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CS360

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Quiz#1

Code in Github link: https://github.com/MynameisKoi/CS360/blob/main/quiz%231.cpp

1.

a.

```cpp
class Smith{
    private:
    int m_wife;

    protected:
    int m_home;

    public:
    int name;

    // default constructor
    Smith(): m_wife(3), m_home(2), name(1){}

    friend class Friend_Smith;
    friend class Son_friend_Smith;
};
```

b.

```cpp
// class Son_Smith, inherited from Smith
class Son_Smith: public Smith{
    private:
    int flag;

    public:
    // default constructor
    Son_Smith(): Smith(){
        flag = 4;
    }
};
```

c.

```cpp
//friend class of Smith, named Friend_Smith
class Friend_Smith{
    public:
    void help(const Smith& sm){
        cout << "Name: " << sm.name << endl;
        cout << "Home: " << sm.m_home << endl;
        cout << "Wife: " << sm.m_wife << endl;
        cout << endl;
    }
};
```

d.

```
//class Son_friend_Smith, inherited from Friend_Smith
class Son_friend_Smith: public Friend_Smith{
    public:
    void help(const Smith& uncle_smith){
        cout << "Name: " << uncle_smith.name << endl;
        cout << "Home: " << uncle_smith.m_home << endl;
        cout << "Wife: " << uncle_smith.m_wife << endl;
        cout << endl;
    }

    //call the help function of Friend_Smith passing uncle_smith as its argument
    void sfsm_help(const Smith& uncle_smith){
        Friend_Smith::help(uncle_smith);
    }
};
```

e.

```
//Verify all help functions in the classes
int main(){
    Smith sm;
    Son_Smith son_sm;
    Friend_Smith f_sm;
    cout << "Help functions in Friend_Smith" << endl;
    f_sm.help(sm);
    Son_friend_Smith sf_sm;
    cout << "Help functions in Son_friend_Smith" << endl;
    sf_sm.help(sm);
    cout << "Call the help function of Friend_Smith in Son_friend_Smith" << endl;
    sf_sm.sfsm_help(sm);
    cout << "Help functions in Friend_Smith with Son_Smith object argument" << endl;
    f_sm.help(son_sm);

    return 0;
}
```

Source code:

```cpp
#include <iostream>
using namespace std;

class Smith{
    private:
    int m_wife;

    protected:
    int m_home;

    public:
    int name;

    // default constructor
    Smith(): m_wife(3), m_home(2), name(1){}

    friend class Friend_Smith;
    friend class Son_friend_Smith;
};

// class Son_Smith, inherited from Smith
class Son_Smith: public Smith{
    private:
    int flag;

    public:
    // default constructor
    Son_Smith(): Smith(){
        flag = 4;
    }
};

//friend class of Smith, named Friend_Smith
class Friend_Smith{
    public:
    void help(const Smith& sm){
        cout << "Name: " << sm.name << endl;
        cout << "Home: " << sm.m_home << endl;
        cout << "Wife: " << sm.m_wife << endl;
        cout << endl;
    }
};

//class Son_friend_Smith, inherited from Friend_Smith
class Son_friend_Smith: public Friend_Smith{
```

```cpp
    public:
    void help(const Smith& uncle_smith){
        cout << "Name: " << uncle_smith.name << endl;
        cout << "Home: " << uncle_smith.m_home << endl;
        cout << "Wife: " << uncle_smith.m_wife << endl;
        cout << endl;
    }

    //call the help function of Friend_Smith passing uncle_smith as its argument
    void sfsm_help(const Smith& uncle_smith){
        Friend_Smith::help(uncle_smith);
    }
};

//Verify all help functions in the classes
int main(){
    Smith sm;
    Son_Smith son_sm;
    Friend_Smith f_sm;
    cout << "Help functions in Friend_Smith" << endl;
    f_sm.help(sm);
    Son_friend_Smith sf_sm;
    cout << "Help functions in Son_friend_Smith" << endl;
    sf_sm.help(sm);
    cout << "Call the help function of Friend_Smith in Son_friend_Smith" << endl;
    sf_sm.sfsm_help(sm);
    cout << "Help functions in Friend_Smith with Son_Smith object argument" << endl;
    f_sm.help(son_sm);

    return 0;
}
```

Run program & result:

```
PS D:\VS CODE\C C++\CS360\HW#1\Quiz1> cd "d:\VS CODE\C C++\CS360\HW#1\Quiz1\" ;
Help functions in Friend_Smith
Name: 1
Home: 2
Wife: 3

Help functions in Son_friend_Smith
Name: 1
Home: 2
Wife: 3

Call the help function of Friend_Smith in Son_friend_Smith
Name: 1
Home: 2
Wife: 3

Help functions in Friend_Smith with Son_Smith object argument
Name: 1
Home: 2
Wife: 3
```