VILNIUS UNIVERSITY
FACULTY OF MATHEMATICS AND INFORMATICS
INSTITUTE OF COMPUTER SCIENCE
DEPARTMENT OF COMPUTATIONAL AND DATA MODELING

Software engineering | Information Technology 2nd year, 3rd group | Area 4

Technical Specification

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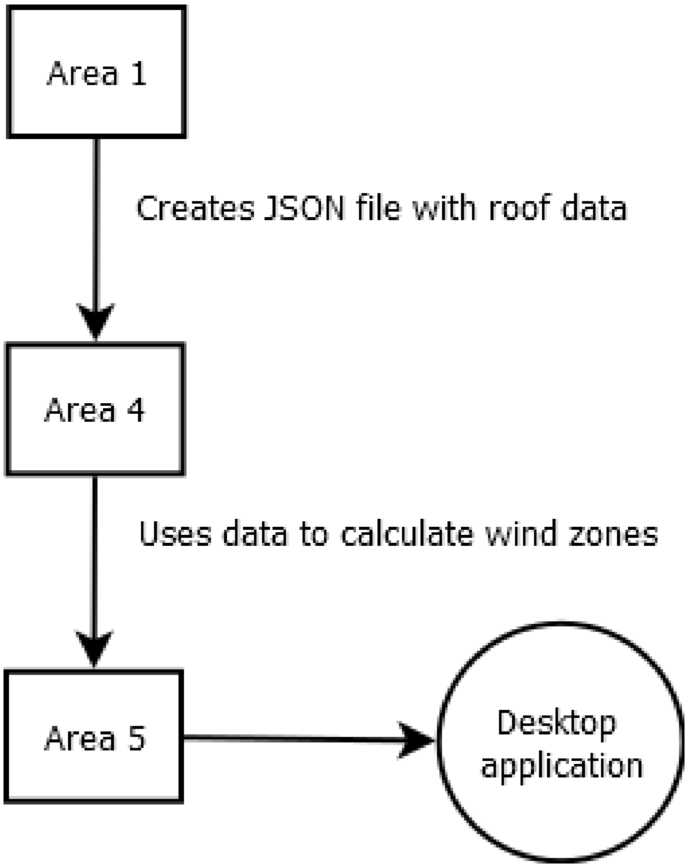
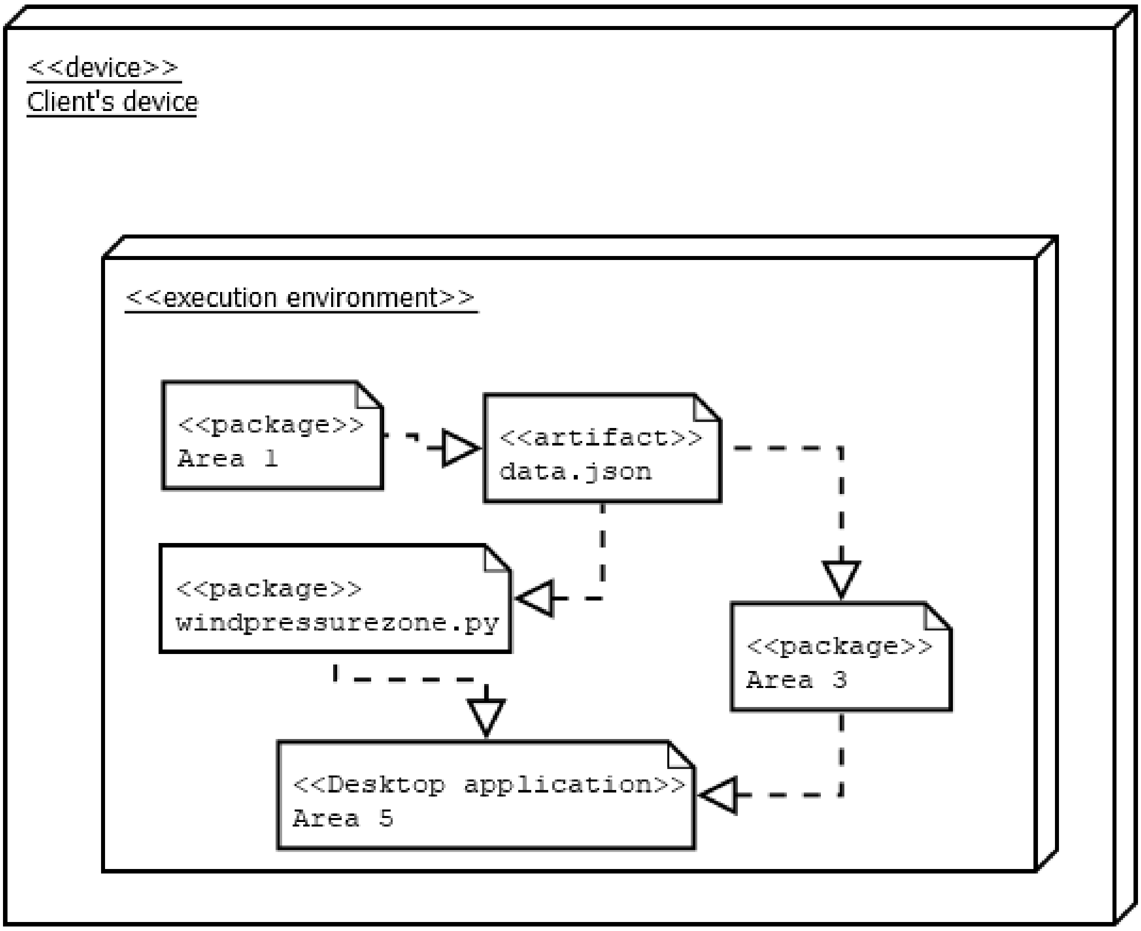
1. Overview

