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National University of Computer & Emerging Sciences
FAST-Karachi Campus
CS218- Data Structures (Fall 2019)
Quiz#1

Dated: September 16, 2019 Marks: 25
Time: 20 min. Std-ID: _____Sol_____

Question No. 1 Appropriately match the columns. [10]

Column A	Column B
1. Pure Virtual Functions	a. Hiding complexity (9)
2. Class	b. Polymorphic mapping (7)
3. Operators precedence + association	c. New operations for types (6)
4. const pointer	d. Abstract Base Class (1)
5. typeID()	e. Data Type (2)
6. Operator overloading	f. Function Overloading (10)
7. dynamic_cast()	g. Expression (3)
8. Virtual functions	h. Run time polymorphism (8)
9. Encapsulation	i. RTTI (5)
10. Compile Time Polymorphism	j. reference (4)

Question No. 2 Indicate TRUE or FALSE. [5]

1. **A base class pointer can hold a derived class object. TRUE**
2. **A virtual or pure virtual function can be private. TRUE**
3. **A destructor can be virtual. TRUE**
4. **An abstract class object contains VPtr. TRUE**
5. **A single virtual table is maintained per class. TRUE**

Question No. 3 Explain each question by giving 1-2 lines of explanation. [10]

1. **Why constructors are not virtual?**

A virtual call is a mechanism to get work done given partial information. In particular, "virtual" allows us to call a function knowing only any interfaces and not the exact type of the object. To create an object, you need complete information. In particular, you need to know the exact type of what you want to create. Consequently, a "call to a constructor" cannot be virtual.

2. **Is inline function more efficient than normal functions in c/c++?**

- Yes, they are more effective and efficient concept, there is no function call overheads as the function is used with the code.
- No overhead for parameters passing on stack and returning value
- Compiler can do a lot of different optimizations.

3. **What are the best practices for defining an assignment operator of a new type?**

- An assignment operator must check for self-assignment
- The earlier memory of left hand side object is to wipe off
- New memory should be grabbed exactly of the same size of right hand side object
- Member-wise copy should be done for all members.

4. **What is a pure virtual function?**

- It is a function in base class without the implementation, which make the base class abstract.
- The derive class must define its own implementation for it.
- It is an abstract function.

5. **Why multiple inheritance is considered bad?**

- Multiple inheritance is available in C/C++ is an important feature of the language.
- The use of multiple inheritance gives rises to some ambiguity in code which can be rectify with proper understanding of the concept for multiple inheritance.
- Overall, it is not a bad idea.