Blender Geometry Nodes for Roman Residential

Degree programme: BSc in Computer Science
Specialisation: Computer Perception and Virtual Reality
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Blender geometry nodes were used to build a modular system for generating Roman residential architecture. Archaeological references from Aventicum guided the creation of domus-like housing blocks, facade variations and courtyard structures. The node networks allow procedural control over building layouts, proportions and detail levels. A level-of-detail workflow ensures efficient use in real-time engines such as Unity.

Introduction

Roman cities featured organized street grids and residential building types such as domus, villa and insulae. Aventicum, the capital of Roman Helvetia, is only partially preserved today, with most domestic architecture missing. Procedural methods offer an efficient way to explore possible urban layouts and support digital reconstruction.

Concept

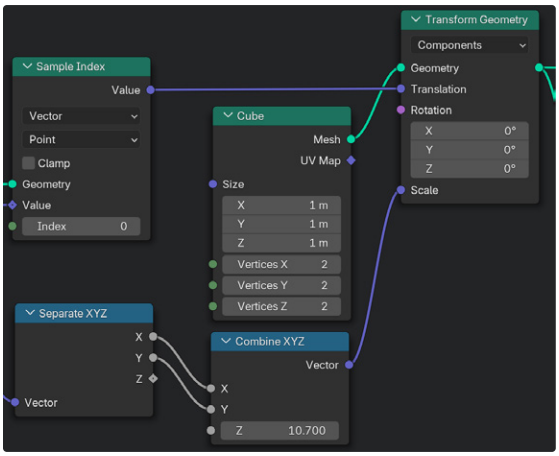
This thesis investigates how Blender's geometry node system can generate Roman residential architecture in a modular and reproducible way. Archaeological references were combined with procedural modelling techniques to build housing blocks and courtyard structures.

Goals

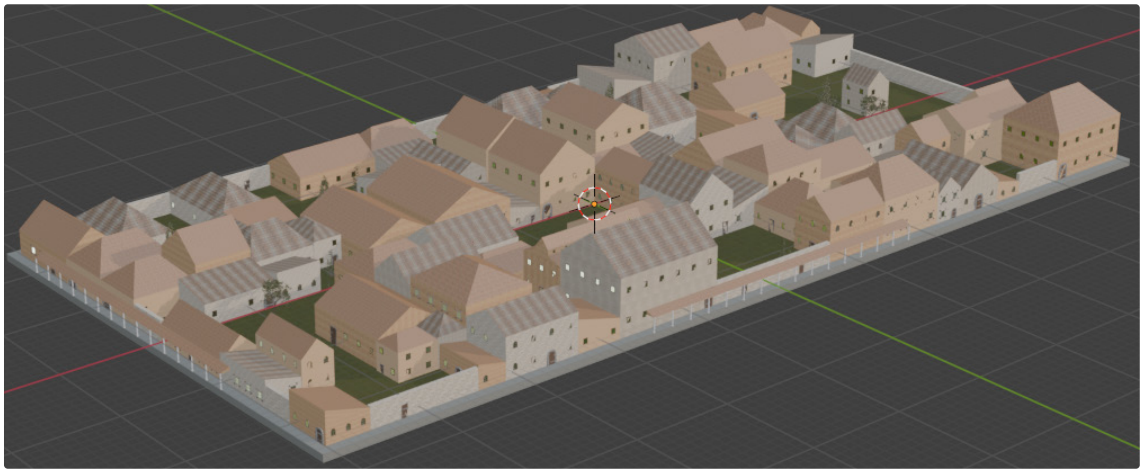
The main objectives of this thesis are to study the archaeological state of knowledge on Aventicum, collect reference material on Roman residential buildings, learn and evaluate Blender geometry nodes for architectural generation, develop a custom system for generating housing blocks and facades, and implement level-of-detail for real-time rendering in Unity.

Results

A geometry-node-based system for modular Roman housing blocks was created, supporting variations in layout, height, roofs and facade structures. It enables both bird's-eye and street-level views and works efficiently in real-time engines such as Unity.



Node network used to separate and filter mesh edges in Blender's geometry nodes as part of the procedural building



Geometry-node-based prototype of Roman residential building volumes with randomized subdivisions and modular house structures.

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