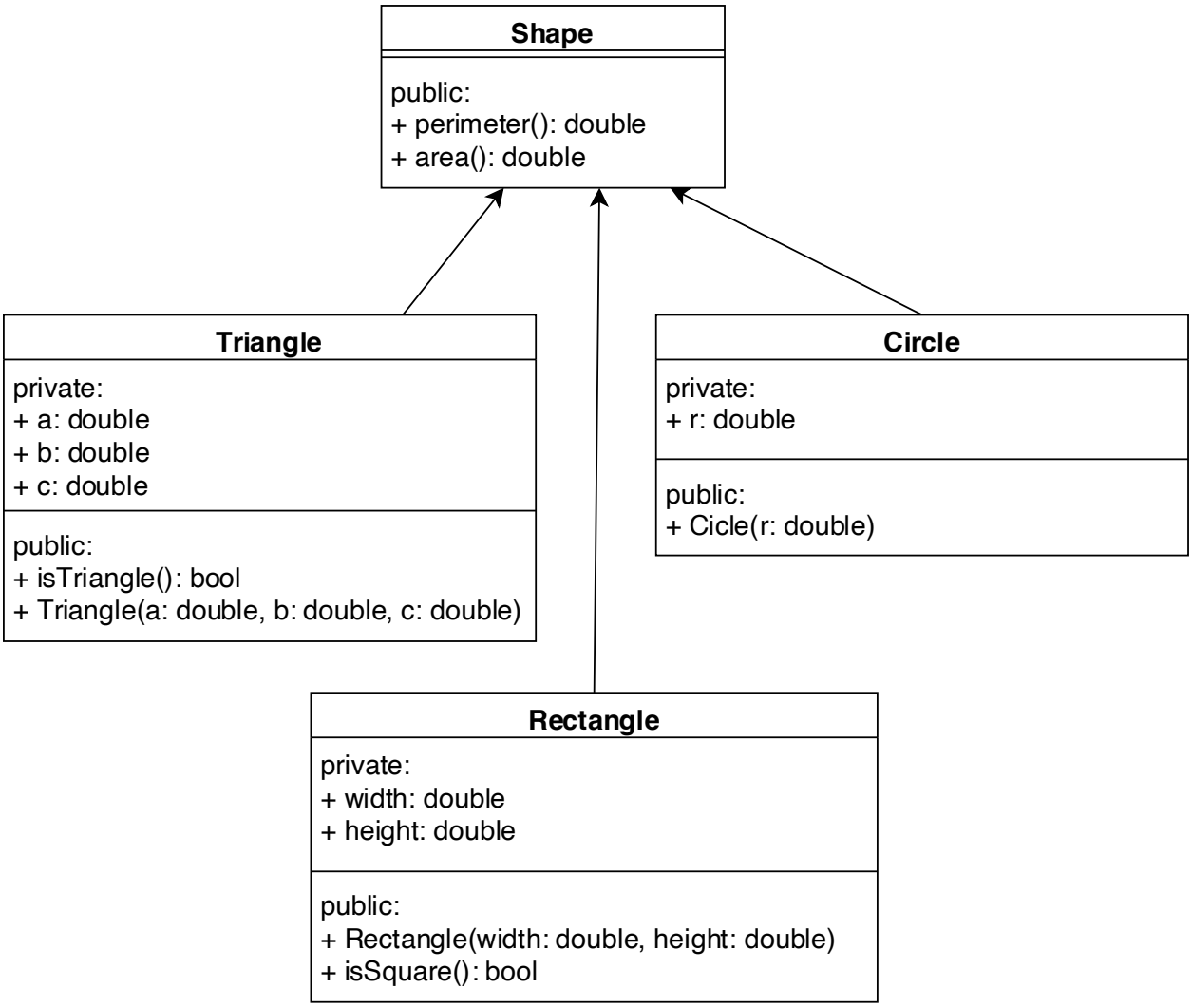
Exercises 2: Inheritance in C++

Task 1: Create classes with the following design:



