Programming 2 – Laboratory 7

Your task will be creating classes describing a shop keeping cats, hamsters and pelicans. At feeding time each pet gets access to 2 types of food: grain and fish. Each type of pet eats in a different way.

Part 0 (1 point)

Implement 2 classes derived from a `Food` class representing two types of food: `Grain` and `Fish`. Each of them contains `type amount` field, constructor taking a default `amount` value, `type GetAmount()` method returning `amount` and `void EatFood(type howMuch)` method substracting `howMuch` from `amount`. The only diffrence between `Grain` and `Fish` is that, for `Grain type` is `float`, while for `Fish type` is `int`. The `type amount` field must be private.

Part 1 (2 point)

Abstract class `Pet` represent general info about an animal in the shop. Implement constructor `Pet(string, float)` for this class.

Overload operator `operator<<(ostream& out, const Pet& pet)` . It prints the default info about every animal and call `virtual` method `Print(ostream& out)` describing details about animal and its species.

First implemented animal will be `Hamster`. Hamster eats a `float hungerGrain` of a grain, whenever he is fed. If there is not enough food for Hamster, he doesn't eat and he gets sick (change of `bool isSick` value). Sick animals don't want to eat (check in `Feed` method, if animal is sick).

Override methods `Feed(Food* food)` and `Print(ostream& out)` for a `Hamster` class. In `Feed` method you don't know which food is grain and which food is fish. You have to check it in every call. You know, that there is exactly one of each type in an input.

Part 2 (1 point)

Override methods `Feed(Food* food)` and `Print(ostream& out)` for a `Pelican` class. Pelican eats a `int hungerFish` of fish and `hungerGrain * weight` of grain, whenever he is is fed. If there is not enough food any type of food for pelican, he doesn't eat at all and gets sick (change of `bool isSick` value)

Override methods `Feed(float* food)` and `Print(ostream& out)` for a `Cat` class. Cat eats `int hungerFish` of fish every time, he is fed. If there is not enough food for a cat, he doesn't eat and gets sick (change of `bool isSick` value)

Part 3 (1 points)

Implement basis constructor, destructor and basic methods of `PetShop` class.

`PetShop` keeps all the pets in an array. Construtor `PetShop(Food[2])` gets the initial `Foods.` You don't know, which one is fish, and which one is grain, but we are always limited to 2 types of food. To properly copy food form `Food[2] to foodAmount` in class, you need to allocate `foodAmount (always 2 elements)` and properly copy form `Food[2]` (this require to add cloning method to Food polymorphic hierarchy).

Destructor deletes all the pets and foods, that are in the shop.

`void AddPet(Pet* pet)` adds a created pet to the shop.

`operator<<(ostream& out, const PetShop& shop)` prints data about shop and about every pet in the shop.

`FeedPets()` feed every animal in the order in which pets were added to the shop. Food for the pets is taken from the `Food foodAmount[2]` field.

Part 4 (1 point)

Implement `FeedPelicansLast()` method. In this method also all animals are fed, but pelican are fed after others pets. It is important, because sick pelicans don't eat other animals.

Part 5 (2 points)

Implement `CureCats()` method. Whenever cat is sick, you can help him by giving him a hamster to eat. This method checks, if there are any sick cats in the shop. Every sick cat eats one hamster from the shop, if there are any. After eating a hamster cat is cured (`void Cure()` method). Eaten hamster is removed. To remove hamster you have to implement `RemovePet(int index)` method. It deletes a pet from a pointed place in the `pets` array, but it cannot leave invalid pointer in "active" part of array.

