



# What Jupyter brings to GAP

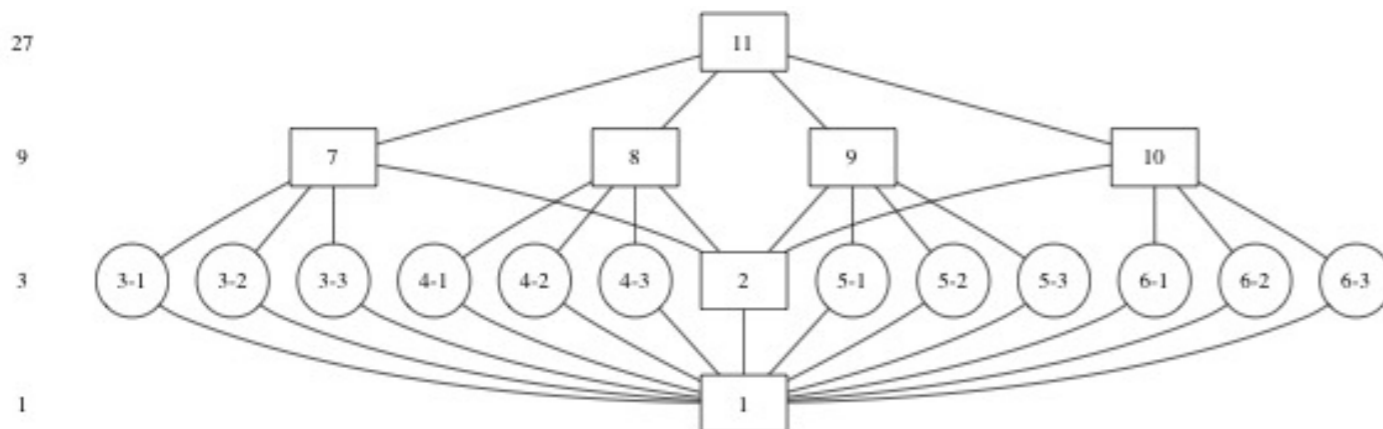
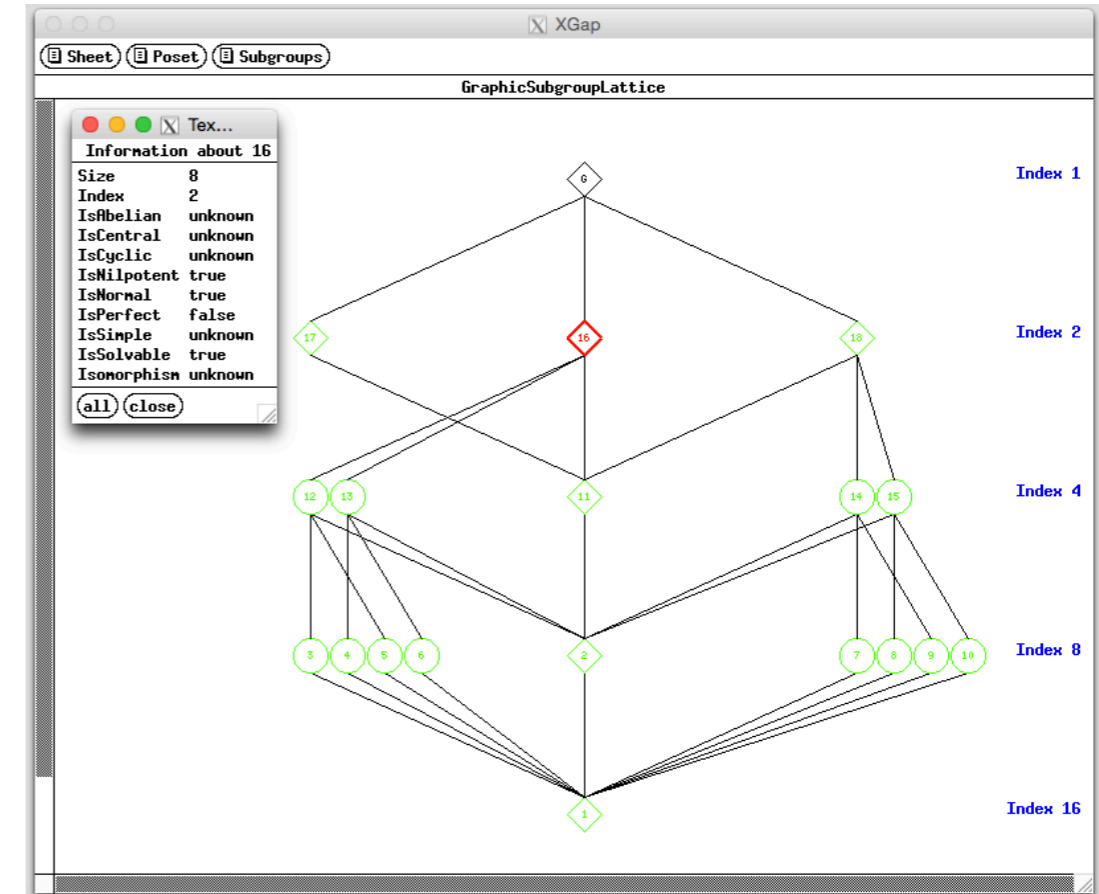
Alexander Kononov (USTAN)  
OpenDreamKit final review meeting  
Luxembourg, 30 October 2019



```

GAP 4.10.2 of 19-Jun-2019
| GAP | https://www.gap-system.org
Architecture: x86_64-apple-darwin17.7.0-default64-kv3
Configuration: gmp 6.1.2, readline
Loading the library and packages ...
Packages: AClib 1.3.1, Alnuth 3.1.1, AtlasRep 2.1.0, AutoDoc 2019.05.20,
AutPGrp 1.10, Browse 1.8.8, CRISP 1.4.4, Cryst 4.1.19,
CrystCat 1.1.9, CTblLib 1.2.2, FactInt 1.6.2, FGA 1.4.0,
Forms 1.2.5, GAPDoc 1.6.2, genss 1.6.5, IO 4.6.0, IRREDSOL 1.4,
LAGUNA 3.9.3, orb 4.8.2, Polenta 1.3.8, Polycyclic 2.14,
PrimGrp 3.3.2, RadiRoot 2.8, recog 1.3.2, ResClasses 4.7.2,
SmallGrp 1.3, Sophus 1.24, SpinSym 1.5.1, TomLib 1.2.8,
TransGrp 2.0.4, utils 0.63
Try '??help' for help. See also '?copyright', '?cite' and '?authors'
gap> DisplayCompositionSeries(Group((1,2,3,4,5,6,7),(1,2)));
G (2 gens, size 5040)
| Z(2)
S (5 gens, size 2520)
| A(7)
1 (0 gens, size 1)
gap>

