National University of Computer and Emerging Sciences, Lahore Campus

	Course:	**Software Engineering**	**Course Code:**	**CS303**
	Program:	**BS (CS)**	**Semester:**	**Fall 2018**
	Duration:	**60 Minutes**	**Total Marks:**	**30**
	Paper Date:	**16-Nov-18**	**Weight**	**15%**
	Section:	**ALL**	**Page(s):**	**4**
	Exam:	**Sessional II**		

Instruction/Notes:

1. A single-sided, hand-written, A4-size help sheet is allowed.

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

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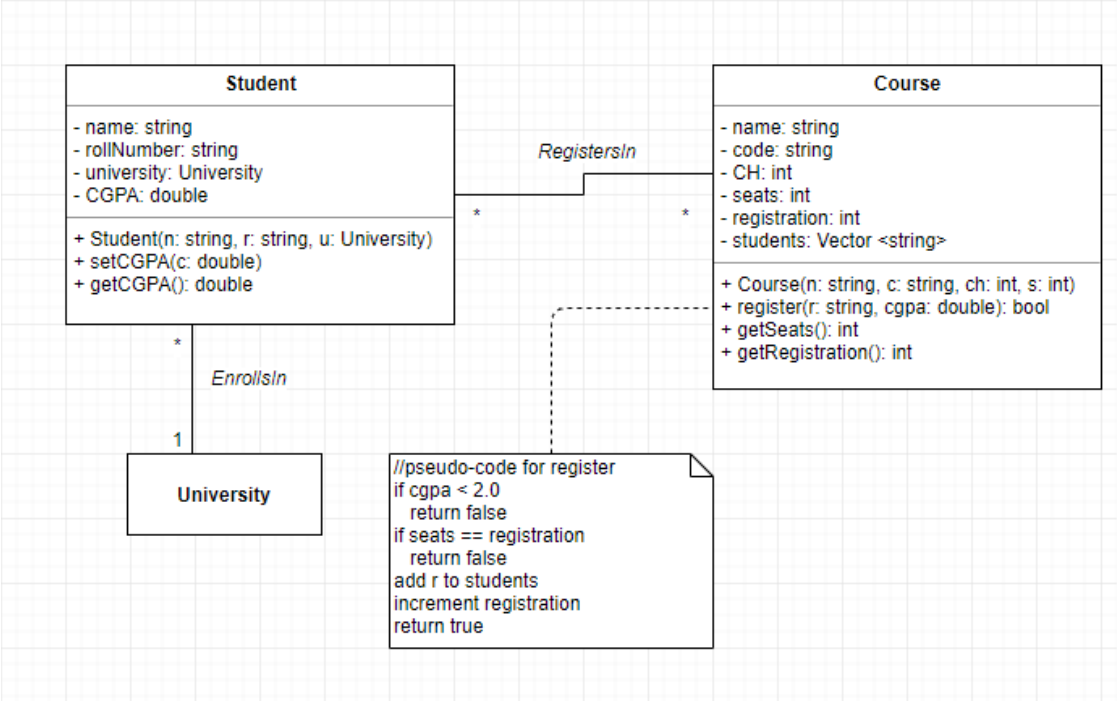
Question 1 (Max. Marks = 10 = 2 + 2(4))

a. Why is it important to neither under-modularize nor over-modularize the design of a software application?

Under-modularization results in modules that are large in size and, therefore, difficult to build and maintain. Over-modularization, on the other hand, results in modules that are small in size. This increases the cost and effort of integrating these modules.

b. Use the following partial design class diagram of a campus management system to answer the questions given below. Justification of answers must be provided to get credit.



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i. What type of cohesion will be exhibited by the set and get functions of the Student class?

Perfect cohesion (or functional cohesion) because these set and get functions are expected to be atomic i.e. contain just one statement (or perform just one task).

ii. What type of cohesion is exhibited by the Course class?

Communicational/informational cohesion because all course-related data and operations are encapsulated in the Course class.

iii. What types of coupling are explicitly present between the Student and University classes?

1. Common coupling because the university attribute of the Student class has data type University.
2. Stamp coupling because University is the data type of the u argument of the constructor of the Student class.

iv. What types of coupling does the register operation of the Course class suffer from?

