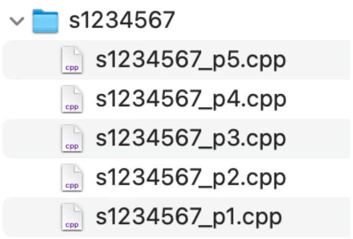
Mock-up Exam

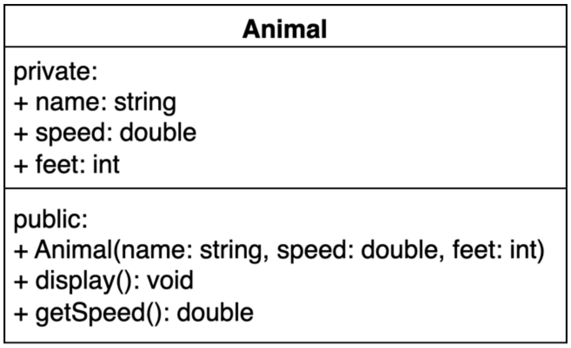
DURATION: 120 minutes

Please write your program and save your files with name as follow:



```
s1234567
    s1234567_p5.cpp
    s1234567_p4.cpp
    s1234567_p3.cpp
    s1234567_p2.cpp
    s1234567_p1.cpp
```

Question 1. (*30 points*) Given the following UML:



Animal

private:
+ name: string
+ speed: double
+ feet: int

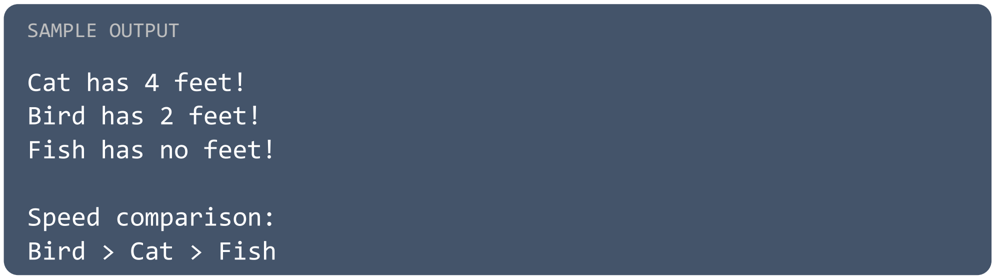
public:
+ Animal(name: string, speed: double, feet: int)
+ display(): void
+ getSpeed(): double

Requirements:

1. Define class **Animal** follow the design, the **display** function prints out the number of feet of that animal. (*10 points*)
2. Create a main function to implement the **Animal** class, create 3 objects as following table (*10 points*):

Name	Speed (km/h)	Feet
Cat	48	4
Bird	390	2
Fish	12	0

3. Output the names of the animals in descending order of speed. (10 points)

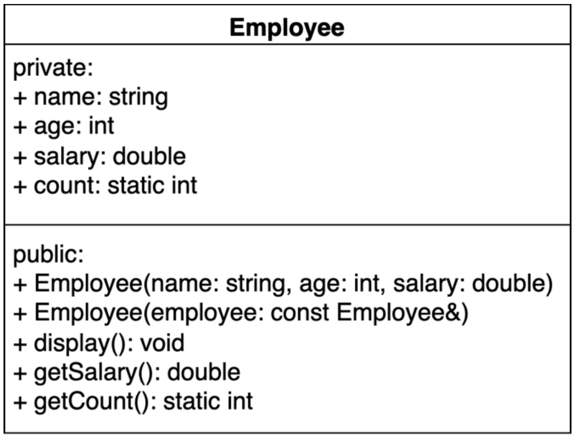


```
SAMPLE OUTPUT

Cat has 4 feet!
Bird has 2 feet!
Fish has no feet!

Speed comparison:
Bird > Cat > Fish
```

Question 2. (*30 points*) Given the following UML:



Employee

private:
+ name: string
+ age: int
+ salary: double
+ count: static int

public:
+ Employee(name: string, age: int, salary: double)
+ Employee(employee: const Employee&)
+ display(): void
+ getSalary(): double
+ getCount(): static int

Requirements:

1. Define class **Employee** follow the design, the **display** function output the information of that employee in one line, the static **count** data member will increase whenever a new employee created. **Employee** class also has a *copy constructor.* (*10 points*)
2. Create a main function, create 3 employees as following table, and print out the list into the screen (*10 points*):

Name	Age	Salary (TWD)
Lin Jia-Hui	28	40,000
Le Sang	24	38,000
Yang Zhe-Wei	26	45,000

