Read Me
Project: Virus Propagation
Unity Id: ndgandh2
Option 1: Static Contact Network

Description:
The main goal of the project is to analyze the propagation of a virus in a static contact network and prevent a network-wide epidemic.

Files Includes With This Project:

1. P5_ndgandh2.R
2. Read Me
3. Report

Environment variable settings (if any) and OS it should/could run on :
Operating System : Windows 8.1
OS Type: 64-bit
Processor: Intel Core-i5

Softwares to be installed:
I have implemented Community Detection using serial program in R.
To install R in Windows:

1. Download R from the following link:
   http://cran.r-project.org/bin/windows/base/
2. Double click on the downloaded R-3.1.1-win.exe file and follow the instructions.

Install RStudio in Windows:

1. Download RStudio from the following link:
   http://www.rstudio.com/products/rstudio/download/
2. Double click on the downloaded .exe file and follow the instructions.

Instruction to run the program:
Open any R development environment (RStudio) and type the following commands

1. *setwd('path-to-the-directory-containing=code-files/')*
   This command will set the working directory of the project

2. *source('path-to-file/P5_ndgandh2.R')*

   This command compiles the R file

3. *virusPropagation(graphFile = "path-to-graph-dir/graphFile")*

This command runs the virusPropagation() function which analyzes the propagation of virus in a given “Static Contact Network” graph for given transmission and healing probability and applies various Immunization policies to prevent a network wide epidemic.

Arguments:

graphFile	path to the static contact network graph

Instruction on how to interpret results:

Sample Input:

Input is a complete undirected unweighted static network graph whose format is as follows:

```
5715 10932
0 1
2 3
4 5
6 7
8 9
```

First row contains the total number of vertices and total number of edges in the graph. Remaining rows contains the vertex id pair which has an edge between them indicating an edge between two nodes.

Sample Output:

Output are the graph plots of the Beta Variation, Delta Variation, Simulation and the Variation of number of vaccines to analyze the propagation of virus in a network and number of vaccines to immunize the virus from spreading in the network.

References:

1. "Home - RStudio." RStudio. N.p., n.d. Web. 01 Nov. 2014.
2. Chakrabarti, Deepayan, and Christos Faloutsos. *Graph Mining: Laws, Tools, and Case Studies*. San Rafael, CA: Morgan & Claypool, 2012. Print.