CS 162
Intro to CS II

“Has a” vs. “Is a” Relationship
What is inheritance?

• Webster Definition?
  – the reception of genetic qualities by transmission from parent to offspring
  – the acquisition of a possession, condition, or trait from past generations

• CS Definition?
  – Base class (Parent) and Derived class (Child)
  – Ancestor class and Descendant class (generations)
Inheritance Interface

class parent {
    public:
        parent(); //Have a constructor
        void print_mssg();
        int get_shared_var();
    private:
        int shared_var;
};
class child : public parent {
    public:
        child(); //This constructor needs to call parent() constructor
        void print_mssg(); //Redefine or Override inherited function
    private:
        int unique_var;
};
Inheritance Implementation

```cpp
parent::parent() {
    shared_var = 0;
}
int parent::get_shared_var() {
    return shared_var;
}
void parent::print_mssg() {
    cout << "I’m parent!" << endl;
}

//child class implementation
child::child() : parent() {  //Need to call inherited constructor first
    unique_var = 0;
}
void child::print_mssg() {
    cout << "I’m child!" << endl;  //This will take precedence over parent
}
```
What is not inherited?

- Constructors
- Destructors
- Friends
- Assignment Op Overload

- Inherited, but not accessible: Private Members
Demo: Vehicle Toll ...

• Get into groups of 4-5 people
• Design the classes for a vehicle and bike to provide the toll amount based on the seats for all vehicles, except bikes that are free.
  – Non-default constructors to set the seats
  – Accessor function for the seats
  – Provide toll amount for vehicles and bikes
• How will you make sure it is working?