Project Overview:

This project focuses on the generation and analysis of hyperuniform point clouds using persistent homology.

Project Tasks and Responsibilities:

Task 1: Data Generation and Collection

- **Responsible:** Enno
- **Description:** Generate hyperuniform point cloud data for analysis for different parameters and scale it using nuFFT. Generate hyperuniform Gaussian scalar fields.

Task 2: Application of Persistent Homology

- **Responsible:** Bekzat
- **Description:** Apply persistent homology techniques to the data and extract and visualize topological features using ripser or GUDHI.

Task 3: Topological Analysis

- **Responsible:** Bekzat
- **Description:** Compare diagrams using Wasserstein distance, identify HU regions in parameter space, and analyse robustness to partial data

Task 4: Result Interpretation and Comparison

- **Responsible:** All group members
- **Description:** Compare results with existing studies.

Task 5: Synthesizing Results

- **Responsible:** All group members
- **Description:** Condense and prepare results for presenting to seminar participants.

Timeline:

- Phase 1 - Literature Overview: DONE
- Phase 1 - Working Plan: DONE
- Phase 2 – Task 1, Task 2, Task 3
- Phase 2 – Task 4, Task 5

Coordination:

- Tools: GitHub, Canva