Object-Oriented Programming and Data Structures

COMP2012: Inheritance (Additional)

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Assignment Between Base- and Derived-class Objects

Given the following definitions and public inheritance is used:

```
Base base;
Derived derived;
```

- The following assignments are fine:

```
base = derived;      // Slicing
Base* b = &derived;      // Can't use derived-class specific members
Base& b = derived;      // Can't use derived-class specific members
```

- The following assignments give compilation errors:

```
derived = base;      // Unless you define such conversion
Derived* d = &base;      // No such conversion
Derived& d = base;      // No such conversion
```

No Slicing for protected/private Inheritance

If you use protected/private inheritance, slicing won't work either. That is, none of the assignments in the previous page work.

```
class Student : protected UPerson { /* incomplete */ };
int main( )
{
    Student ug("UG", ECE, 3.0);
    UPerson p = ug;
    UPerson* q = &ug;
    UPerson& r = ug;
}
```

```
a.cpp:11: error: cannot cast 'Student' to its protected base class 'UPerson'
    UPerson p = ug;
                ^
a.cpp:12: error: cannot cast 'Student' to its protected base class 'UPerson'
    UPerson* q = &ug;
                 ^
a.cpp:13: error: cannot cast 'Student' to its protected base class 'UPerson'
    UPerson& r = ug;
                 ^
./student.h:6:17: note: declared protected here
class Student : protected UPerson
                ^~~~~~~~~~~~~~~~~
```