



FAST- National University of Computer & Emerging Sciences, Karachi.  
School of Computing,  
Mid II Examination, Fall 2021  
22<sup>nd</sup> November, 2021, 08:30 am – 09:30 am



Course Code: CS-1004	Course Name: Object Oriented Programming
Instructors: Farah Sadia	Section:
Student Roll No:	

**Instructions:**

- Except your Roll No and Section, DO NOT WRITE anything on this paper.
- Return the question paper with your answer sheet.
- Read each question completely before answering it. There are **3 questions on 2 pages**.
- In case of any ambiguity, you may make assumptions but your assumption must not contradict any statement in the question paper.
- All the answers must be solved according to the SEQUENCE given in the question paper, otherwise points will be deducted.

Time Allowed: 60 minutes

Maximum Points: 70

**Question 01- Short Q/A**

[points: (5\*4)=20] [Estimated Time: 20 minutes]

1. What is name mangling?
2. What is the mechanism to declare and use a friend function and friend class? Explain using an example.
3. How many types of inheritance are included in the hybrid inheritance Diamond problem. Write the names of those and Give the diamond problem example in terms of UML diagram.
4. Assume class C is inherited from class B and class B is inherited from class A. Can we access a public variable of class A, using the object of class C, if class B has protected inheritance? Explain your answer.

**Question 02- Coding**

[points: 20] [Estimated Time: 10 minutes]

1. Determine the output of the following code segment.

<pre>class Shape{ public:     virtual void sayHi() { cout &lt;&lt;"Just hi! \n";} }; class Triangle : public Shape{ public:     virtual void sayHi() { cout &lt;&lt;"Hi from a triangle! \n";} }; class Rectangle : public Shape{ public:     virtual void sayHi() { cout &lt;&lt;"Hi from a rectangle! \n"; } };</pre>	<pre>int main(){     Shape *p;     int which=1;     switch ( which ) {         case 1: p = new Shape;         case 2: p = new Triangle;         case 3: p = new Rectangle;     }     p -&gt; sayHi();     return 0; }</pre>
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2. Find the Errors in Following code segment and write the only correct line of code. No need to write whole code.

<pre>class Person {     int x; public:     Person(int x) { cout &lt;&lt;"Parameterized Person" &lt;&lt; endl; }     Person() { cout &lt;&lt;"Default Person" &lt;&lt; endl; }     void setX(int i) {x = i;}     void print() { cout &lt;&lt;x; } }; class Faculty : public Person { public:</pre>	<pre>class Student : public Person { public:     Student() {setX(20);}     Student(int x):Person(x) {         cout&lt;&lt;"Student Parameterized"&lt;&lt; endl;     } }; class TA : public Faculty, public Student { public:     TA(){}     TA(int x):Student(x), Faculty(x), Person(x) {</pre>
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<pre>Faculty() {setX(10);} Faculty(int x):Person(x) {     cout&lt;&lt;"Faculty Parameterized"&lt;&lt; endl; } };</pre>	<pre>        cout&lt;&lt;"TA Parameterized"&lt;&lt; endl;     } }; int main() {     TA ta1(30),ta2;     ta1.print();     ta2.print(); }</pre>
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### Question 03- Coding

[points: 30] [Estimated Time: 30 minutes]

Kosar Medical Store provides their services to customers according to doctor prescriptions. The pharmacy has three different categories of medicines: **tablets, capsules and syrup**. Each of the medicines has a **name, formula, retail price, a manufacture date and an expiration date**.

Additionally,

- Tablets have `sucrose_level` which can be a value in range 0 to 1.
- Capsules have an absorption percentage which is a value between 1 to 100.
- Syrups don't have any special fields.

The pharmacy also has employees. A Pharmacist whose responsibility is to ensure that the medicines are sold according to prescription and a Counter Staff whose responsibility is to maintain the revenue of Kosar Medical Store.

#### Flow of operation:

The customer enters the pharmacy and presents a prescription to the counter staff. The counter staff forwards this prescription to the pharmacist who checks and recommends the appropriate medicine type. The counter staff then collects the payment, hands over the medicines and updates the overall revenue.

#### The tasks you have to do are:

1. Identify all the classes, attributes and functions in the above scenario.
2. Identify the type(s) of inheritance present in the scenario.
3. Declare variables and also provide suitable implementation for default and parameterized constructor(s) of each class.
4. Overload the "<=" operator to compare the medicines expiry date with current date. If medicines' is expired not add in bill. Just update the stock. Otherwise generate the bill and update the stock.
5. Create `Search_Medicine()` in both Pharmacist and Counter Staff. The function should allow Pharmacists to search and print the details of medicine based on the formula. The function in Counter Staff should allow to search the medicine using the name. Using virtual function.

Best of Luck ☺