Knuth, Donald E.
The Stanford GraphBase: A platform for combinatorial algorithms. (English) [Zbl 0806.68121]
Ramachandran, Vijaya (ed.), Discrete algorithms. Proceedings of the 4th annual ACM-SIAM symposium,

The Stanford GraphBase is a freely available collection of computer programs and data useful for testing
and comparing combinatorial algorithms. The programs generate a large number of graphs with a great
variety of properties. Some of the graphs are based on data from the “real world”: Five-letter words
of English, the characters in classical works of fiction, highway distances between cities, input-output
statistics of the US economy, college football scores, computational logic circuits, the Mona Lisa, etc.
Others are based on regular mathematical constructions such as lattices and quaternions. Graphs can
be modified and combined by union, intersection, complementation, product, and forming line graphs.
A general induced-graph routine allows omission and/or collapsing and/or splitting of vertices, and/or
replacement of vertices by arbitrary graphs.

Each graph has an identifying name, so that researchers all over the world can compare results on identical
graphs and so that experiments are reproducible. For example, graphs such as book (“homer”, 280, 0, 1,
0, 0, 1, 1, 0) and random_bigraph (128, 128, 1000, −1, 0, 0, 0, 0, 314159) and all-perms (9) are well
defined.

Conclusion: This paper is a brief overview of the system. Complete details appeared in the author’s book
For the entire collection see [Zbl 0771.00043].

Reviewer: D.E.Knuth

MSC:
68U99 Computing methodologies and applications
68R10 Graph theory (including graph drawing) in computer science
05C85 Graph algorithms (graph-theoretic aspects)
68-04 Software, source code, etc. for problems pertaining to computer science

Keywords:
Stanford GraphBase; combinatorial algorithms

Software:
GraphBase