University of Messina
Master Degree in Enginering and Computer Science
Advanced Algorithms and Computational Methods
Module A
2023/2024

Assignment no. 1

- **Implement a complete Abstract Data Type (ADT) with adjacency matrices using Python and NumPy**
- Issue date: 26 October 2023
- Deadline (strict): 03 November 2023
- How to submit: via email at **gfiumara@unime.it**, subject: Assignment no. 1 Student name/surname. Use the university email account, if already active. Introduce yourself in the email body
- What to submit: the Python code (exclusively in .py format)
- Marks: Up to 3

1. Feel free to adopt the procedural (functions) or object-oriented (classes, objects, methods) approach
2. Implement the following functions/methods (Note that arguments have been omitted because they depend on the coding approach): `vertex_count()`, `edge_count()`, `vertices()`, `edges()`, `get_edge()`, `degree()`, `incident_edges()`, `insert_vertex()`, `remove_vertex()`, `insert_edge()`, `remove_edge()`
3. Select the proper data type for the adjacency matrix. Motivate your choice
4. Apply the ADT you developed to the dataset contained in the file named `karate.edgelist.txt`, it can be downloaded from the Teams Files section (subdirectory: Assignment1)
5. Use the package `matplotlib` to plot the degree of each node of the dataset