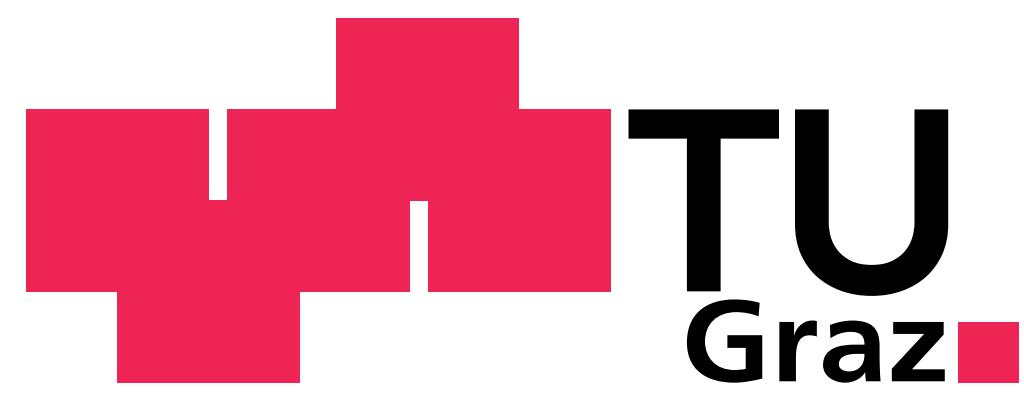


# KNITSIM: KNITTING SIMULATION FOR FABRIC PATTERN VISUALIZATION



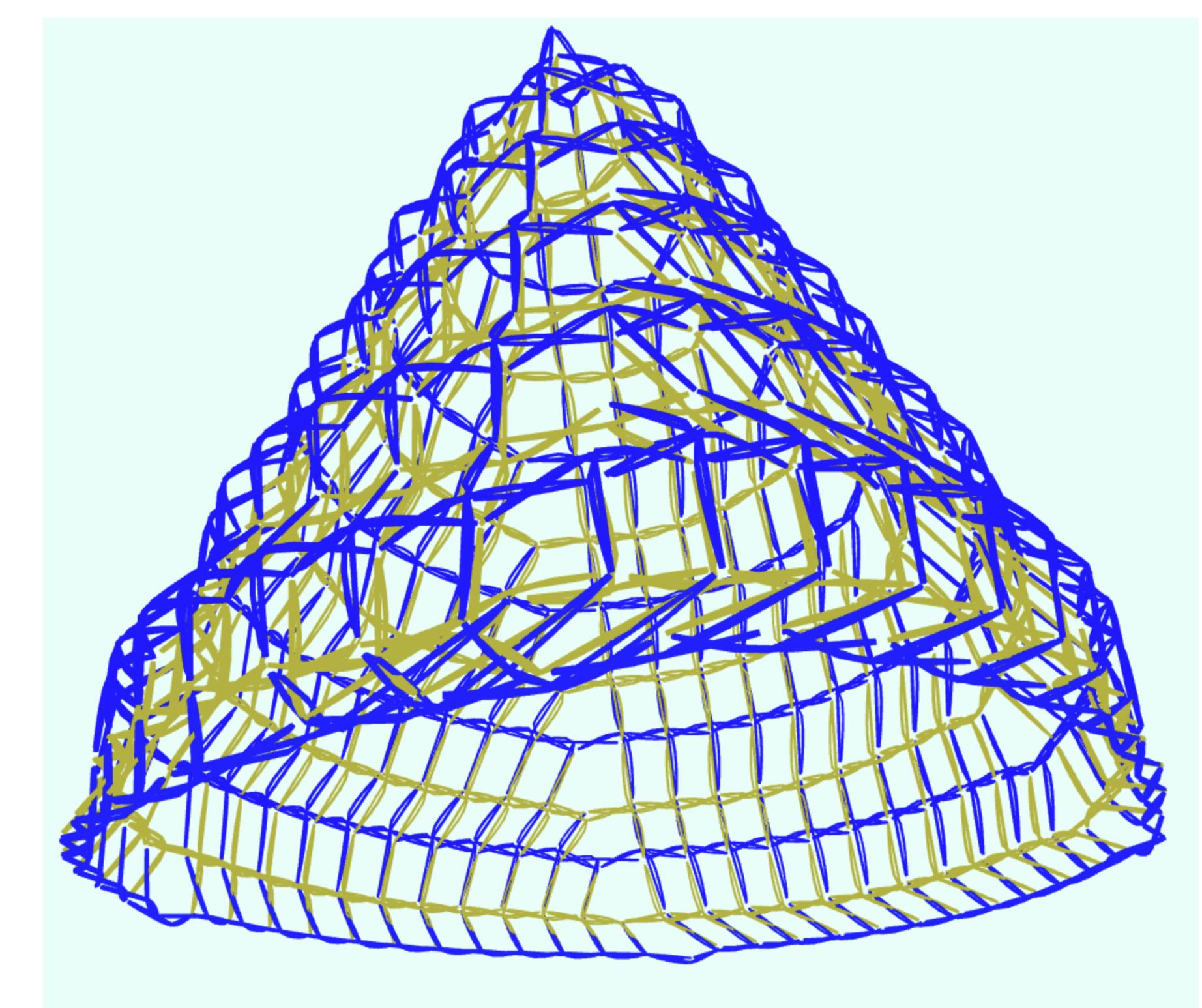
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## KNITTING PROCESS

