COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND GOVERNANCE

NCSC 408: SIMULATION AND MODELLING

END OF SECOND SEMESTER EXAMINATION

JANUARY/MAY 2022

LECTURER: MR MUKHALELA

DURATION: 3 HOURS

INSTRUCTIONS TO CANDIDATES

1. This paper carries **5** questions.
2. Answer **All** questions from **section A (Practical using a Lab allocated computer),** Save your Work on the Desktop, file name should be your Student ID + Course Code eg 2017NCSC407.
3. Answer any **2 (two)** from **section B** questions **use Exam provided Answer booklet in the section.**
4. Each question carries 20 marks.
5. The marks for each question are indicated in square **[]** brackets.

Section A

Question 1

Using Argo UML, come up with a detailed Use-Case diagram to model a Bank ATM System. The model should include both the include and the extend kinds of use-cases and all actors concerned. [25]

Question 2

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 Modeling tool to coin an acceptable AB model for the problem at hand. Comment your code please. Include all possible variables which may be of aid for the model to aid management in deciding adoption of the proposal. [25]

Section B

Question 3

a. As software developers, we often build models during design and/or we reverse-engineer them from an existing system. Identify and narrate briefly any five (5) reasons for building these models. [10]

b. Discuss the usefulness of the self-organization, feedback loops etc qualities of complex adoptive systems in simulation and modelling everyday life. [15]

Question 4

a. The development of serious games in most of today's industries requires the skills of a Simulation Engineer to come up with a detailed simulation on how the proposed

system will work. Discuss, using real life examples how these are achieved in relation to the types of simulations and or models we have. [15]

b. Exemplify a scenario where a Simulation Engineer may harness both ABM and DES in a project. [10]

Question 5

Comment and exemplify how the following types of simulation and models can be harnessed in modern day simulation engineering;

(i) Live

(ii) Virtual and

(iii) Constructive. [25]

End of Examination.