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CS 162

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Assignment 3 Design Document

Understanding the Problem:

Summary. We are tasked with creating a game where you play as a zoo manager, purchasing animals and profiting off of their exhibitions. The game goes month by month, with each month having to pay certain fees, acquire certain revenues, and deal with other events. If the player runs out of both money and animals, then the game is over. We are asked to use object-oriented design practices such as inheritance, operator overloading, and the big three as we write this program, with a great focus on inheritance specifically. There are three different animal types, and we must dynamically allocate an array that can contain each type.

Assumptions:

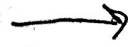
- I am assuming that players are not allowed to let animals die if they have enough money to pay for treatment
- I am assuming that the player must feed all animals every month, without having the option to let them starve
- I am assuming that animals can only give birth to babies of that animal type

Design:

(see next page)

Design

Animal
~~Zoo~~ Class



Child Classes

protected:
{
 birth rate
 age
 cost
 monthly food cost
 monthly revenue
 string animal type
}

public:
{
 constructor
 destructor
 getters
 setters
}

{
 print animal
 is-baby
 is-adult
 iterate month
}

{
 Tiger
 Sea Otter
 Bear
}

Zoo Class
private:

Animal ** array
array length
month
special event
money

public:

iterate month
special event
sickness
babies
purchase animal
pay feeding

Program Flow

Program Starts

↓
Zoo object created

↓
player must buy at least
one animal

↓
while (money > 0) {

iterate month {

special event
buy animal
etc..

} }

↓
array of animal pointers
memory freed

↓
zoo object destroyed

↓
program ends.

Testing:

<i>Function</i>	<i>Case</i>	<i>Case Type</i>	<i>Outcome</i>
Animal::is_baby()	Age = 0	Good	Return true
Animal::is_baby()	Age = 6	Edge	Return false
Animal::is_baby()	Age = 48	Bad	Return false
Zoo::purchase_animal(std::string "Tiger")	Money > Tiger.cost	Good	Add Tiger to animal array. Decrease money by Tiger.cost
Zoo::purchase_animal(std::string "Tiger")	Money = Tiger.cost	Edge	Add Tiger to animal array. Decrease money to 0.
Zoo::purchase_animal(std::string "Tiger")	Money < Tiger.cost	Bad	Cout << "You do not have enough money to purchase this animal." << endl;
Zoo::iterate_month()	Player has no money and an animal gets sick	Bad	Animal dies and zoo.money does not change
Zoo::iterate_month()	Player has enough money when animal gets sick	Good	Money is taken away, and animal is alive
Zoo::iterate_month()	Animal is 6 months old and money = 2 * cost	Edge	Money is taken away and animal is alive