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CS202 Program 1 Design and UML

Goal:

In this project, I was aiming to create an object-oriented program to simulate several kinds of drones. Based on the different type of drones, each kind of drones have different abilities. The program was designed to control the movement and each unique ability of the drones.

Design:

In this program, I was planning to develop at least eight classes to implement all the functions needed. Firstly, I will create a control center class, this class is a client for user to control all the functions about the drones. It has an dynamically allocated array of the vertex node which is each drones, so it has default constructor and destructor to handle the dynamic memory. It also has the search, remove, and several other functions which can invoke the direct function under vertex class. Secondly, I will develop a vertex class as the node to store each drone with the adjacent list. It has copy constructor and search, remove. There also a move function to control the movement of this drone. Thirdly, I will create an edge List class and a Node class to build an edge list. The edge list class has the head pointer of the list and also contains the copy constructor. The Node class contains the pointer points to each adjacent vertex, and a next pointer. Finally, I will create the virtual Drone class, which stores the information about position such like longitude, latitude, and altitude. It also has the basic character to store the name. The default constructor was used to initial the drone and copy constructor to deep copy and assignment. It also has abstract move function and abstract modify function to change the private member of the position information. What’s more, I will also create three different kind of drones which inherit from the base drone class. They are small Drone class with the racing and exploring function, the medium drone class with the photograph and research function, last, the large drone class which can be used to deliver goods or used to assist some agriculture activities such like crop-dusting. Those derived class all has the default constructor and copy constructor which are used to initial the drone and invoke the constructor in their base class to assign the value of the name and position.

Standard requirements:

Basic requirement that I will obey in this program: I will not use statically allocated arrays in my classes or structures, and I will use dynamically allocated arrays instead. I will put all my data member in the private section and use public and private functions to access them. I will not put the input operation in my class, instead, I will put all the input operation in the client program, and I will use several .cpp file to implement the functions and use .h fine to define the functions, finally, using main.cpp to perform the all the client operation. I will not use global variables in my program, if necessary I will define const constant. I will not use the string neither string class, and I realize that I can use the cstring library to use several functions about string, like strlen(), strcmp(), and strcpy(). Every characters and sentences will be stored in the arrays of characters instead.

Requirements:

This program should implement a Graph to handle the location, including elevation, of the drones and restricted areas. Besides, the graph should be implemented using an adjacent list which is a dynamically allocated array of head pointers to edge list. Each head pointer points to a linear linked list of adjacent drone locations. Lastly, all of the traversal function should be implemented as recursive function.