```



- Pre-Jupyter approaches to visualisation in GAP:**
- emulating graphics in the terminal
  - XGAP (Linux only)
  - external tools to produce graphics (non-interactive, hard to run on Windows)



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## Demo: examples illustrating how OpenDreamKit VRE toolkit is transforming GAP users' practices

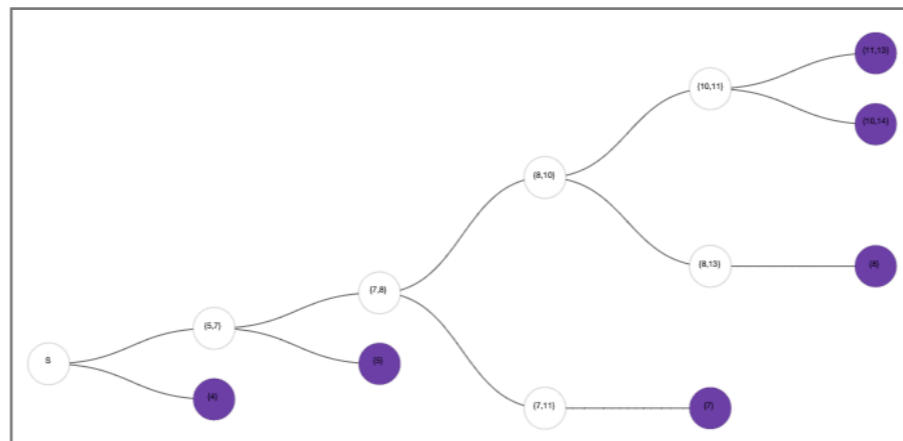
All screenshots below were generated in GAP Jupyter notebooks

### Welcome to GAP Jupyter notebooks!

This repository contains a collection of examples of using GAP in [Jupyter](#).

Notebooks requiring GAP 4.10.2 release:

- [An example with finitely presented groups](#)
- [Semigroups package in GAP](#)
- [The number of numerical semigroups with given genus](#)
- [The state of GAP packages ecosystem](#)
- [Using GAP effectively: a lecture on some tips and pitfalls](#)



JupyterSplashDot(DotString(N));

```
In [5]: G := DihedralGroup(16);
GraphicSubgroupLattice(G);
```

Out[4]: <group of size 16 with 4 generators>

Out[5]:

Francy Settings Subgroup Lattice GraphicSubgroupLattice

There are 5 levels in this Group.

- Is commutative? true
- Size 8
- Isomorphism [8, 1]

First we construct the group  $G = SO(3, 17^2)$  of order 24137280.

```
In [3]: G:=SO(3,17^2);
Size(G);
```

Out[2]: SO(0,3,289)

Out[3]: 24137280