Military Institute of Science and Technology (MIST)

Department of Computer Science & Engineering (CSE)

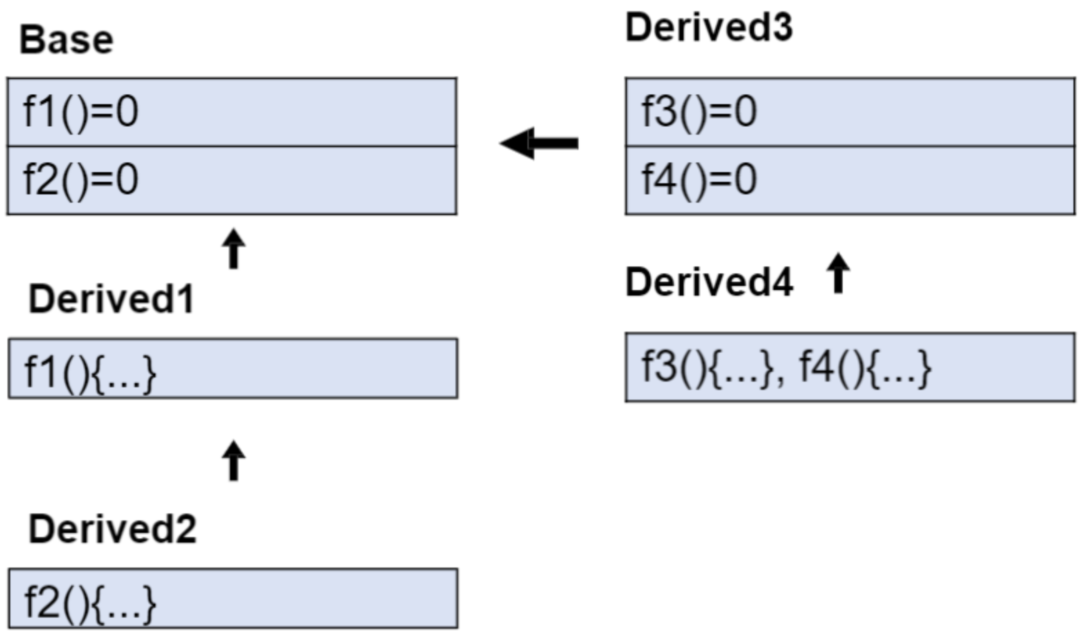
CSE 205: Object Oriented Programming Language, CT-3, Date: 23/06/21

Time: 40 min	Marks: 20

Instructions:

1. Making choices in life is pretty hard, fortunately, you don’t have to make any in this exam. Answer all the questions provided below.
2. Numbers on the right side of each question signify individual question marks.

1. 3+3

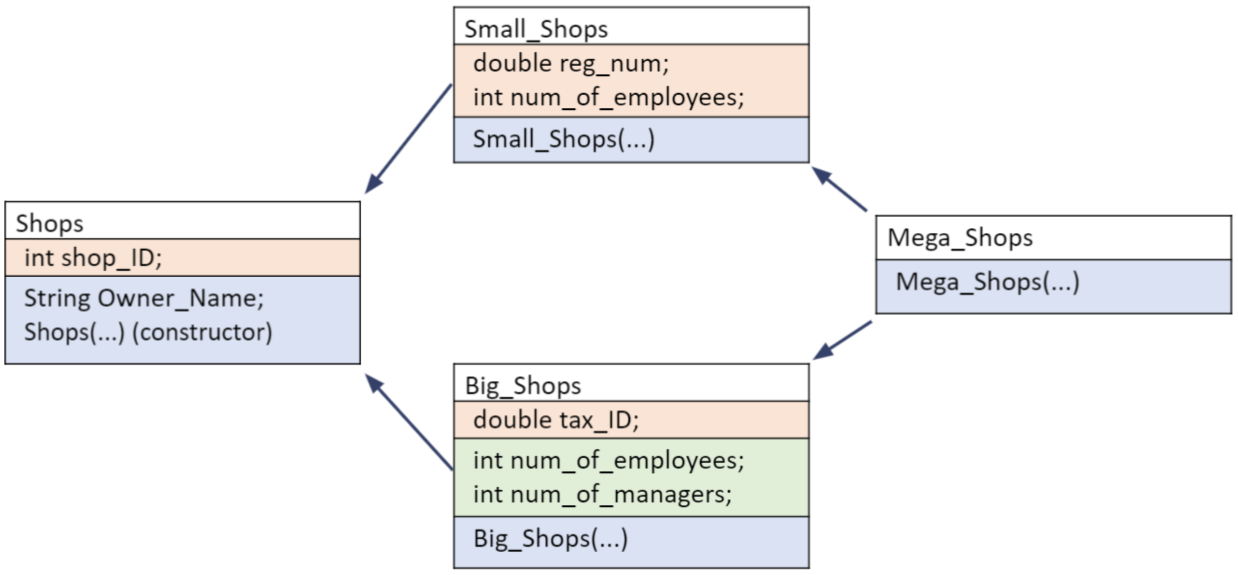


Take a look at the inheritance scenario above. Now, based on it, answer the following questions-

a) Identify Abstract Class(es), Interface(s) and Concrete Class(es).

b) Which ones are Pure Virtual Functions in this scenario? Why do you think we keep these functions in base classes even though they aren’t used by the base class itself?

