



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

Faculty of Computing and Informatics

Department of Computer Science

QUALIFICATION: Bachelor of Computer Science	
QUALIFICATION CODE: 07BACS	LEVEL: 5
COURSE: Object Oriented Programming	COURSE CODE: OOP521S
DATE: November 2019	SESSION: 1
DURATION: 3 HOURS	MARKS: 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
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THIS EXAM PAPER CONSISTS OF 2 PAGES
(Excluding this front page)

INSTRUCTIONS

1. This is a closed book examination with two sections; A and B.
2. Answer ALL questions in a separate writing booklet provided to you.
3. Total marks per section are given in [], and () per question.
4. For Section A, answer each question on a new page.
5. NUST's rules and regulations apply.

SECTION A:**[70 marks]**

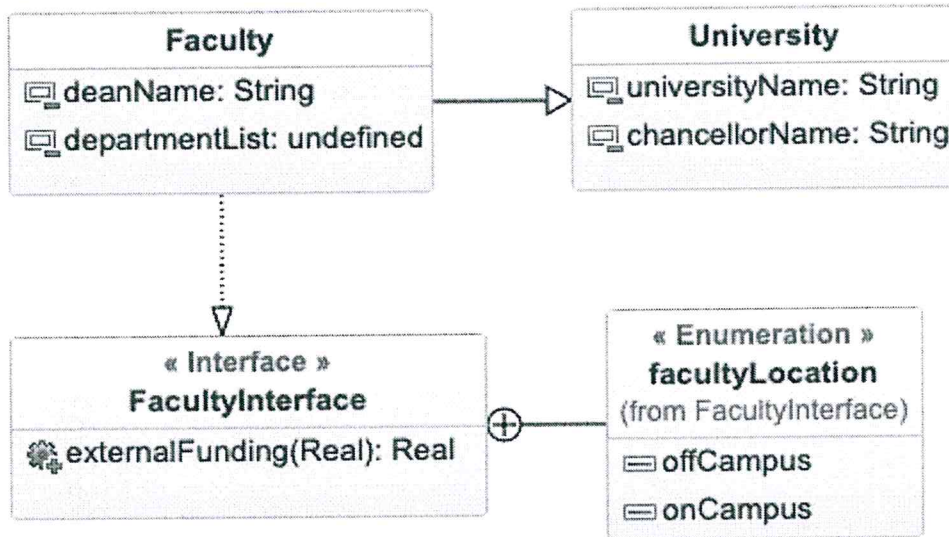
Clearly explain and distinguish the following terms from one another. Give example code in ALL cases.

1. class and object (10 marks)
2. method overload and method override (10 marks)
3. deepToString() and toString() (10 marks)
4. encapsulation and abstraction (10 marks)
5. inheritance and aggregation (10 marks)
6. checked exception and unchecked exception (10 marks)
7. polymorphism and instantiation (10 marks)

SECTION B:

[30marks]

Kindly study the class diagram below and write code that fulfils the requirements given underneath.



1. Create the classes **Faculty** and **University** as given in the class diagram. Add at least two constructors for each class, including a full constructor in each. Take note that *departmentList* in **Faculty** should be an arraylist of String variables. (5marks)
2. Define **FacultyInterface** that has an abstract method *externalFunding()*, which returns a double and receives one parameter of type double. Also add an enum *facultyLocation* as shown in the class diagram above. (4marks)
3. Implement the **FacultyInterface** assuming that *externalFunding* is calculated by multiplying the *numberOfPartnerships* the Faculty has with the *averageGrant* given basing on the table below: (5 marks)

facultyName	averageGrant
FCI	1.5 million
FEN	1.2 million
FHS	850 thousand

4. Assuming that external funding should not exceed 10 million annually for each Faculty, add a custom exception, **ExternalFundingException** that will be thrown in the event that this condition is not met. Add all necessary code to handle this exception. (7 marks)
5. In the driver class do the following operations:
 - a. Create at least two **Faculty** objects using different constructors in (1). (2 marks)
 - b. Demonstrate polymorphism and write an appropriate comment. (2 marks)
 - c. Display all the properties of the objects you created to the screen. (2 marks)
6. Comments, readability and use of conventions. (3 marks)

[END]