


# National University of Computer and Emerging Sciences, Lahore Campus

	Course:	Object Oriented Programming	Course Code:	CS-217
	Program:	BS (Computer Science)	Semester:	Spring 2020
	Duration:	1 hour 15 mins	Total Marks:	50
	Paper Date:	09-04-2020	Weight	-
	Section:	G	Page(s):	1
	Exam:	Quiz 4	Reg. No.	

## Question # 1:

Consider the case of a software that can assist the instructors in preparing exams. An exam can have multiple questions where each question is a multiple-choice, fill-in-blank, or any other suitable subtype. An instructor can add questions to exam and finally print it. Your task is to write an object-oriented program using concepts of associations, inheritance and polymorphism, while satisfying the following description of classes:

- **Exam** can have multiple questions, with the option to **add** questions and **print** the exam.
- **Question** is an abstract (pure virtual) class
- **MCQ** (multiple-choice) is a **Question** containing **statement** and multiple numbered **options**
- **FIB** (fill-in-blank) is a **Question** containing **statement** with a specific **word** left as blank

The given code of the **main** and corresponding output serves as a guideline for implementation. Take care of memory management issues in your implementation.

<b>Code</b>	<pre>Exam final(2); // exam has 2 questions // options for mcq question char* options[] = {"option 1","option 2","option 3"}; // adding MCQ as q1 having 3 options final.add(new MCQ("Select the correct option below:",3,options));  // adding FIB as q2 where 4<sup>th</sup> word is a blank final.add(new FIB("A fill in blank question",4));  // prints the exam questions polymorphically final.print();</pre>
<b>Output</b>	<pre>Question 1 Select the correct option below: 1. option 1 2. option 2 3. option 3  Question 2 A fill in ____ question</pre>

**Hint:** Consider using a string tokenizer function `char*[] strtok(char* text, char* sep)` that returns an array of words in the given **text** separated by separator **sep**.