AFRICA UNIVERSITY
A United Methodist-Related Institution

COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND GOVERNANCE

NCSE103 – OBJECT ORIENTED SOFTWARE DEVELOPMENT

END OF SECOND SEMESTER EXAMINATION

AUGUST 2023

LECTURER: MR MUKHALELA

DURATION: 3 HOURS

INSTRUCTIONS TO CANDIDATES

1. This paper carries **6** questions.
2. Answer **All** questions from **section A (Practical using a Lab allocated computer),** Save your answer in a folder on your desktop, its name should be your Student ID+ Course Code eg 20120234NSE103.
3. Answer any **2 (two)** from **section B** questions **use Exam provided Answer booklet in the section.**
4. Each question carries 25 marks.
5. The marks for each question are indicated in square [] brackets.

Section A

Question 1

Draw a UML Use Case diagram using ArgoUML for ATM Banking System, your creativity will earn you more credit, include all necessary kinds of relationships in your diagram;. [25]

Question 2

Draw class diagrams using ArgoUML to show the following classes: Automobile, headlamps, and sedan.

On the class diagram demonstrate some of the following elements often shown on such diagrams;

Class Diagram Elements

• generalization • composition • public attribute • object return type • aggregation • public operation • private attribute • exception • multiplicity • private operation • class name • visibility modifier • realization • stereotype • primitive attribute • protected operation • dependency

NB: Not all elements are to be shown on your diagram. [25]

Section B

Question 3

Discuss the merits of using OOP as a software development methodology. [25]

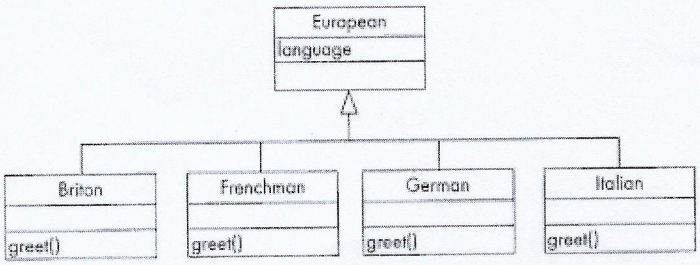
Question 4

Write elaborate notes on the following terms used in OOSD;

(i) Object
(ii) Message
(iii) Method
(iv) Encapsulation
(v) Class

NB: Use examples. [25]

Question 5



Inheritance hierarchy for the European class

Using the above class diagram demonstrate polymorphism using the clues given below. Write the related java code, include a for loop to demonstrate the use of the greet() method as it is to be used polymorphically by European subclasses.

How the different classes in the European hierarchy implement the greet() operation

Class	*Method specification for greet()*
European	undefined
Briton	Good morning
Frenchman	Bonjour
German	Guten Tag
Italian	Buongiorno

Attributes and responses to the greet() message of some objects from the European hierarchy

Object name	*Class*	*Attributes*	*Response to greet() message*
pierre	Frenchman	language: French	Bonjour
hans	German	language: German	Guten Tag

[25]

Question 6

a. List three types of relationships between classes. Briefly describe each. [15]

b. Relationships in UML diagrams often have multiplicities associated with them. Briefly describe, in English, what each of the multiplicities below mean.

(i) 0..1

(ii) 1

c. (i) What aspect of a class is captured on a CRC card?

(ii) List four ways in which collaboration diagrams differ from sequence diagrams.

[10]

End of Examination.