

# Weighted Graphs: Homework Solutions

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## Exercises 1, 2, 3

### Text:

*Implement the array-based version of the Dijkstra's algorithm.  
Implement the binary heap-based version of the Dijkstra's algorithm by using the library `binheap` that was developed during Lesson 6, Lesson 7 and Lesson 8.  
Test the implementations on a set of instances of the problem and compare their execution times.*

### Solution:

After having implemented both versions of *Dijkstra's Algorithm*, the two versions have been compared w.r.t. execution times by using random-generated graphs represented as adjacency (linked) lists.

Since the complexity of the algorithm depends in any case both on the number of nodes on the graph and on their connectivity (namely: on the number of edges), graph density has been kept constant while varying the number of nodes.

As we can see from the graph, the *heap-based* version of the algorithm (i.e. that using a heap to manage the priority queue) performs better than the array-based one, especially as the size of the graph grows.

## Benchmarks:

