

## CS 12 - Quiz 4 February 26, 1997

1. (20 pts) Write the class and member functions for the following: A census taker needs a class to maintain information on the people who are living in a particular household. Keep track of the address of the residence, the number of people living there and the name and age of each person. Save memory by dynamically allocating constructs to hold the names and ages until the number of people is known. You should have member functions to allow you to set the information and to display the information. You should also have an appropriate constructor and destructor.

**Answer:**

```
class family {

    char *address;
    int num_people;
    struct member{
        char *name;
        int age;
        member *next;
    };
    member *person;

public:

    family(char *addr = NULL) {
        address = addr;
        num_people = 0;
        person = NULL;
    }

    ~family() {
        delete address;
        member *tmp1 = person,
            *tmp2 = NULL;
        for (int x = 0; x < num_people; x++) {
            tmp2 = tmp1;
            tmp1 = tmp1->next;
            delete tmp2;
        }
    }

    void add_member(char *_name, int _age) {
```

```

        member *tmp = person;
        for (int x = 0; x < num_people; x++)
            tmp = tmp->next;
        tmp = new member;
        num_people++;
        tmp->name = _name;
        tmp->age = _age;
        tmp->next = NULL;
    }

void remove_member(char *_name) {
    member *tmp1 = person,
            *tmp2 = NULL;
    while(strcmp(tmp1->name, _name)) {
        tmp2 = tmp1;
        tmp1 = tmp1->next;
    }
    if (tmp2 != NULL)
        tmp2->next = tmp1->next;
    else
        person = tmp1->next;
    delete tmp1;
}

void change_address(char *_address) {
    address = _address;
}

void display_info() {
    cout << "address: " << address << endl;
    cout << "number of people: " << num_people << endl;
    member *tmp = person;
    for (int x = 0; x < num_people; x++) {
        cout << " person " << x << ": " << tmp->name << endl;
        cout << " age: " << tmp->age << endl;
    }
}
};

```

2. (10 pts) State and define the 3 ways to include members that define the member's accessibility.

**Answer:**

**private:** Can only be accessed by member and friend functions of the class.

**protected:** Can be accessed by member and friend functions of derived classes also.

`public:` Can be accessed by anything.

3. (a) (10 pts) Write classes to depict the following:

(b) (10 pts) Show how you would define the class C3 to have the same capabilities without using inheritance.