1. Data coupling because two simple/unstructured arguments (r and cgpa) are passed to it.

2. Control coupling because the value of cgpa determines the flow of control within the register operation.

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Question 2 (Max. Marks = 10)

We need to develop a software system that, as a subtask, requires to determine if the values entered as input by the user will form a triangle or not. The software also determines the type of the triangle if the input values form a triangle.

The three input values A, B, and C are integer values and each corresponds to one side of a triangle. Based on the inputs, the system outputs the type of the triangle i.e. Equilateral, Isosceles, Scalene, NotATriangle. The NotATriangle output is provided if A, B, and C do not form a triangle. In order to form a triangle, the sides A, B, and C must meet the following constraints:

C1: $A<B+C$

C2: $B<A+C$

C3:$C<A+B$

The type of triangle is decided based on the following:

1. If all sides are equal then it is **Equilateral**
2. If exactly two sides are equal then it is **Isosceles**
3. If no pair of sides is equal then it is **Scalene**
4. If A, B, C do not satisfy any of the constraints C1, C2, C3 then it is **Not A Triangle**

Provide a complete decision table that models the information provided above. Your decision table shall not use more than four conditions with each condition being expressed in terms of one or more input values (i.e. A, B, C) only. [Hint: Most of these conditions shall be simple (not compound).]

	R1-8	R9	R10	R11	R12	R13	R14	R15	R16
A, B, C form a Δ?	**F**	**T**	**T**	**T**	**T**	**T**	**T**	**T**	**T**
A=B?	**-**	**T**	**T**	**T**	**T**	**F**	**F**	**F**	**F**
A=C?	**-**	**T**	**T**	**F**	**F**	**T**	**T**	**F**	**F**
B=C?	**-**	**T**	**F**	**T**	**F**	**T**	**F**	**T**	**F**
Equilateral		**X**							
Isosceles					**X**		**X**	**X**	
Scalene									**X**
Not a Δ	**X**								
Impossible			**X**	**X**		**X**			

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Question 3 (Max. Marks = 10)

Specify which of the 3 golden rules of UI design is related to each of the following statements/screenshot. Also, indicate (by circling) whether that rule is being violated or followed.

a. All the applications in MS Office use the cross button to close the windows.
Rule: **Make the interface consistent** **Followed** or Violated

b. When you are about to close an application with some unsaved data, the system responds "do you want to save your work?"
Rule: **Place the user in control** **Followed** or Violated

c. You have developed a game in which the right cursor key makes the player jump, while the up and left cursor keys makes the player go right and left respectively.
Rule: **Make the interface consistent** Followed or **Violated**

d. For a banking application, you have provided 10 menus with each menu containing ten to twelve options.
Rule: **Reduce the user's memory load** Followed or **Violated**

e. Assume a user is trying to move a file to a particular location. Also assume, a file with the same name already exists at that location. A pop-up is displayed with multiple options (e.g. replace, skip, cancel, compare, etc.), out of which any one can be selected.
Rule: **Place the user in control** **Followed** or Violated

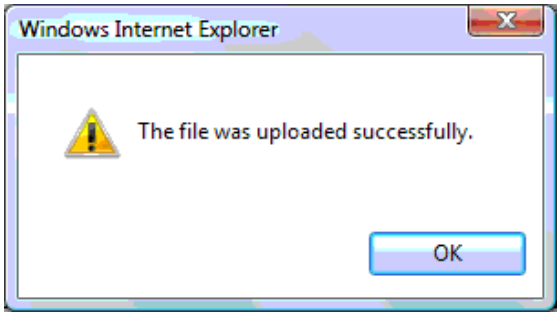
f. The Apple iPhone allows only 4 app icons to sit in the main menu area at the bottom of the screen.
Rule: **Reduce the user's memory load** **Followed** or Violated
OR
Consistent User Interface **Followed**

g. When a critical problem occurs on Windows, such as an unexpected crash, it automatically displays the blue screen of death and restarts the computer.
Rule: **Place the user in control** Followed or **Violated**

h. In a newly developed application, the keyboard shortcut for saving work is Ctrl + P.
Rule: **Make the interface consistent** Followed or **Violated**

i. If a user enters a hyperlink in MS Word it is automatically underlined and font color is made blue.
Rule: **Place the user in control** Followed or **Violated**
OR
Make the interface consistent **Followed** or Violated

j.



Rule: **Make the interface consistent** Followed or **Violated**