(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY
(MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

2022/2023 ACADEMIC YEAR

THIRD YEAR SECOND SEMESTER EXAMINATIONS

FOR THE DEGREE OF

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

COURSE CODE: BCS 365

COURSE TITLE: SOFTWARE DEVELOPMENT

DATE: Tuesday 20th April, 2023 **TIME:** 8.00 – 10.00a.m.

INSTRUCTIONS TO CANDIDATES

Question ONE (1) is compulsory
Answer any other TWO (2) questions
TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

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Question One

(a) Define the following software development terms (3 marks)
   (i) Exploratory programming
   (ii) Requirements gathering
   (iii) System Modelling
   1 mark for each correct definition

(b) Identify and explain the various system perspectives. (4 marks)

   1 mark for correct perspective

(c) In software development, it is useful to classify operations as being either **constructors** or **observers**. Briefly describe:
   (i) Constructors
   (ii) Observers (6 marks)

   1 mark for each correct description

(d) Identify any four objectives of SSADAM (4 marks)

(e) There are many different software processes, but all involve some common aspects, what aspects are these? (4 marks)

(f) A time comes when exploratory programming is the only option left for most programmers, suggest conditions under which this is so, (3 marks)

(g) Consider the following statement. "Ram is a student". Use your knowledge of predicate calculus to illustrate the difference between predicate and statement function (6 marks)

   2 marks for illustrating a predicate.

   4 marks for illustrating a statement function.

Question Two

(a) (i) The idea behind algebraic specifications is that an abstract data type (ADT) should be characterized only by the behaviors of its members. What do you understand by this statement? (2 marks)
   (ii) In algebraic specifications, abstract data types are defined by signatures and axioms. Briefly explain what each term means (4 marks)

(b) (i) Briefly describe Stacks as used in software development (4 marks)

   (ii) Give a one sentence interpretation of the following algebraic specifications in relation to stacks and abstract data types. (7 marks)

   Stack <Elem>:
   Signature:

   isEmpty :
   topOf :
   empty :
   pop : Stack<Elem> → Stack<Elem>
   push : Stack<Elem> × Elem → Stack<Elem>

(c) It's argued that it's better to model a range of *pop* as *stack * elem* than jsut *stack*. Why should this be the case and in which programming language would this more applicable? (3 marks)

Question Three

(a) There are several notations for displaying data-flow diagrams, including Edward Yourdon, Larry Constantine, Tom DeMarco, Chris Gane, and Trish Sarson. Use a suitably labelled diagram to illustrate the three most widely used DFD notations: (12 marks)

(b) Starting with a simple context diagram of two entities, brake down the context diagram to level 1 using SSADM DFD Templates and Examples. (8 marks)

Question Four

(a) (i) Is software requirements specification necessary? If so what do you opine to be its goals? (7 marks)

(b) It's Unfortunate that much of the time, systems architects and programmers write software requirements specifications with little (if any) help from the technical communications organization. And when that assistance is provided, it's often limited to an edit of the final draft just prior to going out the door. Suggest possible benefits a software development organization can derive by involving technical writers in the entire duration of developing software requirements specification document. (7 marks)

(c) Several standards organizations (including the IEEE) have identified nine topics that must be addressed when designing and writing an SRS. Identify and explain any four such topics. (6 marks)

Question five

(a) There are several software processes models, among them are the waterfall model, Incremental development and Reuse-oriented software engineering, create a six column table to show item number, process model, definition, advantages, disadvantages and application (16 marks)

No.	Process model	Definition	Advantages	disadvantages	application
1	Waterfall				
2	Incremental				
3	Re-use oriented				

(b) Use a well labelled diagram to illustrate the components of software requirements engineering process activities (4 marks)