

### Third assignment report

The first thing I noticed is that the algorithm may not terminate in the case where recovery is faster than contagion. For example by setting the parameters in this way:

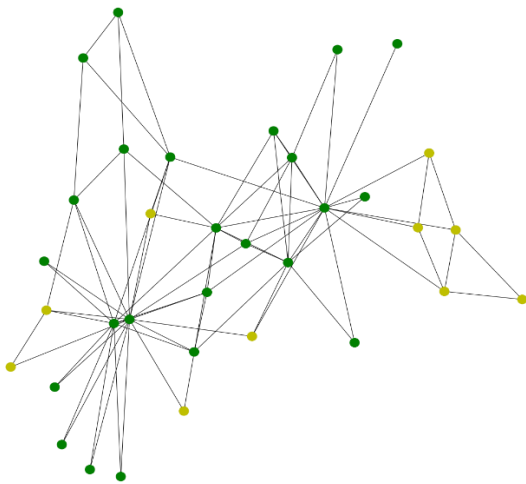
$p$  (disease transmission probability) =  $1/10$

$T$  (duration of the infection) = 3

$q$  (recovery probability) =  $1/2$

$i_0$  (number of nodes to start the diffusion of the virus) = 3

This is the final configuration that I got:



Karate Club Graph

Nodes S(susceptible) are represented by the yellow, Nodes I(infected) are represented by the red and nodes R (recovered) are represented by the green. I can notice from the graph that not all the nodes are recovered because not all were infected. In this case, we should change the stop condition of the algorithm as “Repeat until there are not nodes I (infected)”.

If I increase the duration of the infection ( $T$ ), it may happen that the infection reaches all nodes because even if the probability of infection is low but they spend more time as infected, they don't have the chance to heal and block infection.

If the goal is to make the algorithm work as specified, so you have to infect all nodes, then you can apply the inverse principle by setting the parameter  $p$  higher and the parameter  $q$  lower in this way it is easier that the contagion expands to all nodes as they take longer to finish in R(recovered).

