

### Homework Assignment 3

Given 04/12/2016, due 05/02/2016

Write code that finds a maximum flow in a directed graph, using the Ford-Fulkerson algorithm on capacities given as matrix

```
void maximum_flow(int n, int s, int t, int *capacity, int *flow)
```

Your function has the following arguments:

- **n**: the number of vertices of the graph,
- **s**: the start vertex,
- **t**: the target vertex
- **capacity**: the matrix of edge capacities.
- **flow**: the matrix used to return the maximum flow.

The vertices are numbered from 0 to  $n-1$ , so **s** and **t** are numbers in that range.

**capacity**, **flow** are pointers to  $n \times n$  matrices of nonnegative integers; the array element **capacity**[*i*][*j*] is the capacity of the edge from *i* to *j*, and can be accessed as **\*(capacity + i\*n + j)**. Your function should return in the matrix **flow** the flow values of the maximum flow from **s** to **t**. The **flow** variable of your function points to space allocated for the **flow** matrix.

Your function will need at least the following auxiliary arrays:

- an  $n \times n$  matrix to hold the current flow,
- an  $n \times n$  matrix to hold the current residual capacities,
- an array to maintain which vertices are already visited in the search of an augmenting path from **s** to **t** with positive residual capacity.

You have to allocate the auxiliary arrays. You can use either BFS or DFS for the search of the augmenting path.