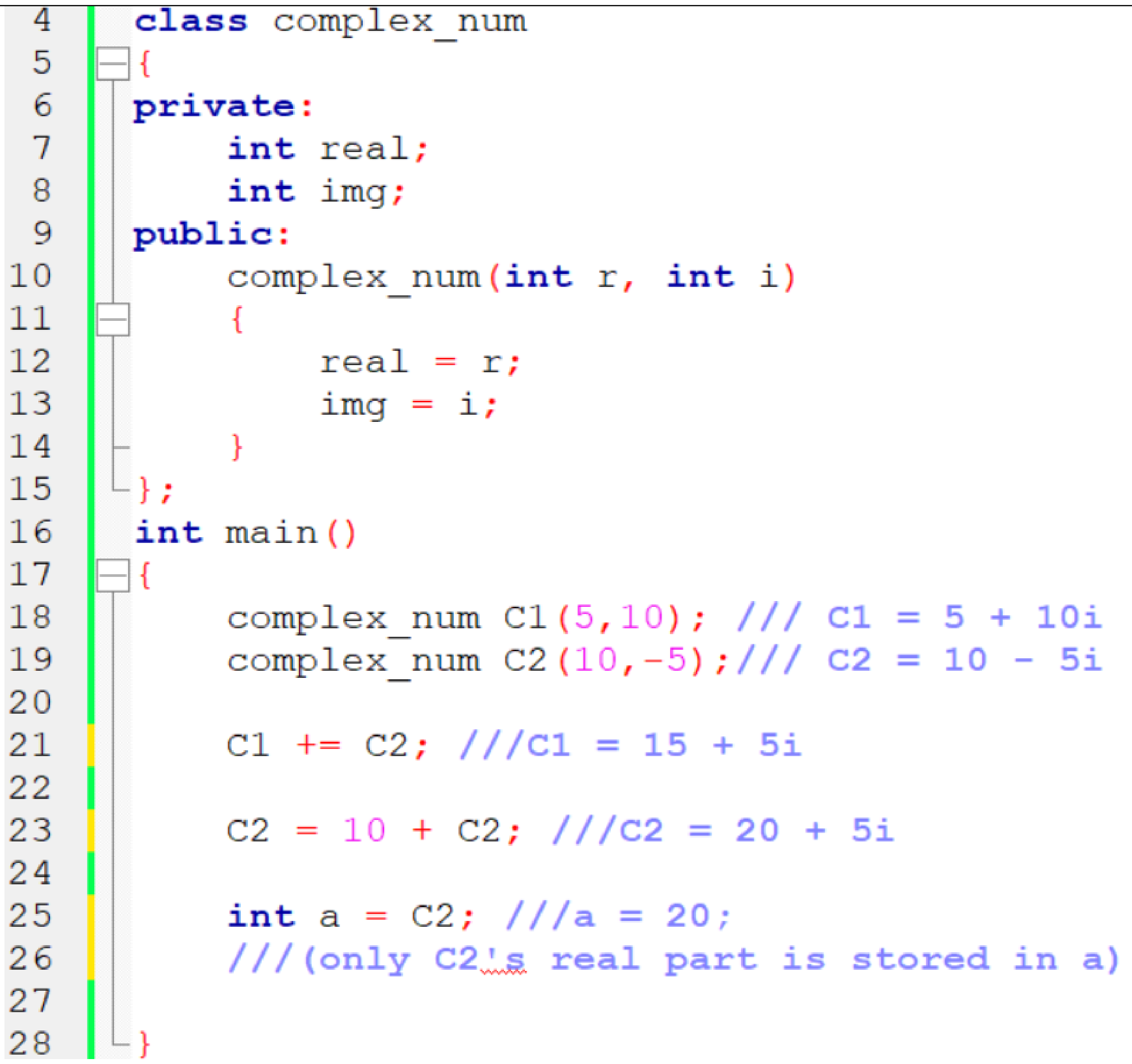
2. 6+2



Identify the problem the above inheritance scenario poses. Explain the drawbacks of this situation with a graphical example **or a** short code snippet.

Can virtual inheritance solve this problem? If so, which class needs to be inherited virtually?

3. 3x2 =6



```
 4  class complex_num
 5  {
 6  private:
 7      int real;
 8      int img;
 9  public:
10      complex_num(int r, int i)
11      {
12          real = r;
13          img = i;
14      }
15  };
16  int main()
17  {
18      complex_num C1(5,10); /// C1 = 5 + 10i
19      complex_num C2(10,-5);/// C2 = 10 - 5i
20
21      C1 += C2; ///C1 = 15 + 5i
22
23      C2 = 10 + C2; ///C2 = 20 + 5i
24
25      int a = C2; ///a = 20;
26      ///(only C2's real part is stored in a)
27
28  }
```

Take a look at the code snippet above. Now, do necessary operator overloading so that lines 21, 23, and 25 can be executed. **Write only the operator overloading functions for the 3 cases.**

Note that, “complex_num” it’s a class that stores complex numbers. The value of each object/variable after the line is executed is given as comments in the corresponding lines.