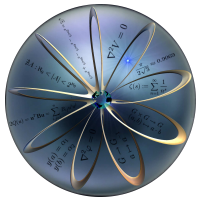

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Floyd's algorithm

Canonical name	FloydsAlgorithm
Date of creation	2013-03-22 12:16:29
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Author	vampyr (22)
Entry type	Algorithm
Classification	msc 68R10
Classification	msc 05C38
Classification	msc 05C85
Synonym	all pairs shortest path algorithm

Floyd's algorithm is also known as the all pairs shortest path algorithm. It will compute the shortest path between all possible pairs of vertices in a (possibly weighted) graph or digraph simultaneously in $O(n^3)$ time (where n is the number of vertices in the graph).

Algorithm FLOYD(V)

Input: A weighted graph or digraph with vertices V

Output: A matrix *cost* of shortest paths and a matrix *pred* of predecessors in the shortest path

```
for (a, b) ∈ V² do
  if adjacent(a, b) then
        cost(a, b) ← weight(a, b)
        pred(a, b) ← a
  else
        cost(a, b) ← ∞
        pred(a, b) ← null
for c ∈ V do
  for (a, b) ∈ V² do
        if cost(a, c) < ∞ and cost(c, b) < ∞ then
              if cost(a, b) = ∞ or cost(a, c) + cost(c, b) < cost(a, b) then
                    cost(a, b) ← cost(a, c) + cost(c, b)
                    pred(a, b) ← pred(c, b)
```