The file chess\_plays.csv includes 4 variables describing the location and time of specific chess competitions. The data is in form of a 2-mode network, i.e., chess players (*chessID*) are participating in chess meetings (*meetingID*). See below a short description of the variables.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variable** | Area | chessID | meetingID | year |
| **Description** | This variable identifies the overall area of the meeting (this does not equal to the specific meeting location). | This variable identifies the individual chess player. | This variable describes the chess meeting and is a unique combination of date and location. Two chess players would have the same meetingID IF they participated in the same meeting on the same day. | This variable describes the year of the meetingID. The data typically has multiple meetingIDs per chess player. |

The file has 707,247 observations describing the participation of chess players in competitions between 2007 and 2017. I need a PYTHON script that computes several centrality measures of each chess player using **NetworkX** (or a similar python package), while giving me the option to calculate those measures (1) by year only or (2) by year and area. I would also like to have the opportunity to add additional centrality measures IF needed in the future.

The deliverable is the PYTHON code that generates a .csv file with 19,120 (the number of unique chess player-year combinations) rows in the following structure:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **chessID** | **year** | **Degree** | **Normalized Degree** | **Closeness** | **Normalized Closeness** | **Betweenness** | **Normalized Betweenness** | **Eigenvector** | **Normalized Eigenvector** |
| 1378 | 2011 |  |  |  |  |  |  |  |  |
| 1378 | 2012 |  |  |  |  |  |  |  |  |
| 1378 | 2013 |  |  |  |  |  |  |  |  |
| 1378 | 2014 |  |  |  |  |  |  |  |  |
| 1378 | 2015 |  |  |  |  |  |  |  |  |
| 1378 | 2016 |  |  |  |  |  |  |  |  |
| … | … | … | … | … | … | … | … | … | … |

Again, I want the option to compute the RAW and NORMALIZED centrality measures by (1) year alone or (2) year and area.