

ARTEC2021 Assignment 02

(Due Date: October 18, 2021)

Question 1

Questions in this section are related to the content in the authored by Duncan J. Watts and Steven H. Strogatz on small-world networks¹

- (a) What is the total number of actors (n) in the film actors network?
- (b) With an aid of a simple illustrative example, state the definition of k ?
- (c) With an aid of a simple illustrative example, state the definition of characteristic path length $L(p)$ of a network.
- (d) With an aid of a simple illustrative example, state the definition of cluster coefficient $C(p)$ of a network.
- (e) In the legend of Table 1, the authors claimed that $L \gtrsim L_{random}$ and $C \gg C_{random}$. Comment if their research method is sound enough to validate their claims.

Question 2

- (a) Search over Google Scholar and list three papers (other than the above paper) which are single-authored by Duncan J. Watts in between 1998 and 2005.
- (b) The first academic position of Duncan J. Watts was in Columbia University as an assistant professor. What was his professor rank before he left the university?
- (c) After Watts has left Columbia University, he has been working in a number of institutes. Search over the Internet and list all the institutes he has been affiliated and his positions in these institutes.

Question 3

- (a) Find out the reasons why he devoted his doctoral research on small world networks. Which scholar influenced him to do this research. Note that it is a difficult part.
- (b) As mentioned in the lecture, the works done by Duncan J. Watts led to a wave of researches on small-world networks, social networks, scale-free networks and power-law networks in the 2000s. Search over the Internet and list five renown scholars who were influenced by Watts's works in the 2000s.
- (c) How do the contributions of the research works in the area of small-world networks (social networks, scale-free networks and power-law networks) influence the researches in the area of electronic commerce, technology management or other disciplines? You only have to state its influence on one area.

¹Watts, D. J., and Strogatz, S. H. (1998). Collective dynamics of 'small-world' networks. *Nature*, 393(6684), 440-442.