M2 – NSD (Practical Work 2)
Distances and triangles

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Exercise 1 — *BFS*   Implement an efficient BFS algorithm.

Use it to make an algorithm that outputs all connected componnents and their sizes (number of nodes). Test your algorithm on some real-world graphs, what can you say?

Use your BFS algorithm to make an algorithm that computes an approximation of the diameter of a graph. Test it on real-world graphs with a known diameter.

Exercise 2 — *Triangles*   Implement an efficient algorithm for counting triangles.

Generalize it to compute the transitivity ratio of the graph.

Generalize it to count the number of triangles each node belongs to and to compute the clustering coefficient of each node in the graph and the clustering coefficient of the graph.

Exercise 3 — *Dijkstra (optional)*   Implement the Dijkstra algorithm.