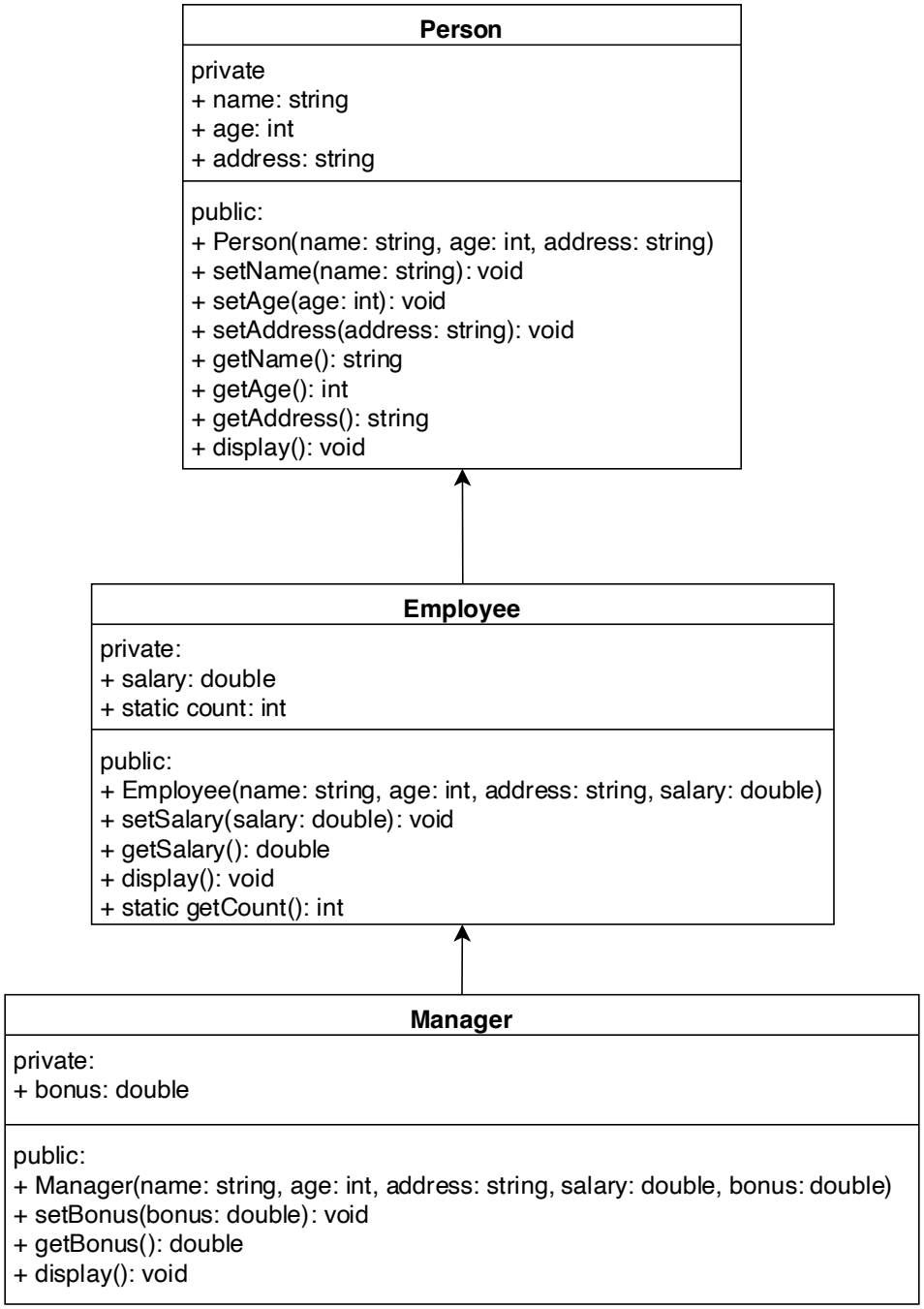
Explanation:

- Class **Triangle**, **Rectangle** and **Circle** inherit **Shape** class.
- In **Triangle** class, a, b and c are the 3 sides of the triangle, respectively.
- isTriangle() return **true** if a, c and c form a triangle, otherwise return **false**.
- perimeter() in **Triangle** class returns perimeter of that triangle if a, b and c form as triangle, if not, output a message: "This is not a triangle".
- area() in **Triangle** class returns area of that triangle if a, b and c form as triangle, if not, output a message: "This is not a triangle".
- isSquare() return **true** if the width and height are equal, otherwise return **false**.
- perimeter() in **Rectangle** class returns perimeter of that rectangle.
- area() in **Rectangle** class returns area of that rectangle.

Write a main function to create 3 instances of each class by using constructor and output the perimeter and area of each shape.

```
#include <iostream>

int main() {
    // Examine Triangle class
    Triangle tri(3,4,5);
    if (tri.isTriangle()) {
        cout << "This is a triangle" endl;
        cout << "Perimeter: " << tri.perimeter() < end;
        cout << "Area:" << tri.area() << endl;
    }
    else {
        cout << "This is not a triangle" << endl;
    }

    // Examine Rectangle class
    Rectangle rec(8,8);
    if (tri.isSquare()) {
        cout << "This is a square" endl;
    }
    else {
        cout << "This is not a square" << endl;
    }
    cout << "Perimeter: " << tri.perimeter() < end;
    cout << "Area:" << tri.area() << endl;

   // Examine Circle class
    Circle c(2.4);
    cout << "Perimeter: " << tri.perimeter() < end;
    cout << "Area:" << tri.area() << endl;


    return 0;
}
```

Task 2: Create classes with the following design:



Explanation:

- Person class stores the information of a person and a count as a **static member**.
- getCount() function member will return number of employees created.
- In **Manager** class, bonus data member stores the percentage of salary that manager can be received.
- The salary of a manager will be calculated by **salary + bonus*salary**.

Write a main function to create 3 employees and 1 manager using constructor and output the information and salary of each person.

```
#include <iostream>

int main() {
    // Examine Triangle class
    Employee em1('Lin Jia-Hui',24,'23, Da-an');
    Employee em2('Lee Zhe-Wei',22,'12, Lin Shen street');
    Employee em3('Chen Zheng',28,'2, Xinyi Street');

    em1.display();
    em2.display();
    em2.display();

    Manager ma1('Huang Shen',32,'23 Yuan Dong street');
    ma1.display();

    cout << "Number of employee:" << Employee::getCount() << endl;

    return 0;
}
```