

# plantri and fullgen

**plantri** and **fullgen** are programs for generation of certain types of planar graph.

The authors are Gunnar Brinkmann (University of Ghent) and Brendan McKay (Australian National University).

Graphs are generated in such a way that exactly one member of each isomorphism class is output without the need for storing them. The speed of generation is more than 1,000,000 graphs per second in many cases, so extremely large classes of graph can be exhaustively listed.

## plantri (Version 4.5; Sep 5, 2011)

The graph classes generated by **plantri** include:

- Planar triangulations
  - connectivity 1, 2, 3, 4 or 5
  - minimum degree 3, 4 or 5
  - eulerian with connectivity 3 or 4
- Planar quadrangulations
  - arbitrary simple
  - 3-connected
  - minimum degree 3 and simple
  - 3-connected, no non-facial 4-cycles
- Planar simple graphs
  - connectivity 1, 2 or 3
  - minimum degree 1, 2, 3, 4 or 5
- Planar simple bipartite graphs
  - connectivity 1, 2 or 3
  - minimum degree 1, 2, or 3
- Triangulations of a disk
  - connectivity 2 or 3
  - minimum degree 2 or 3
- Planar cubic graphs
  - connectivity 1, 2, or 3
  - connectivity 1, 2, or 3
  - girth 3, 4 or 5
  - cyclic connectivity 3, 4 or 5
  - bipartite with cyclic connectivity 3 or 4
- Planar quartic graphs
  - 3-connected simple

- 4-edge-connected simple
- 4-edge-connected
- 3-connected, 6-cyclically-edge-connected

For more details, see the [manual](#).

## **fullgen**

The program **fullgen** generates fullerenes, which are planar cubic graphs having only faces of size 5 or 6.

There is also an option for forbidding adjacent pentagons.

For more details, see the [manual](#).

This version corrects an error that caused some fullerenes to be missed starting at 136 vertices, or from 254 vertices in the case of IPR fullerenes.

## **Download the programs**

The programs are written in C and are free for all purposes other than sale for profit.