OS project - MST, Strategy/Factory, Client-Server, Threads, Active Object, Thread poll (Leader-Follower) and Valgrind

Option 1: Pre-defined project

This project deals with the Minimal Spanning Tree (MST) problem on weighted - directed - graph.
You will implement a Factory for MST strategy.
We are also interested in the following data about the MST

- Total weight of the MST
- Longest distance between two vertices
- Average distance between and two edges n the graph.
    - assume distance (x,x)=0 for any X
    - We are interested in avg of all distances Xi,Xj where i=1..n j≥i.
- Shortest distance between two vertices Xi,Xj where i≠j and edge belongs to MST
- We will calculate in LF and in pipeline.

1. Implement a graph data structure - same as ex3.
2. Implement a data structure with a tree on the graph, as in section 1
3. Implement a Factory for MST algorithm that implements two algorithm solvers of
    a. Borůvka
    b. Prim
    c. Kruskal
    d. Tarjan
        You may examine MST implementation
[(Working) C++ Implementation of the Karger-Klein-Tarjan Algorithm for finding MST in expected linear time]
    e. Integer MST
https://www.sciencedirect.com/science/article/pii/S0022000005800649?via%3Dihub
4. We implement a server that Gets MST requests
    a. The server can get graphs, changes, and solve requests (same as ex 3) - Replace kosaraju command with the corresponding algorithm request.
5. The server will solve the problem and provide all the measurements above
    a. Using pipeline pattern (requires implementation of active object)
    b. Using Leader-Follower Thread poll
6. Provide Valgrind analysis (memcheck, helgrind, cg)
7. Prove code coverage of all code

Option 2: Suggest your own project

You may choose to create a project of your own choosing, the project should have a similar span and provide some sort of communications and design patterns.
You will need to provide code coverage and valgrind analysis.

This option allows you to be more creative, and focus on subjects that you are interested in.

If you choose this option, please get a pre-approval on your project subject.

Project ideas - Video player with effects (change to B/W picture in picture etc.) based on dranger ffmpeg tutorial (pipeline implementation)