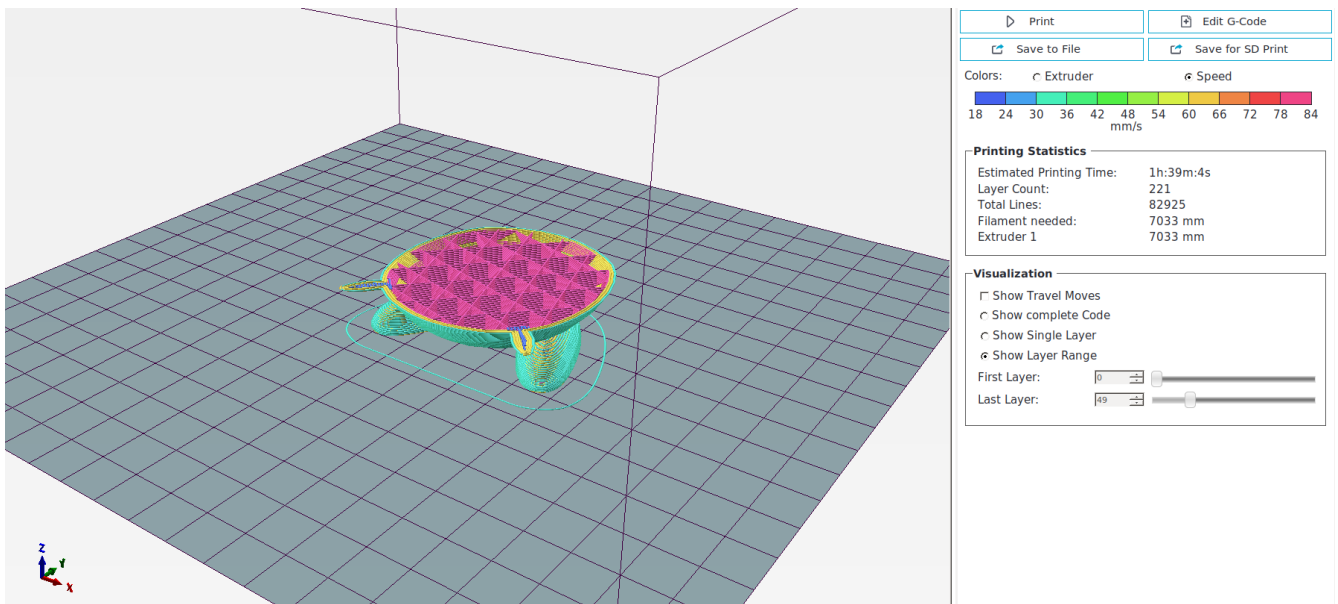
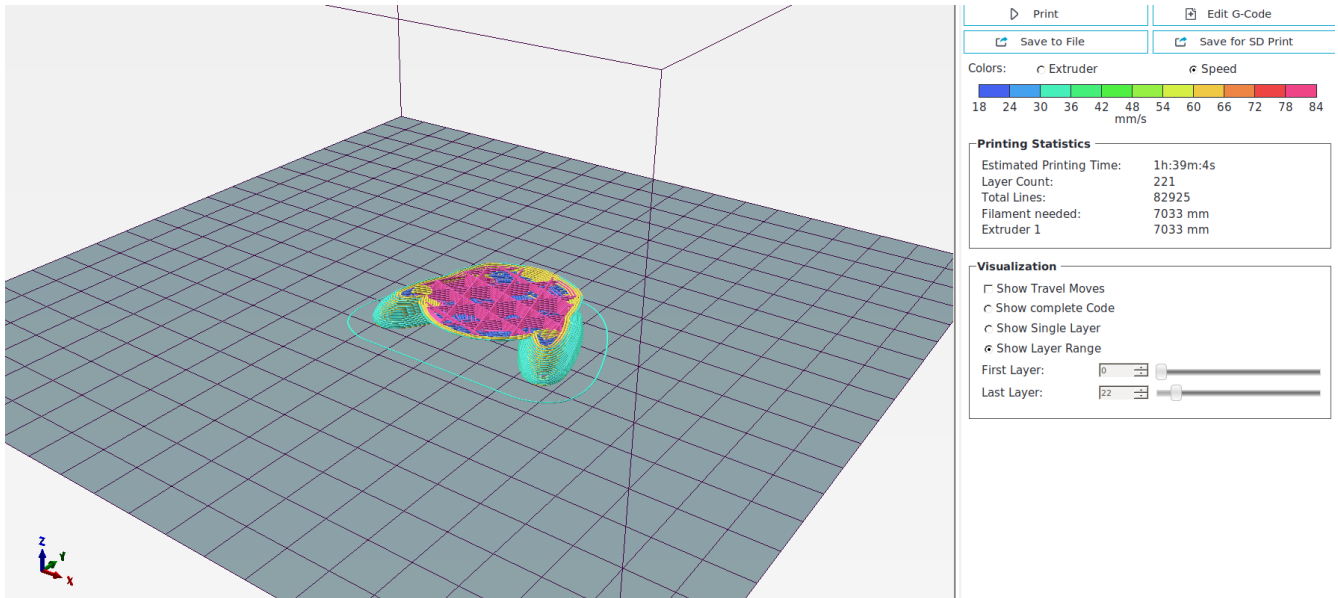