Example output

```
***** Part 0 - (2 points) *****

Left 3.6 of grain     Expected: 3.6
Left 7 of grain     Expected: 7

***** Part 1 - (2 points) *****

Rusalka
Hamster
Eats 3.6 of grain
Weight: 46
Rusalka is healthy

Amount of food:
Grain: 12 Fish: 10

Feeding Gruby 2 times

Gruby
```

```
Hamster
Eats 8 of grain
Weight: 108
Gruby is Sick

Amount of food:
Grain: 4 Fish: 10

Feeding Rusalka

Rusalka
Hamster
Eats 3.6 of grain
Weight: 46
Rusalka is healthy

Amount of food:
Grain: 0.4 Fish: 10

***** Part 2 - (1 points) *****

Amount of food:
Grain: 10 Fish: 10

Feeding pelicans

Jago
Pelican
Eats a 0.02 of his weight of grain and 2 fish
Weight: 68
Jago is healthy

Bird
Pelican
Eats a 0.01 of his weight of grain and 2 fish
Weight: 74
Bird is healthy

Amount of food:
Grain: 7.9 Fish: 6

Feeding Nyan 1 time and Kitku 2 times

Kitku
Cat eating 4 fish
Weight: 230
Kitku is Sick

Nyan
Cat eating 3 fish
Weight: 202
Nyan is healthy

Amount of food:
Grain: 7.9 Fish: 3

***** Part 3 - (1 points) *****
```

```
Amount of food:
Grain: 26 Fish: 14

Feeding all animals

Pet shop with 6 animals
Amount of food:
Grain: 12.3 Fish: 3

Jago
Pelican
Eats a 0.02 of his weight of grain and 2 fish
Weight: 68
Jago is healthy

Kitku
Cat eating 4 fish
Weight: 230
Kitku is healthy

Rusalka
Hamster
Eats 3.6 of grain
Weight: 46
Rusalka is healthy

Bird
Pelican
Eats a 0.01 of his weight of grain and 2 fish
Weight: 74
Bird is healthy

Gruby
Hamster
Eats 8 of grain
Weight: 108
Gruby is healthy

Nyan
Cat eating 3 fish
Weight: 202
Nyan is healthy


Feeding all animals

Pet shop with 6 animals
Amount of food:
Grain: 7.34 Fish: 1

Jago
Pelican
Eats a 0.02 of his weight of grain and 2 fish
Weight: 68
Jago is healthy

Kitku
Cat eating 4 fish
```

```
Weight: 230
Kitku is Sick

Rusalka
Hamster
Eats 3.6 of grain
Weight: 46
Rusalka is healthy

Bird
Pelican
Eats a 0.01 of his weight of grain and 2 fish
Weight: 74
Bird is Sick

Gruby
Hamster
Eats 8 of grain
Weight: 108
Gruby is Sick

Nyan
Cat eating 3 fish
Weight: 202
Nyan is Sick


***** Part 4 - (1 points) *****

Amount of food:
Grain: 26 Fish: 14

Feeding all animals, but pelicans last

Pet shop with 6 animals
Amount of food:
Grain: 12.3 Fish: 3

Jago
Pelican
Eats a 0.02 of his weight of grain and 2 fish
Weight: 68
Jago is healthy

Kitku
Cat eating 4 fish
Weight: 230
Kitku is healthy

Rusalka
Hamster
Eats 3.6 of grain
Weight: 46
Rusalka is healthy

Bird
Pelican
Eats a 0.01 of his weight of grain and 2 fish
```

```
Weight: 74
Bird is healthy

Gruby
Hamster
Eats 8 of grain
Weight: 108
Gruby is healthy

Nyan
Cat eating 3 fish
Weight: 202
Nyan is healthy


Feeding all animals, but pelicans last

Pet shop with 6 animals
Amount of food:
Grain: 0.700001 Fish: 0

Jago
Pelican
Eats a 0.02 of his weight of grain and 2 fish
Weight: 68
Jago is Sick

Kitku
Cat eating 4 fish
Weight: 230
Kitku is Sick

Rusalka
Hamster
Eats 3.6 of grain
Weight: 46
Rusalka is healthy

Bird
Pelican
Eats a 0.01 of his weight of grain and 2 fish
Weight: 74
Bird is Sick

Gruby
Hamster
Eats 8 of grain
Weight: 108
Gruby is healthy

Nyan
Cat eating 3 fish
Weight: 202
Nyan is healthy


***** Part 5 - (2 points) *****
```

```
Let cats cure themselfs in part 3 shop

Pet shop with 4 animals
Amount of food:
Grain: 7.34 Fish: 1

Jago
Pelican
Eats a 0.02 of his weight of grain and 2 fish
Weight: 68
Jago is healthy

Kitku
Cat eating 4 fish
Weight: 230
Kitku is healthy

Nyan
Cat eating 3 fish
Weight: 202
Nyan is healthy

Bird
Pelican
Eats a 0.01 of his weight of grain and 2 fish
Weight: 74
Bird is Sick


Let cats cure themselfs in part 4 shop

Pet shop with 5 animals
Amount of food:
Grain: 0.700001 Fish: 0

Jago
Pelican
Eats a 0.02 of his weight of grain and 2 fish
Weight: 68
Jago is Sick

Kitku
Cat eating 4 fish
Weight: 230
Kitku is healthy

Nyan
Cat eating 3 fish
Weight: 202
Nyan is healthy

Bird
Pelican
Eats a 0.01 of his weight of grain and 2 fish
Weight: 74
Bird is Sick

Gruby
```

Hamster
Eats 8 of grain
Weight: 108
Gruby is healthy