



Università
della
Svizzera
italiana

Faculty of
Informatics

Institute of
Computing
CI

Numerical Computing

2022

Student: Albert Cerfeda

Discussed with: Alessandro Gobetti

Solution for Project 3

Due date: Wednesday, November 9, 2022, 11:59 PM

Numerical Computing 2022 — Submission Instructions

(Please, notice that following instructions are mandatory:
submissions that don't comply with, won't be considered)

- Assignments must be submitted to iCorsi (i.e. in electronic format).
- Provide both executable package and sources (e.g. C/C++ files, Julia). If you are using libraries, please add them in the file. Sources must be organized in directories called:
Project_number_lastname_firstname
and the file must be called:
project_number_lastname_firstname.zip
project_number_lastname_firstname.pdf
- The TAs will grade your project by reviewing your project write-up, and looking at the implementation you attempted, and benchmarking your code's performance.
- You are allowed to discuss all questions with anyone you like; however: (i) your submission must list anyone you discussed problems with and (ii) you must write up your submission independently.

1. The assignment

1.1. Implement various graph partitioning algorithms [50 points]

Summarize your results in table 1.

1.2. Recursively bisecting meshes [20 points]

Summarize your results in table 2.

1.3. Comparing recursive bisection to direct k -way partitioning [15 points]

Summarize your results in table 3.

Table 1: Bisection results

Mesh	Coordinate	Metis 5.0.2	Spectral	Inertial
grid(12, 100)	12			
grid(100, 12)	12			
grid(100, 12, pi/4)				
gridt(50)				
gridt(40)				
Smallmesh				
Tapir				
Eppstein				

Table 2: Edge-cut results for recursive bi-partitioning.

Case	Spectral	Metis 5.1.0	Coordinate	Inertial
mesh3e1				
airfoil1				
3elt				
barth4				
crack				

Table 3: Comparing the number of cut edges for recursive bisection and direct multiway partitioning in Metis 5.1.0.

Partitions	Helicopter	Skirt
16-recursive bisection		
16-way direct bisection		
32-recursive bisection		
32-way direct bisection		