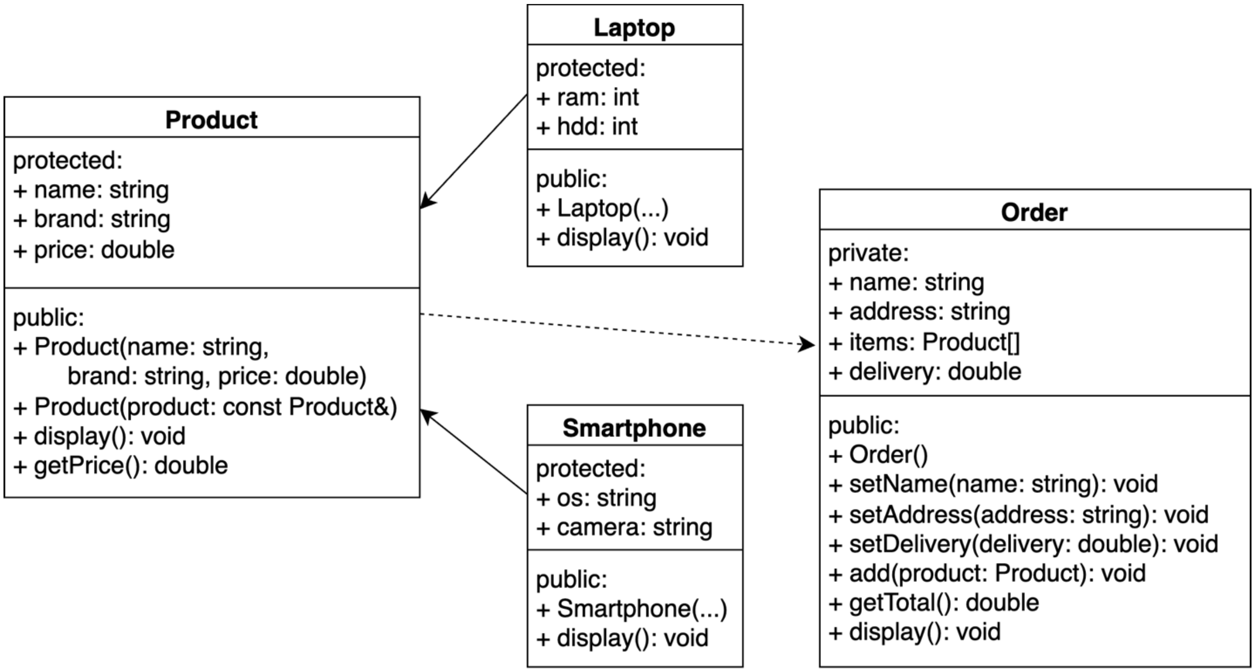
3. Sort the employee list in ascending order of salary and print out the sorted list into the screen. (*10 points*)

```
SAMPLE OUTPUT

> EMPLOYEE LIST:
Name               Age    Salary
-----------------------------------
Lin Jia-Hui        28     40,000
Le Sang            24     38,000
Yang Zhe-Wei       26     45,000

> EMPLOYEE LIST AFTER SORTING:
Name               Age    Salary
-----------------------------------
Le Sang            24     38,000
Lin Jia-Hui        28     40,000
Yang Zhe-Wei       26     45,000
```

Question 3. (*40 points*) Given the following UML:



Requirements:

1. Define 4 classes **Product, Laptop, Smartphone,** and **Order** (*15 points*).
   - **Laptop** and **Smartphone** are derived classes from **Product.**
   - In **Product**, **Laptop**, and **Smartphone** class, the **display** function output the detail of that product in one line.
   - In Order, **items** will hold a list of products (*students can use array or vector*). **delivery** data member will store the delivery fee for that order.
   - The **getTotal** function will return the final price from all items price and delivery fee.

2. Create a main function, create 2 laptops and 3 smartphones as following table: (*5 points*):

Name	Brand	RAM	HDD	Price
VivoBook	Asus	8	512	30,000
Swift 5	Acer	16	512	34,000

Name	Brand	OS	Camera (MPX)	Price
Galaxy S23 Ultra	Samsung	Android	12	36,900
iPhone 14 Pro	Apple	iOS	12	38,000
Xiaomi 13 Pro	Xiaomi	Android	12	34,888

3. In main function, simulate creating an order as follow: (*15 points*)
    - Input name and address
    - Pick product from product list and add it into current order.
    - Input delivery fee
    - Print out the detail of order and total.

```
SAMPLE OUTPUT

> INPUT ORDER:
Enter name: Le Sang
Enter address: 12 Yuan Dong Road.

PRODUCT LIST:
No.    Name                Brand        Price
-----------------------------------------------
1      VivoBook            Asus         30,000
2      Swift 5             Acer         34,000
3      Galaxy S23 Ultra    Samsung      36,900
4      iPhone 14 Pro       Apple        38,000
5      Xiaomi 13 Pro       Xiaomi       34,888

Choose product (input 0 to stop choosing): 4
Add more product (Y/N) ? Y

PRODUCT LIST:
No.    Name                Brand        Price
-----------------------------------------------
1      VivoBook            Asus         30,000
2      Swift 5             Acer         34,000
3      Galaxy S23 Ultra    Samsung      36,900
4      iPhone 14 Pro       Apple        38,000
5      Xiaomi 13 Pro       Xiaomi       34,888

Choose product (input 0 to stop choosing): 1
Add more product (Y/N) ? N

Input delivery fee: 300

> ORDER DETAILS:
NAME: Le Sang
ADDRESS: 12 Yuan Dong Road.
-----------------------------------
iPhone 14 Pro       Apple  38,000
VivoBook            Asus   30,000
-----------------------------------
DELIVERY FEE: 300 TWD
TOTAL: 68,300 TWD

END.
```