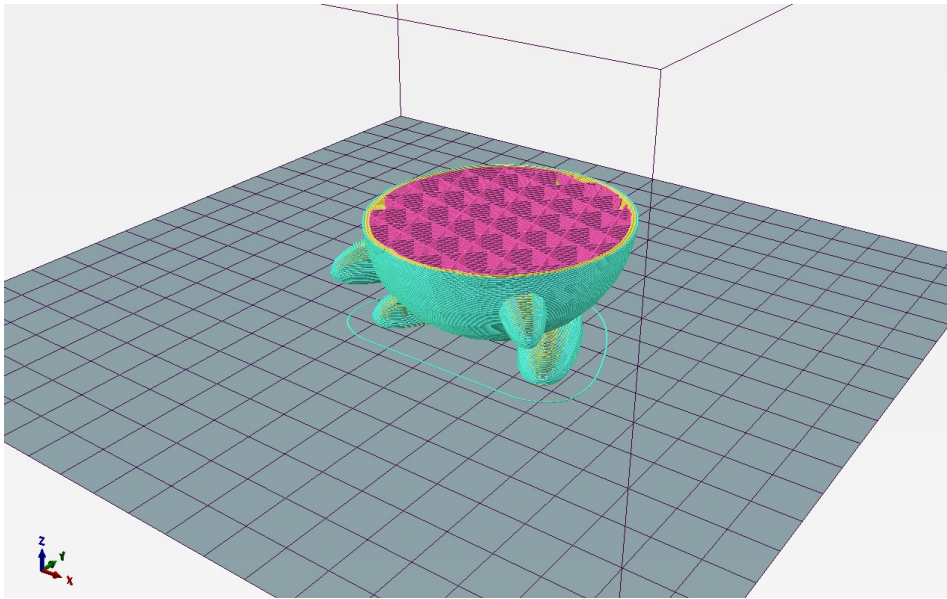


