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

Assignment no. 2

Barabasi-Albert directed network

– Issue date: 14 December 2023

– Deadline (strict): 21 December 2023 at 23:59 CET

– How to submit: via email at **gfiumara@unime.it**, subject: Assignment no. 2 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.txt format)

– Marks: Up to 3

What to do

1. Network size: 10^4 nodes, $m = 4$

2. Initial condition: a fully connected network (hand-made) with $m = 4$ nodes

3. Data structure to store the network: edge list (at the beginning of the program you have to specify the meaning of the edge (u, v). Is the edge originating from u?)

4. Connect each new node to pre-existing nodes with probability

$$\Pi(k_i^{in}) = \frac{k_i^{in}}{\sum_j k_j^{in}}$$

5. Select at random which of the m edges of each new node is incoming or outgoing

6. Plot the resulting degree distributions (incoming and outgoing)