This technical specification details a package, which takes coordinates out of a JSON file, takes roof coordinates, places them into zones and exports that data back out as a JSON package. The JSON that is supplied to this package is taken from a JSON file that was converted from an XML by Area 1. The file which we receive consists of coordinates and parts of the roof, which we process with our code. By running the file through the code, we receive coordinates and their zones for wind pressure. The data that we get with our code is passed on to Area 5.

2. Context diagram


Area 1
Creates JSON file with roof data
Area 4
Uses data to calculate wind zones
Area 5
Desktop application

3. Deployment diagram



4. Technologies and tools

Programming language - Python (versions 3.9 - 3.10)

Libraries used in the code:

json: The json library can parse JSON from strings or files. The library parses JSON into a Python dictionary or list. It can also convert Python dictionaries or lists into JSON strings.

re: The re module provides a set of powerful regular expression facilities, which allows you to quickly check whether a given string matches a given pattern (using the match function), or contains such a pattern (using the search function).

math: provides us access to some common math functions and constants in Python, which we can use throughout our code for more complex mathematical computations.

IDE - VS Code and PyCharm

Unit testing - UnitTest

Version Control tool - GitHub

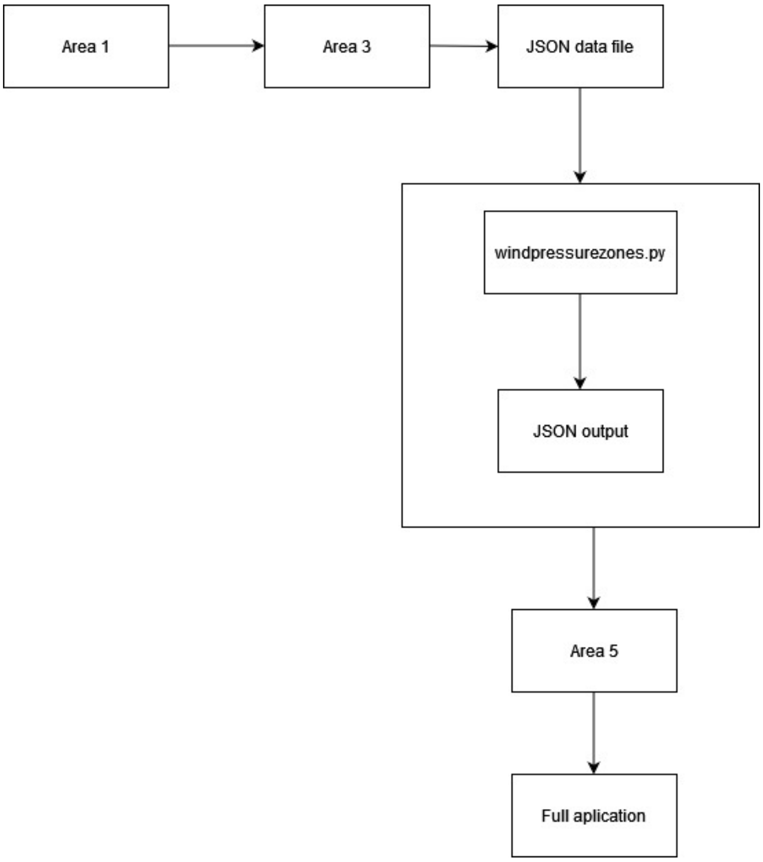
Documentation writing tool - Overleaf LaTeX

5. Structural aspects

The main components of our package are windpressurezones.py and data.json. Windpressurezones.py contains the whole code for our Area, while data.json contains all of the data we are working with. Windpressurezones.py firstly parses the json file that we have from Area 1, takes the necessary data, calculates the zones and finally prints out the zones and their point coordinates to a nicely formatted json file. data.json itself contains all the data of the roof.

6. Dynamic aspects

- The package receives the data file as input.
- After parsing the file, the code checks the sum of both low and high points, checks the roof for ridges and calculates the a value, which is roof height.
- After doing that, it checks the length of any given line and fines wind pressure zones.
- Finally, it sorts all coordinates into zones and prints it out to a json file, which is passed down further to Area 5.



7. Testing

Testing will be done using unit tests. Functions and other small pieces of software will be tested and checked for errors