- Lengthy and manual, requires careful planning; and results in 3D pieces:
  - is inherently 3D due to offsets,
  - knitting pieces are commonly 3D structures, e.g. socks, hats, clothing, ...
- Goal: simulate relaxing fabrics to visualize final piece based on knitting pattern.
- Our Approach: web-based simulation of fabric and pattern combinations beforehand using an interactive code editor.

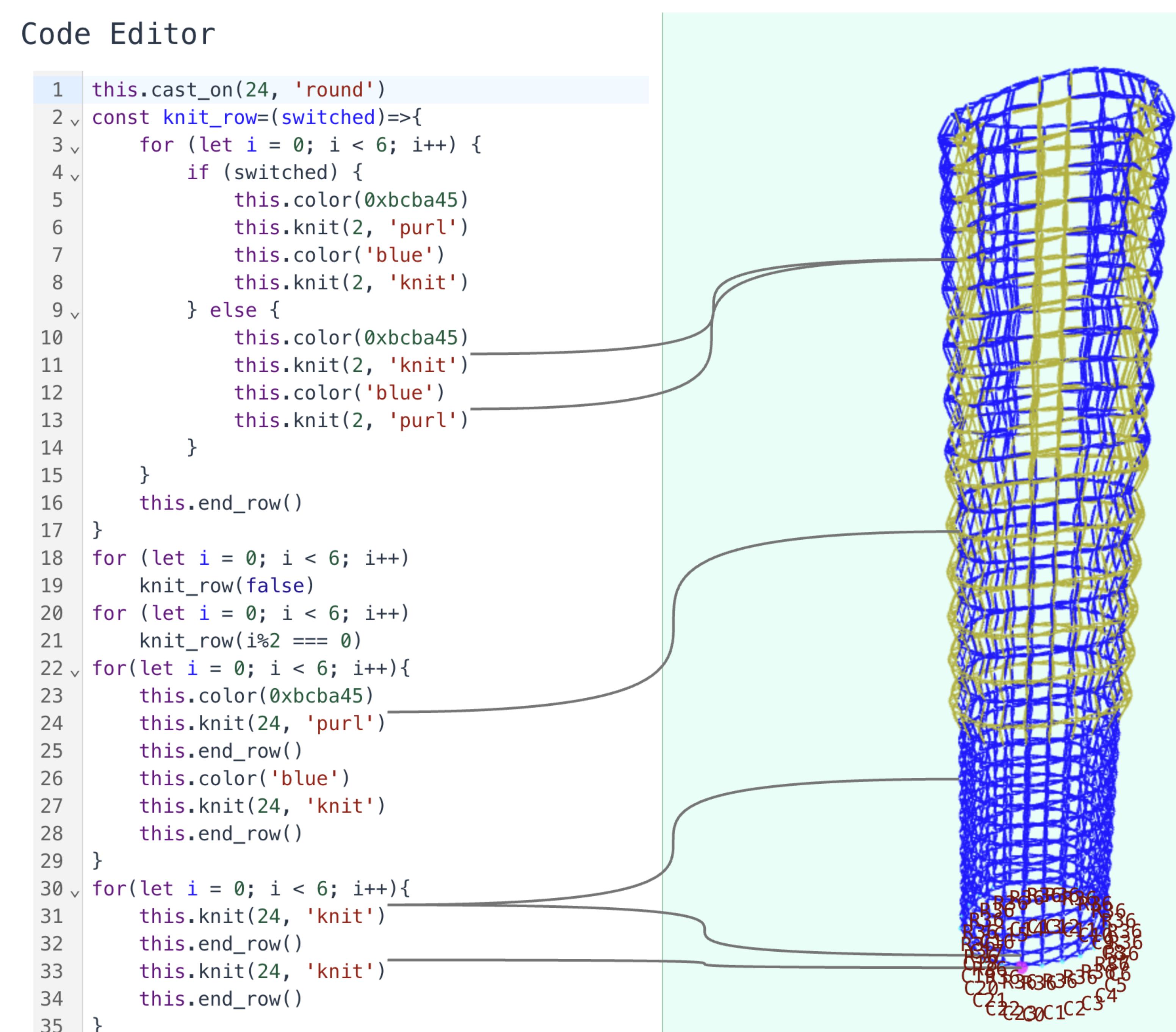
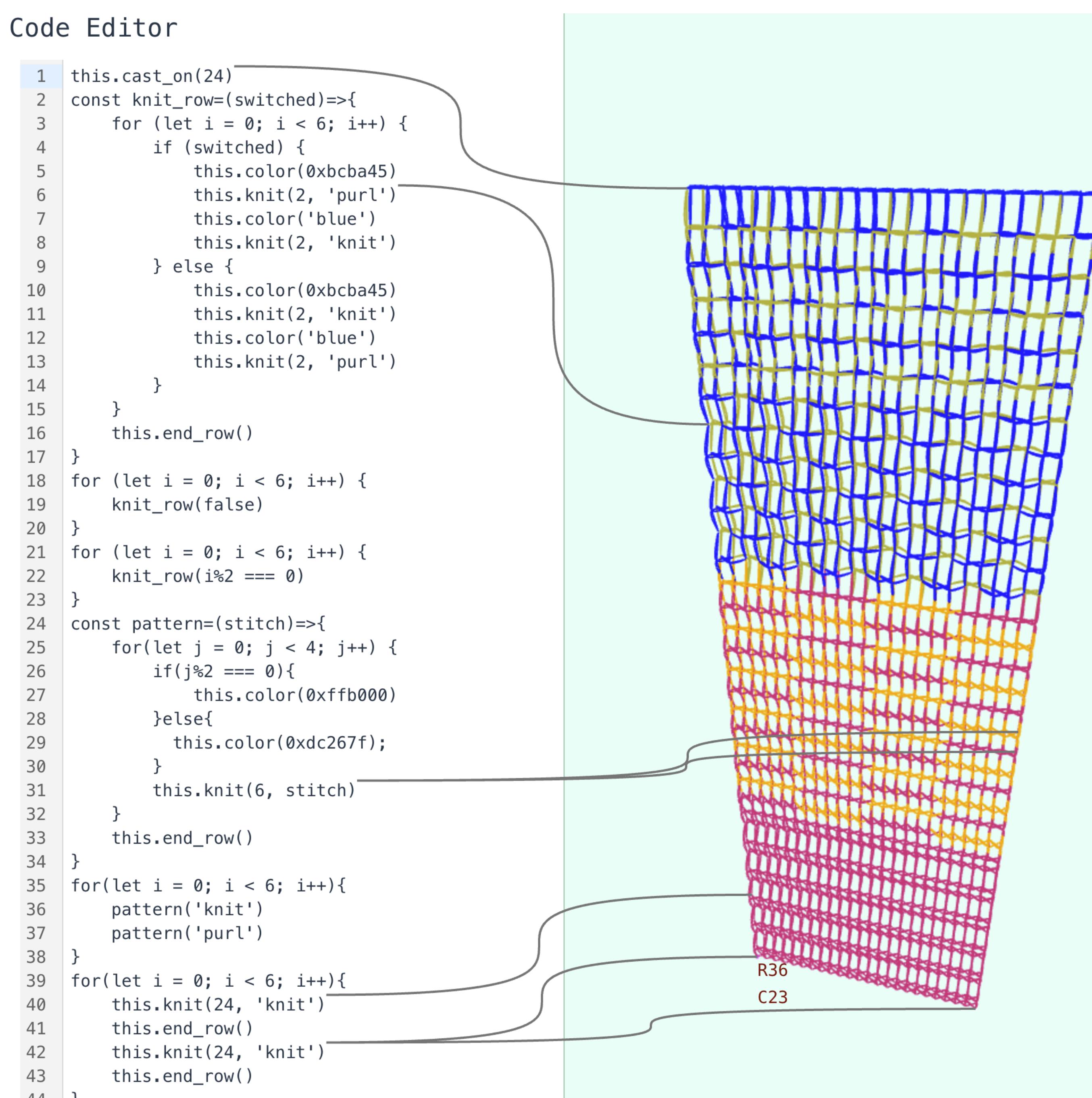