6.839 Advanced Computer Graphics
Homework 1: From Design to Machine Instructions
Report WriteUp
Runjia Tian
Master in Design Studies, Technology
Harvard University Graduate School of Design

1 Printing with a Virtual Printer

Slicing Pokemon With Repetier Host Slic3r Slicer with default parameters





[Print](#)

[Edit G-Code](#)

[Save to File](#)

[Save for SD Print](#)

Colors: ☒ Extruder ☒ Speed

18 24 30 36 42 48 54 60 66 72 78 84 mm/s

Printing Statistics

Estimated Printing Time: 1h:39m:4s

Layer Count: 221

Total Lines: 82925

Filament needed: 7033 mm

Extruder 1: 7033 mm

Visualization

☐ Show Travel Moves

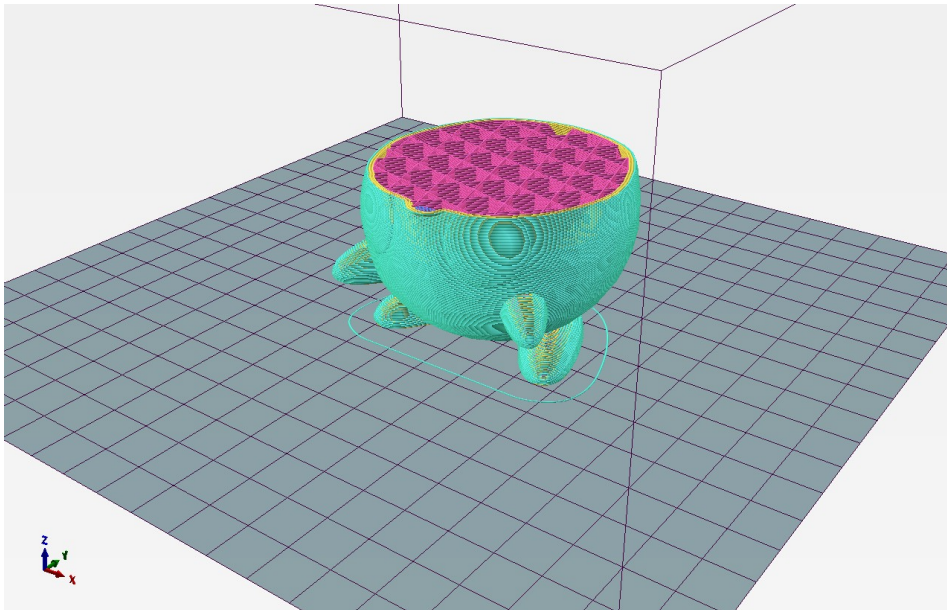
☒ Show complete Code

☒ Show Single Layer

☒ Show Layer Range

First Layer: 0

Last Layer: 93



[Print](#)

[Edit G-Code](#)

[Save to File](#)

[Save for SD Print](#)

