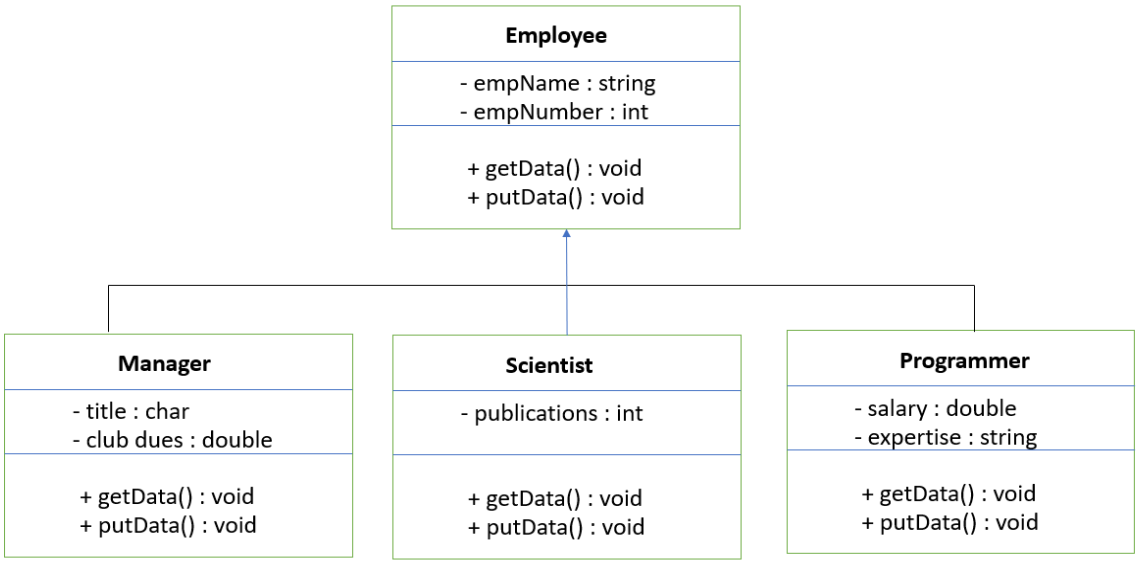
# Object Oriented Programming

## Assignment:

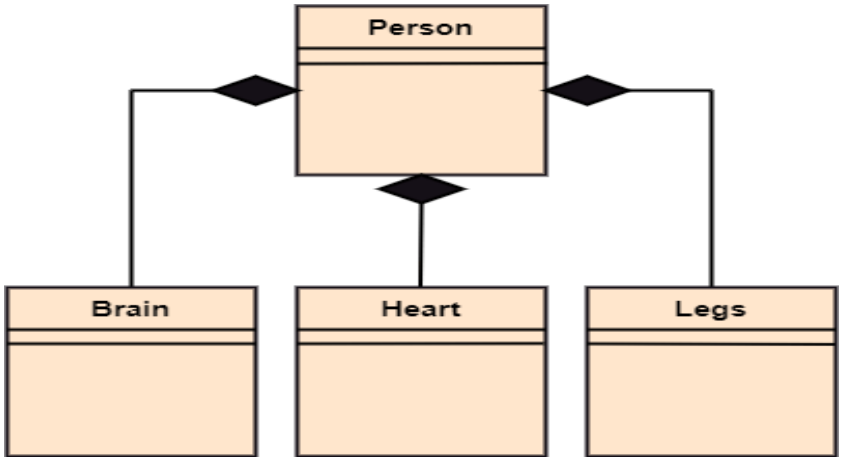
**Q No.1:** Declare and define four Rectangle Classes namely Rectangle1, Rectangle2, Rectangle3 and Rectangle4. Each class having 2 private data members i.e. **length** and **breadth**. Initialize these data members of each class using parameterized constructors. Show the length and breadth of each rectangle and sum the length and breadth of all these rectangles using friend function "**sum()**". Output of your program should be in the following format:

```
                Length  Breadth
Rectangle 1  :    5        3
Rectangle 2  :    2        6
Rectangle 3  :    4        6
Rectangle 4  :    2        5
--------------------------------
       Sum   :   13       20
--------------------------------
```

**Q No.2:** Implement the following UML Diagram using **C++ Inheritance**. First identify inheritance type w.r.t level and then code accordingly.



**Q No.3:** Implement and code the following UML Diagram using **C++ compositon.** Declare and define data members and member fuctions for each class.




**QNo.4:** Write and explain the calling order of constructor and destructor in each scenario. Implement the following member functions for each class;

- Shapes: area()
- 2d shapes: area()
- 3d shapes: area (), volume()
- Circle: radius, area()
- Square: side, area()
- Cube: length, width, height, area(),volume()
- Pyramid: base, height, area(),volume()

Using the concept of Abstract class, pure virtual functions and polymorphism override the concerned functions in the derived classes and also write constructors and destructors of each class.

Creating one dimensional arrays of shapes, 2dshapes and 3dshapes objects implement the concept of polymorphism.