



COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND GOVERNANCE

NCSC407 :SIMULATION AND MODELLING

END OF SECOND SEMESTER EXAMINATIONS

MAY 2021

LECTURER: MR MUKHALELA

DURATION: 7 HOURS

INSTRUCTIONS

Answer any **ONE** question. Submit answer to parts (a) as code(s) and output as screenshots via **email:** mukhalelab@africau.edu and part (b) (only applies for some questions) as essay type answers via **Moodle**.

The marks allocated to **each** question are shown at the end of the section. Include citations where possible in your essay type answers.

Credit will be awarded for logical, systematic and neat presentations.

Question One

One of the most difficult problems facing a simulation analyst is that of trying to determine whether a simulation model is an accurate representation of the actual system being studied, ie whether the model is valid. Referencing on the assessment of an existing simulation model by the following authors; Fossett et al. (1991), Gass (1983), Gass and Thompson (1980), and Knepell and Arangno (1993) Write a detailed essay that summarizes the findings from these assessments on verification and validity of simulation models. [50].

Question Two.

- (a) Discuss the usefulness of the self-organization, feedback loops etc qualities of complex adoptive systems in simulation and modelling everyday life. [25]
- (b) Discuss the usefulness of generating variables in a model. Cite examples using any system domain we have looked at during our semester Labs. [25]

Question Three.

- (a) Having just joined a company as a Graduate IT-Business Strategist, an intern Marketing student proposed using viral marketing as a strategy in launching a new mobile based payment platform for your organisation. Your task is to analyse the proposed word of mouth viral marketing strategy proposed via a model of some sort before you approve its launch. You and your team are interested in noticing the adoption rate of the Mobile App having launched it via viral marketing word-of-mouth in a community of 1500-2500 potential adopters. Your team also shown interest in analysing likely output of your simulation in graphical way. Use your imagination and the NetLogo Simulation and Modelling tool to coin an acceptable model for the problem at hand. Comment your code please. [35]
- (b) Discuss both the Erdos-Renyi random graph and the Bass model of diffusion, link your understanding on how you used them in the model in (a) above. [15]

END OF EXAMINATION