

# Notebook

March 6, 2019



**Question 1** Copy and paste the table below in a new cell and fill it with the shortest distance between each pair of vertices. Enter INF if the nodes are disconnected

	node 1	node 2	node 3	node 4	node 5	node 6	node 7	node 8	node 9
node 1	-	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)
node 2	-	-	(?)	(?)	(?)	(?)	(?)	(?)	(?)
node 3	-	-	-	(?)	(?)	(?)	(?)	(?)	(?)
node 4	-	-	-	-	(?)	(?)	(?)	(?)	(?)
node 5	-	-	-	-	-	(?)	(?)	(?)	(?)
node 6	-	-	-	-	-	-	(?)	(?)	(?)
node 7	-	-	-	-	-	-	-	(?)	(?)
node 8	-	-	-	-	-	-	-	-	(?)
node 9	-	-	-	-	-	-	-	-	-

*Write your answer here, replacing this text.*



**Question 2** Now manually calculate the average shortest path length **for each** of the connected components in the network.

*Write your answer here, replacing this text.*



**Question 6** Plot a histogram showing the distribution of clustering coefficients across the 84 Add Health networks.

```
In [39]: ...
```





**Question 7** Make a scatter plot that compares the number of nodes in each network (x axis) to the clustering coefficient (y axis). Does it look like the clustering coefficient changes as the number of nodes does?

```
In [40]: ...  
         # please answer the question as a comment here
```



**Question 9** Plot a histogram showing the distribution of average shortest path lengths across the 84 Add Health networks' largest components.

```
In [45]: ...
```



**Question 10** Make a scatter plot that compares the number of nodes in each largest component (x axis) to the average shortest path (y axis). Does it look like the average shortest path changes as the number of nodes does?

```
In [46]: ...  
         # please answer the question as a comment here
```



**Question 13** Where would the observed Add Health network's statistic fall in the Erdos Renyi networks' distribution?

*Write your answer here, replacing this text.*





**Question 16** What do these two  $p$  values lead you to conclude about the agreement between the ER model and the small world hypothesis (at least, using information from the Add Health network)?

*Write your answer here, replacing this text.*