

Dobble sequence generator

Dobble is a card game where any two cards always share one, and only one, matching symbol.

This is a description of my own algorithm for generating symbol sets for Dobble game cards.

I discovered it trying to understand how other algorithms work, but my solution simplifies the process.

Using that algorithm, you can generate decks with cards of n symbols, where $n-1$ is a prime number. In the following description I will use n equal to 6. So the number of cards in the deck is $6*6 - 6 + 1 = 31$.

This is also the number of symbols. For simplicity I will use the following set of symbols: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, W, X, Z.

The whole process is represented in graphical form at the end of the document.

In the first step we take the first n symbols from that set of available symbols. We use them as the symbols in first card and each of them will be used in next steps, as described below.

So, our first card contains symbols 0, 1, 2, 3, 4, 5.

From the rest of set of our symbols we will form the matrix:

6	7	8	9	A
B	C	D	E	F
G	H	J	K	L
M	N	P	R	S
T	U	W	X	Z

In each of the following steps we will:

- generate cards by reading rows from the matrix combined with one of succeeding symbols from first card
- rebuild our matrix by reading it diagonally

Accordingly, in this step we create five cards: (0, 6, 7, 8, 9, A), (0, B, C, D, E, F), (0, G, H, J, K, L), (0, M, N, P, R, S), (0, T, U, W, X, Z), which can also be graphically represented as:

0	6	7	8	9	A
0	B	C	D	E	F
0	G	H	J	K	L
0	M	N	P	R	S
0	T	U	W	X	Z

Then we transform the matrix like this:

6	7	8	9	A
B	C	D	E	F
G	H	J	K	L
M	N	P	R	S
T	U	W	X	Z

 →

6	C	J	R	Z
7	D	K	S	T
8	E	L	M	U
9	F	G	N	W
A	B	H	P	X

As the result, we receive a new matrix:

6	C	J	R	Z
7	D	K	S	T
8	E	L	M	U
9	F	G	N	W
A	B	H	P	X

Same like earlier, we treat its rows as a source of symbols for our next cards, but we append the next symbol from our first card, which is “1”

1	6	C	J	R	Z
1	7	D	K	S	T
1	8	E	L	M	U
1	9	F	G	N	W
1	A	B	H	P	X

So, our next five cards are: (1, 6, C, J, R, Z), (1, 7, D, K, S, T), (1, 8, E, L, M, U), (1, 9, F, G, N, W), (1, A, B, H, P, X)

Then we do a transformation, but note, that the reading order is slightly different then earlier. The same order will be used in later steps.

6	C	J	R	Z
7	D	K	S	T
8	E	L	M	U
9	F	G	N	W
A	B	H	P	X

→

6	D	L	N	X
7	E	G	P	Z
8	F	H	R	T
9	B	J	S	U
A	C	K	M	W

In that way our matrix takes the following values:

6	D	L	N	X
7	E	G	P	Z
8	F	H	R	T
9	B	J	S	U
A	C	K	M	W

Again, we read its rows to form next cards. Of course we need to append the next symbol from the first card, which is “2”. In that way we receive next five cards: (2, 6, D, L, N, X), (2, 7, E, G, P, Z), (2, 8, F, H, R, T), (2, 9, B, J, S, U), (2, A, C, K, M, W). The same in a graphical form:

2	6	D	L	N	X
2	7	E	G	P	Z
2	8	F	H	R	T
2	9	B	J	S	U
2	A	C	K	M	W

Then we transform the matrix in the same form, to achieve a new one:

6	D	L	N	X
7	E	G	P	Z
8	F	H	R	T
9	B	J	S	U
A	C	K	M	W

→

6	E	H	S	W
7	F	J	M	X
8	B	K	N	Z
9	C	L	P	T
A	D	G	R	U

Next steps presented in short, graphical form are following:

6	E	H	S	W
7	F	J	M	X
8	B	K	N	Z
9	C	L	P	T
A	D	G	R	U

→

3	6	E	H	S	W
3	7	F	J	M	X
3	8	B	K	N	Z
3	9	C	L	P	T
3	A	D	G	R	U

→

6	E	H	S	W
7	F	J	M	X
8	B	K	N	Z
9	C	L	P	T
A	D	G	R	U

→

6	F	K	P	U
7	B	L	R	W
8	C	G	S	X
9	D	H	M	Z
A	E	J	N	T

6	F	K	P	U
7	B	L	R	W
8	C	G	S	X
9	D	H	M	Z
A	E	J	N	T

→

4	6	F	K	P	U
4	7	B	L	R	W
4	8	C	G	S	X
4	9	D	H	M	Z
4	A	E	J	N	T

→

6	F	K	P	U
7	B	L	R	W
8	C	G	S	X
9	D	H	M	Z
A	E	J	N	T

→

6	B	G	M	T
7	C	H	N	U
8	D	J	P	W
9	E	K	R	X
A	F	L	S	Z

6	B	G	M	T
7	C	H	N	U
8	D	J	P	W
9	E	K	R	X
A	F	L	S	Z

→

5	6	B	G	M	T
5	7	C	H	N	U
5	8	D	J	P	W
5	9	E	K	R	X
5	A	F	L	S	Z

→

6	B	G	M	T
7	C	H	N	U
8	D	J	P	W
9	E	K	R	X
A	F	L	S	Z

→

6	C	J	R	Z
7	D	K	S	T
8	E	L	M	U
9	F	G	N	W
A	B	H	P	X

Number of steps with matrix transformation is equal to n, which is number of symbols on a card.

As we can see, if we didn't stop at the last step, we would receive the same matrix like in step 2.

Finally, our deck consists of the following cards:

(0, 1, 2, 3, 4, 5),
 (0, 6, 7, 8, 9, A), (0, B, C, D, E, F), (0, G, H, J, K, L), (0, M, N, P, R, S), (0, T, U, W, X, Z),
 (1, 6, C, J, R, Z), (1, 7, D, K, S, T), (1, 8, E, L, M, U), (1, 9, F, G, N, W), (1, A, B, H, P, X),
 (2, 6, D, L, N, X), (2, 7, E, G, P, Z), (2, 8, F, H, R, T), (2, 9, B, J, S, U), (2, A, C, K, M, W),
 (3, 6, E, H, S, W), (3, 7, F, J, M, X), (3, 8, B, K, N, Z), (3, 9, C, L, P, T), (3, A, D, G, R, U),
 (4, 6, F, K, P, U), (4, 7, B, L, R, W), (4, 8, C, G, S, X), (4, 9, D, H, M, Z), (4, A, E, J, N, T),
 (5, 6, B, G, M, T), (5, 7, C, H, N, U), (5, 8, D, J, P, W), (5, 9, E, K, R, X), (5, A, F, L, S, Z)

All steps on a single sheet:

Step

results

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