Colors: ☒ Extruder ☒ Speed

18 24 30 36 42 48 54 60 66 72 78 84 mm/s

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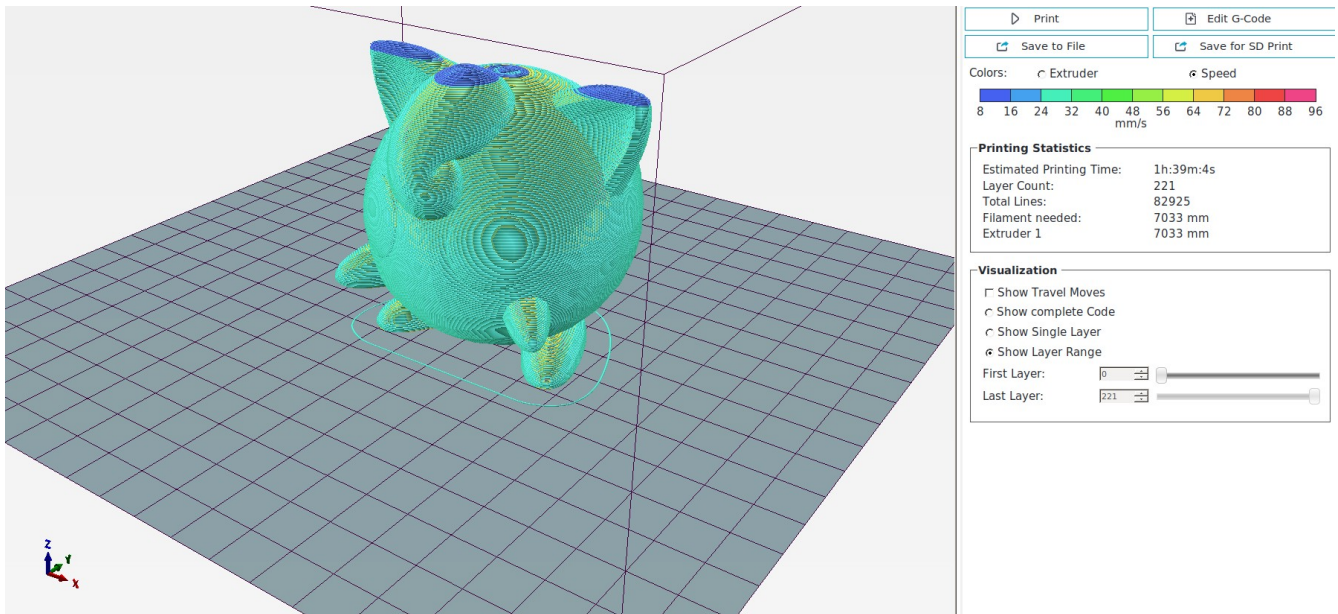
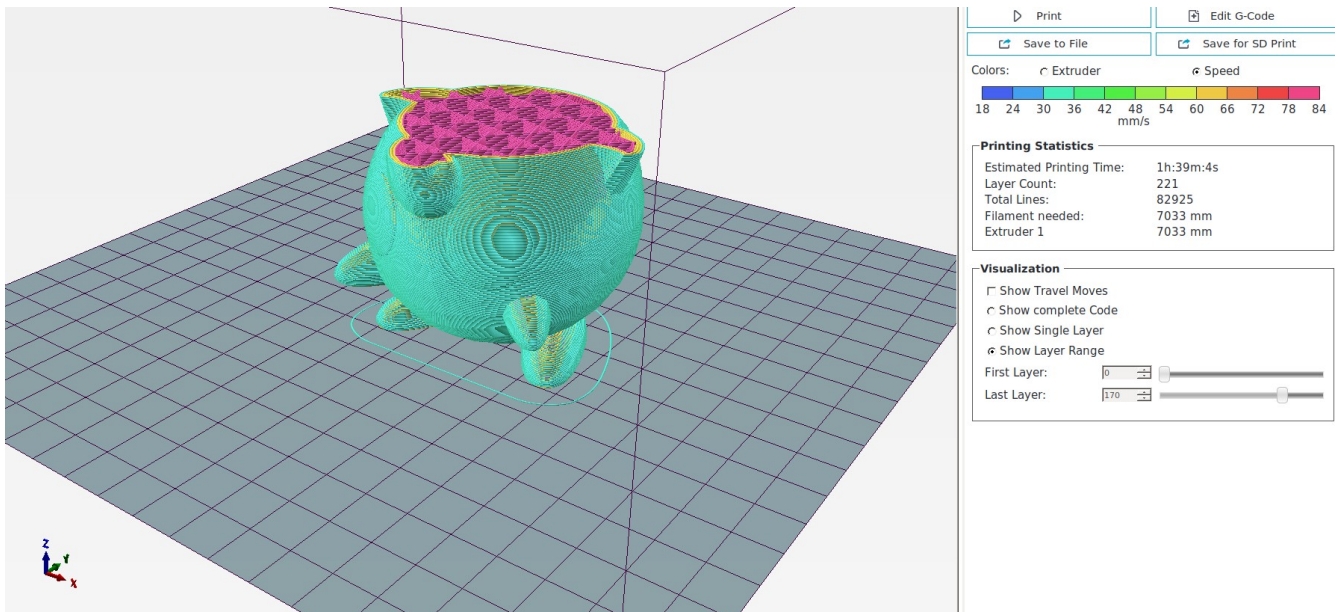
☒ Show complete Code

☒ Show Single Layer

☒ Show Layer Range

First Layer: 0

Last Layer: 135



4 High-level Understanding

Question 1 Answer

Failure Input Type 1: *Non-Manifold Geometries*

This algorithm only works for the case if the input is a two-manifold mesh. If the input is non-manifold, the algorithm will fail, as it will lead to non-closed curves or duplicated contours during the contour construction step.

The way to handle this bug, is to add a sanity check before starting the contour construction to check if there is any vertex that are non-manifold.

Failure Input Type 2: ***Self-Intersecting Geometries***

Another drawback of this algorithm is that it is not prone to self-intersecting geometries. Even if the geometries are self-intersecting, it will still create self-intersecting polygon contours. This does not break the slicing program, but will cause trouble to the real printing process.

To handle this aspect, a sanity check for self-intersecting geometries are necessary even before the slicing algorithm.