## EXISTING GENERATIVE SYSTEMS

- deepKnit* [1]: Machine Learning (ML)-based generation of novel fabrics, including visualization.
- Narayanan et al. [2]: generates patterns (graphs) from meshes, with manual adjustments.
- Yu and McCann [3]: code-based generation.

→ KnitSim: an integrated & coherent design and editing framework on the web.

## LINKED VIEWS



## BUILDING ON KNITSIM

- Code building improvements: Language Model (LM)-assistance, block-based building of code.
- Improve traceability: through highlights in code & 3D-view.
- Fabric rendering: improved rendering of continuous and interlocking knits.
- Allow for more complex topologies: e.g. shirts, trousers, ...

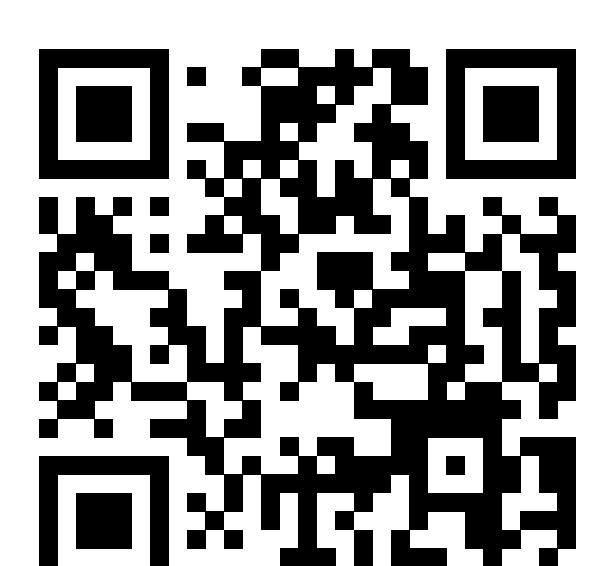
## REFERENCES

- [1] Fabian Scheidt, Jifei Ou, Hiroshi Ishii and Tobias Meisen. 'deepKnit: Learning-based Generation of Machine Knitting Code'. In: *Procedia Manufacturing* 51 (2020). 30th International Conference on Flexible Automation and Intelligent Manufacturing (FAIM2021), pp. 485–492. ISSN: 2351-9789.
- [2] Vidya Narayanan, Kui Wu, Cem Yuksel and James McCann. 'Visual knitting machine programming'. In: *ACM Trans. Graph.* 38.4 (July 2019). ISSN: 0730-0301.
- [3] Tianhong Catherine Yu and James McCann. 'Coupling Programs and Visualization for Machine Knitting'. In: *Proceedings of the 5th Annual ACM Symposium on Computational Fabrication*. SCF '20. Virtual Event, USA: Association for Computing Machinery, 2020. ISBN: 9781450381703.
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## LINK



Demo



Code