

# ARTEC2023 Assignment 01 (Due date: Oct 4, 2023.)

September 20, 2023

## 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 networks<sup>1</sup>

- (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. Which department Watts was affiliated at that time? What was his professor rank just 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 Duncan Watts devoted his doctoral research on small world networks. Which scholar(s) influenced him to do this research.
- (b) The works done by Duncan J. Watts had 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.

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