**CMP3005**

**Fall 2023- 2024**

**Term Project**

One example of a problem that is NP-hard but can be approached with heuristics, similar to the Traveling Salesman Problem (TSP), is the "Graph Partitioning Problem" (GPP). The Graph Partitioning Problem involves dividing the vertices of a graph into a specified number of subsets while minimizing the number of edges that cross between subsets.

Formally, given an undirected graph *G*=(*V*,*E*) and an integer *k*, the goal is to partition the vertex set *V* into *k* subsets *V*1​,*V*2​,…,*Vk*​ in a way that minimizes the number of edges between different subsets.

The Graph Partitioning Problem is known to be NP-hard, as finding an optimal partition is computationally challenging. However some approximation algorithms exist.

Design an algorithm to solve this problem in an efficient way and determine the computational complexity. You may implement the algorithm using Java, Python etc.

This is a group assignment. After determining the approch to solve the problem, you will divide the tasks and distribute it to the group members. You have to prepare a powerpoint presentation related to your solution and approach, and present it to the class.

Group Assignments:

<https://docs.google.com/spreadsheets/d/11OKF2NmHPz6DE51-FLeLDQchaCPyAHV7DlotxFPXIGU/edit#gid=0>