



COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND GOVERNANCE

NCSE 103: OBJECT ORIENTED SOFTWARE DEVELOPMENT

END OF SECOND SEMESTER EXAMINATION

APRIL 2022

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 20120234NSE.
 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.
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Section A

Question 1

Draw class diagrams using ArgoUML to link the following classes using association, aggregation, inheritance and multiplicity where appropriate: [25]

- a. hotel room, booking, guest
- b. club member, adult member, junior member
- c. exam paper, instruction, question, solution
- d. animal, mammal, bird, reptile, dog, horse, parrot
- e. sentence, word, letter, punctuation
- f. academic staff, lecturer, professor, student.

Question 2

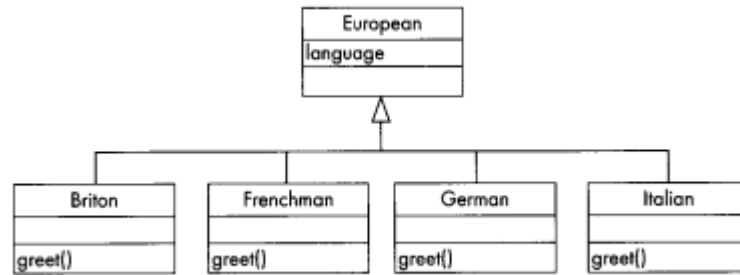
Draw a UML Use Case diagram using ArgoUML for the detailed Use Case – Buy a Product; [25]

1. Customer browses catalog & selects items to buy
2. Customer goes to check out
3. Customer fills in shipping information (address, next-day or 3-day delivery)
4. System presents full pricing information
5. Customer fills in credit card information
6. System authorizes purchase
7. System confirms sale immediately
8. System sends confirming email to customer

NB: Your diagram should include both the Include and extend relationships.

Section B

Question 3



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 4

- As discussed in class, Verification and Validation, or V&V, is often referred to as IV&V, where the I stands for Independent. This means that those responsible for

V&V are independent from those who are responsible for producing the product.

Independence is typically broken down into three categories:

- Managerial Independence
- Financial Independence
- Technical Independence

Describe each type of independence and why it is important to get unbiased V&V.

Also, for each type of independence, give an example of something that can go wrong if you don't have it.

[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
- (iii) n (natural number)
- (iv) 0..n
- (v) 1..n

[10]

Question 5

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

Question 6

Write elaborate notes on the following terms used in OOSD;

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

NB: Use examples.

[25]

End of Examination
