

REGULAR LATIN WORD SQUARES

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A Latin square is an $n \times n$ array filled with n different symbols each occurring only once in each row and once in each column, like a sudoku puzzle. In the following 3 x 3 example the letters A,B,C can be replaced by the numbers 1,2,3.

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A B C
C A B
B C A
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A Latin square is said to be *regular* (also *reduced*, *normalized* or *in standard form*) if both its rows and its columns are in the same order, as in a regular word square, for example:

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A B C
B C A
C A B
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Here are some 3 x 3 squares of this sort using only words allowed in international Scrabble. ETH is an old English letter, DSO a yak/cow cross, AIT a small island, ITA a palm tree, TAI a sea bream, ICH a fish disease, RYA a Scandinavian rug, ARY any and SHA = sh! (be quiet).

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E A T T H E S P A S O D
A T E H E T P A S O D S
T E A E T H A S P D S O
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A I T C H I R Y A A S H
I T A H I C Y A R S H A
T A I I C H A R Y H A S
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On the left below is the first published regular Latin word square, which appeared in the 1860 edition of *American Almanac*, where it was described as a 'palindromic word square', because it reads the same backwards as forwards. METI is a town in Ethiopia. [Geo]

The square on the right is also palindromic. It contains words from Web3 only. NEMA is a parasitic worm and ENAM is a type of land grant in India.

T I M E	M A N E
I T E M	A M E N
M E T I	N E M A
E M I T	E N A M

The square on the left below contains four ChD words, but only two different letters are used so it is not a Latin square. ANAN is an expression of failure to understand.

It is possible to construct a 4 x 4 square using just Scrabble words, all of which are found in ChD. Remarkably, there are only four allowable transposals of the letters ACOT and they can be used to make a perfect regular Latin square. OCTA is a unit of sky cover (one eighth) and ATOC is a species of skunk.

A N N A	C O A T
N A A N	O C T A
N A N A	A T O C
A N A N	T A C O

A 5 x 5 Latin square using only Scrabble words has yet to be found. Here is one with two Scrabble terms, RESAT (an exam, e.g.) and ARETS (assigns), as well as ESTRA, an island off Sweden [Geo], STAER, dialect for 'stair', steep [EDD] and TARSE, penis [OED].

R E S A T
E S T R A
S T A E R
A R E T S
T A R S E

At the 6 x 6 level things get harder. Several proper names have been used in the following square.

I R O N E S
R E S I N O
O S E R I N
N I R O S E
E N I S O R
S O N E R I

IRONES	aromatic oils [Web3]
RESINO	surname listed 67 times in US TDs
OSERIN	surname listed 15 times in US TDs
NIROSE	female given name [100+ on Facebk]
ENISOR	Romanian surname [100+ forebears.io (Net)]
SONERI	cloth of gold [ChD]

A 7 x 7 regular Latin word square is possible, but a couple of the names are dubious.

T R A S I N E
R A N I T E S
A N I R E S T
S I R E N T A
I T E N S A R
N E S T A R I

ESTARIN

TRASINE	canal in central Lithuania [Geo]
RANITES	pl. of 'ranite', a zeolitic mineral [OED]
ANIREST	online clothing supplier located in Germany [Net]
SIRENTA	female given name, e.g. Sirenta Reeves + others [Facebk]
ITENSAR	George and Belle Itensar, 1880 US Census [ancestry.com] (Net)
NESTARI	engineering company in Malaysia [Net]
ESTARIN	sea elves' god in the fantasy world of Dragonlance [Net]

The challenge now is to improve the quality of the larger squares by using more dictionary words, and to construct a reasonable 8 x 8 example.

References

ChD	Chambers Dictionary, 11th ed., 2008
EDD	English Dialect Dictionary, J Wright, 1905
Facebk	Facebook, online social networking site [Net]
Geo	geonames.usgs.gov placename database [Net]
Net	Internet, using Google search program
OED	Oxford English Dictionary, 2nd ed., 1989
TD	Telephone Directory [whitepages.com] (Net)
Web3	Webster's 3rd New International Dictionary, 1976

