National University of Computer and Emerging Sciences, Lahore Campus

Course:	Software Design & Architecture	Course Code:	SE2002
Program:	BS (SE)	Semester:	Spring 2022
Duration:	60 Minutes (1 Hour)	Total Marks:	30 (21)
Paper Date:	21-Mar-22	Weight	15%
Section:	All	Page(s):	3
Exam:	Sessional I		

Instruction/Notes:

Attempt all questions on the question paper. Neither use nor submit any extra sheet.

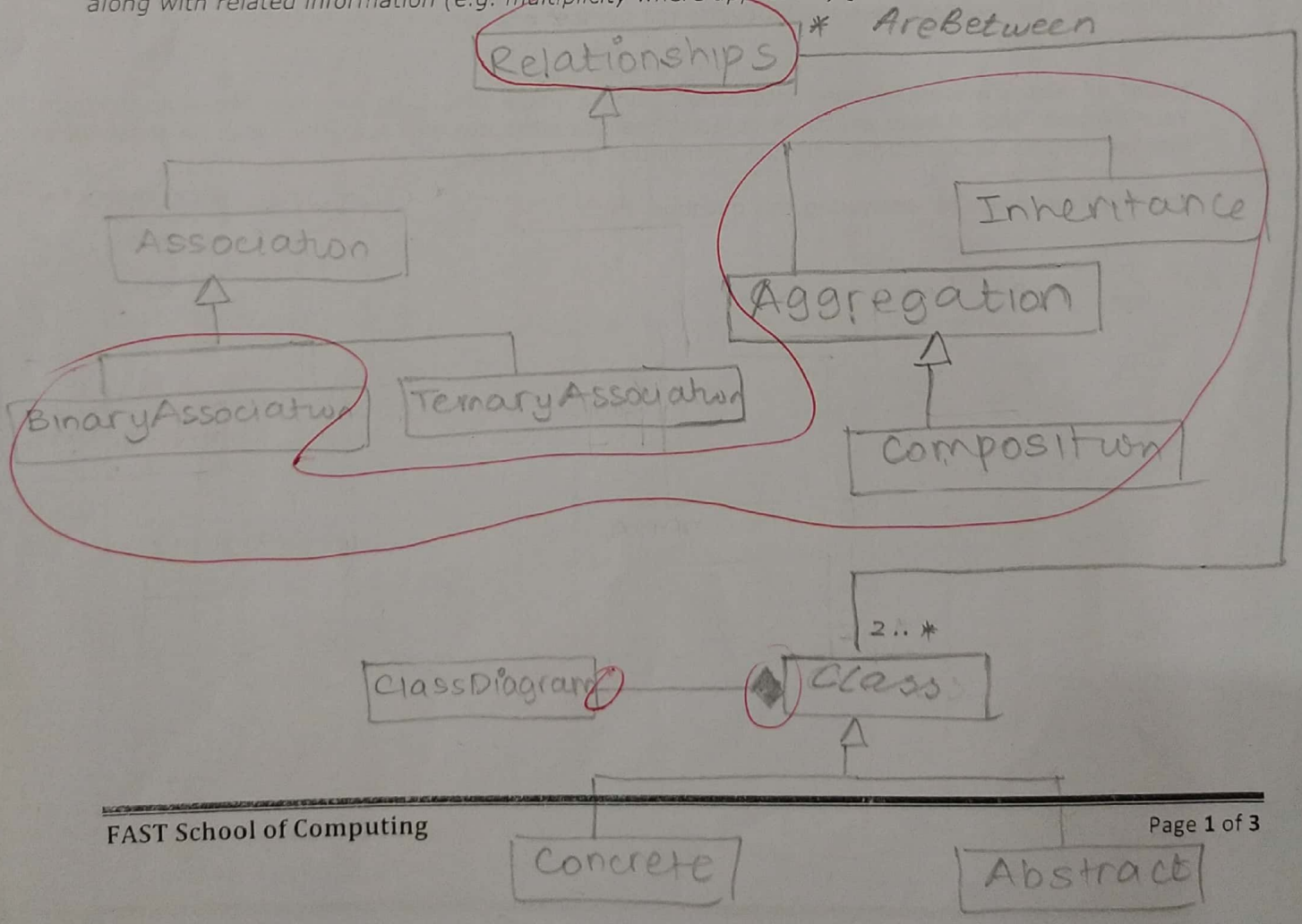
Name: _____ Roll Number: _____ Section _____

Question 1 (Max. Marks = 10)

(4) Depict the relationship between the following UML 2 concepts (listed in alphabetical order) using a UML 2 class diagram:

abstract class, aggregation, association, association class, binary association, class, class diagram, composition, concrete class, inheritance, ternary association

[Note: This class diagram can be considered a meta-level class diagram. Each concept listed above will appear as a separate class in this diagram. This diagram will not include any attributes or operations. It will include classes and (different types of) applicable associations between them along with related information (e.g. multiplicity where applicable).]



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17 **Question 2** (Max. Marks = 20)

Soon after the convocation, students must obtain clearance in order to receive their diplomas. Clearance is granted to students by the registrar. After a student has requested a registrar for clearance, the registrar solicits the student's roll number. Once the roll number has been provided, the registrar uses it to retrieve the student's academic information (i.e. degree, CGPA, credits earned, and list of courses passed) from the academic record. Once the academic information has been retrieved, the registrar first obtains the minimum required CGPA for the degree from the university's prospectus. If the student's CGPA is less than the minimum required CGPA the registrar rejects the request for clearance. Otherwise, the registrar obtains the minimum credits required for the degree from the university's prospectus. If the credits earned by the student are less than the minimum credits required, the registrar rejects the clearance request. Otherwise, the registrar retrieves the core courses of the degree from the university's prospectus. If at least one core course has not been passed by the student, the registrar rejects the clearance request. Otherwise, the registrar uses the student's roll number to retrieve the student's library information (i.e. outstanding issued books and pending fine) from the library. If the student has any outstanding issued books or a pending fine, the registrar rejects the student's clearance request. Otherwise, as a final step, the registrar uses the student's roll number to retrieve a list of the student's societies from the societies record. For each society of the student, the registrar (using the student's roll number) retrieves equipment borrowed (and not returned) by the student. If there is any borrowed equipment from any society (that has not been returned), the registrar rejects the student's clearance request. Otherwise, the registrar uses the student's roll number and current date to create a new clearance for this student.

Model all of the aforementioned interaction using a single UML 2 design-level sequence diagram. Your diagram should have exactly 8 objects. Realistic attributes and operations may be assumed as long as they do not contradict with the information given above.

Use the **next page** for answering this question.

This diagram is on page 3 and 4

:Student

Name: _____ Roll Number: _____ Section _____

[Use this page for answering Question 2 only.]

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