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The Number of Classifications of up to Seven Classificanda

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A 'classification' for present purposes is a set of $\underline{n}$ type-specimens each one of which is corralled on its own by the union of a set of binary partitions, none of which could be omitted without leaving two types unseparated.

Isomorphism between two such classifications often causes excitement (e.g. among some structuralists), though the degree of excitement does not seem to vary as much as it should with the size of the sets involved.

No general formula for T_n, the number of possible classifications of $\underline{n}$ classificanda is, we believe, known. However T_n is quite small for small $\underline{n}$, and can be discovered by anyone who does not mind using inelegant methods. Ours show that values of T_n from $\underline{n}$ = 3 to $\underline{n}$ = 7 are : 1, 3, 6, 26, 122 (hence isomorphism between classifications of 3 classificanda should arouse zero excitementis).

These figures are the result of a computer program (by D.H.F.) which, we hope, throws up all the candidates, plus a [illegible]ber of duplicates not too large to eliminate 'by inspection'.

We offer below a reference catalogue of all 122 classifications of up to 7 classificanda, and would be glad to hear of exemplifications of each type. If it turns out that many of the possibilities are rarely or never exemplified, this may suggest something about subject matters or classifiers or both.

The catalogue uses a graphical representation (which we call a T-graph; see Fig. 1) where each type specimen is thought of as a point in a plane, and each partition is represented by a polygon connecting the points on the non-majority side of that partition (it is not necessary to represent one-point polygons). No more is claimed for this than that it is the most perspicuous of the notations tried, and facilitates somewhat the non-trivial task of eliminating duplicates and equivalents; for the problem of finding a canonical representation of a classification is not solved either - i.e. not only is there no algebraic route to the enumeration problem, there is also no practically useful way known [illegible]s of checking them methodically.

All T-graphs for n = 7 apart from the first (which represents six different [6 | 1] partitions, and is therefore invisible) will consist of lines and triangles, or both, representing [5 | 2] and [4 | 3] partitions respectively. A point may of course fall on the non-majority side of more than one partition; the T-graph will then show coincident line-ends/vertices; and similarly for coincident lines/edges. Sometimes these have to be drawn as 'almost coincident', to avoid ambiguity.

Ambiguity is also fended off by this table of catalogue numbers:

		Number of constituent triangles				
		0	1	2	3	4
Number of constituent lines	0	1	18	50-52	91-98	116-122
	1	2	19-21	53-62	99-113	
	2	3-4	22-29	63-84	114-115	
	3	5-8	30-43	85-90		
	4	9-14	44-49			
	5	15-17				

The T-graph numbers for each value of T_n below T_7 are: (for T_3) 1; (for T_4) also 2, 4; (for T_5) also 3, 7, 8; and (for T_6) also 6, 11, 12, 13, 14, 18, 19=20, 21, 23, 24, [illegible]27, 28=29, 39, 42=43, 51=52, 56=61, 57=58=59=60, 73=74= [illegible]92=93, 95=96=97=98.

The equivalences for T_6 arise because, when n is even, there is no non-majority side of n/2 n/2 partitions. The choice is classificatorily indifferent, but gives T-graphs which are topologically different.

The above corrects and expands a paper by P.J. Wexler, (1971).

We thank the University of Essex Computing Centre for the use of facilities.

REFERENCE

Wexler, P.J. (1971). On the number of taxonomies; or the odds on 'structuralism'.
American Anthropologist, 73, 1258.

Legend to Figure 1.
Figure 1. T-graphs for n = 7

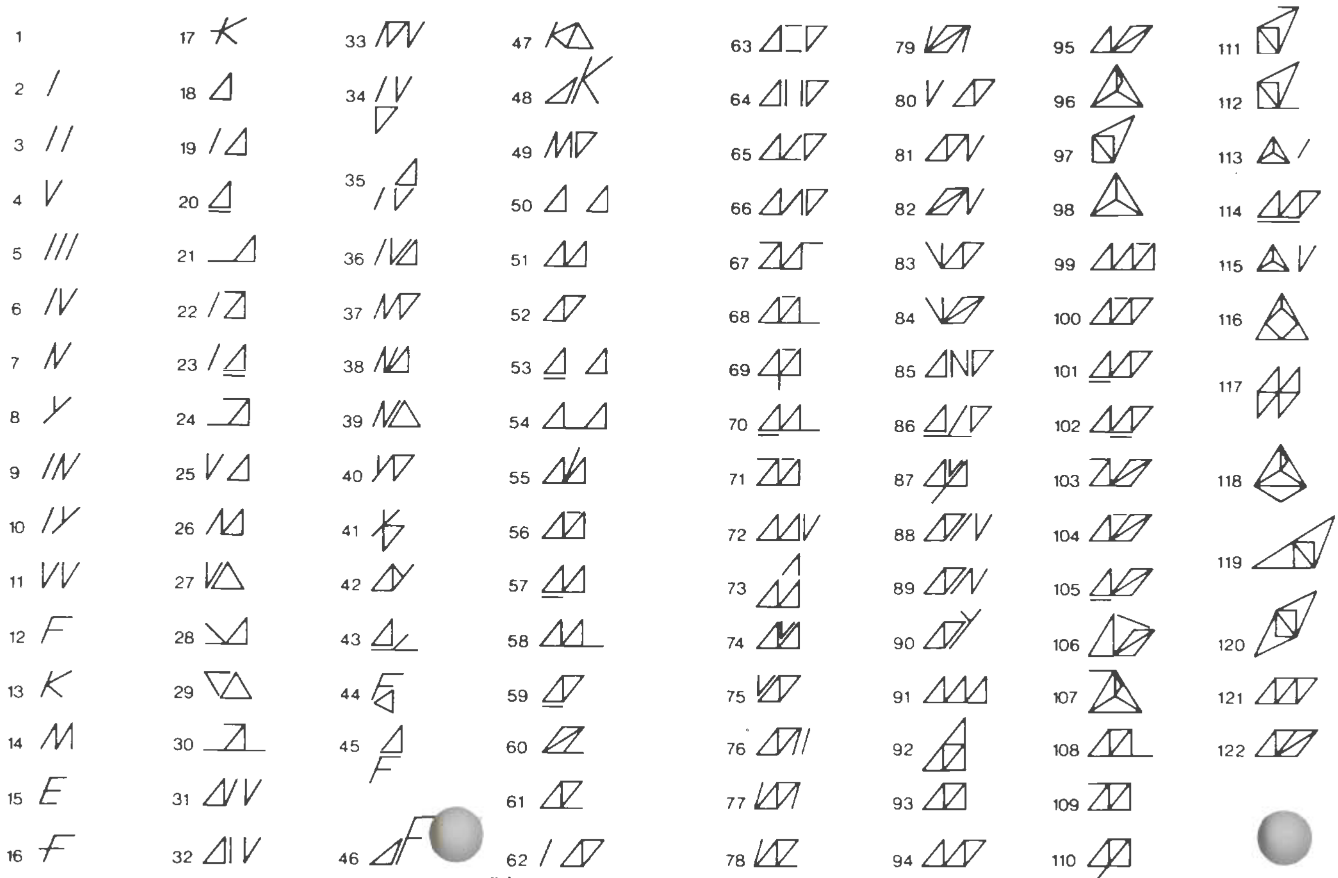

Figure 1. T-graphs for n = 7