18	-4	5	-6
-9	8	7	21	-20	-19	-11	-12	-10	-23	-24	22	13	-14	15	-1	2	-3	5	-6	-4	17	18	16
8	7	-9	-20	-19	21	-12	-10	-11	-24	22	-23	15	13	-14	-3	-1	2	-6	-4	5	18	16	17
7	-9	8	-19	21	-20	-10	-11	-12	22	-23	-24	-14	15	13	2	-3	-1	-4	5	-6	16	17	18
-24	-23	22	-12	-11	-10	20	-21	19	-8	9	-7	17	18	16	-5	6	4	-1	2	-3	-13	14	-15
-23	22	-24	-11	-10	-12	-21	19	20	9	-7	-8	18	16	17	6	4	-5	-3	-1	2	-15	-13	14
22	-24	-23	-10	-12	-11	19	20	-21	-7	-8	9	16	17	18	4	-5	6	2	-3	-1	14	-15	-13
-12	-11	-10	24	23	-22	-8	9	-7	-20	21	-19	-5	6	4	-17	-18	-16	13	-14	15	-1	2	-3
-11	-10	-12	23	-22	24	9	-7	-8	21	-19	-20	6	4	-5	-18	-16	-17	15	13	-14	-3	-1	2
-10	-12	-11	-22	24	23	-7	-8	9	-19	-20	21	4	-5	6	-16	-17	-18	-14	15	13	2	-3	-1