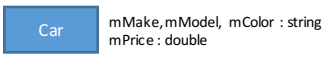
UCLA

# CS 31:
# Introduction To Computer Science I

Howard A. Stahl

## Car Example

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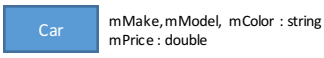

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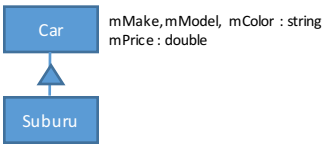


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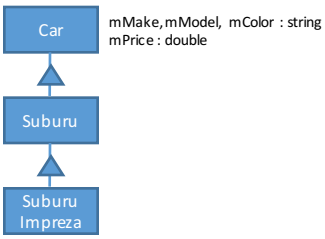


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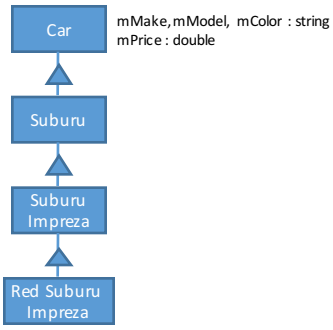

## Inheritance

- A Structural Concept That Supports The "IS-A" Relationship
- An Additive Models
  - Don't Repeat Yourself
  - Layers Of An Onion
- Parent Class-Sub Class

## Inherited Behavior

- Subclasses Can "Override" The Behavior Of Their Parent Class By Providing A Different Implementation Of A Certain Operation
- Subclass Behavior Will Be "Preferred" Over Their Parent Class

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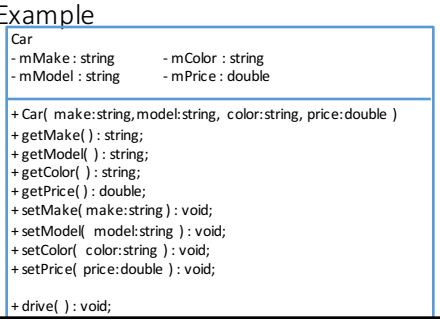

## Car Example

Car

- mMake : string
- mModel : string
- mColor : string
- mPrice : double

+ Car( make:string, model:string, color:string, price:double )
+ getMake( ) : string;
+ getModel( ) : string;
+ getColor( ) : string;
+ getPrice( ) : double;
+ setMake( make:string ) : void;
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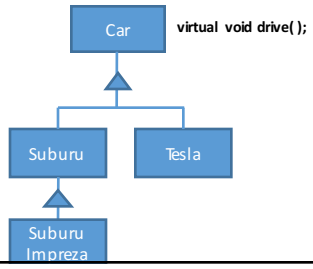
**+ drive( ) : void;**

## Car Example

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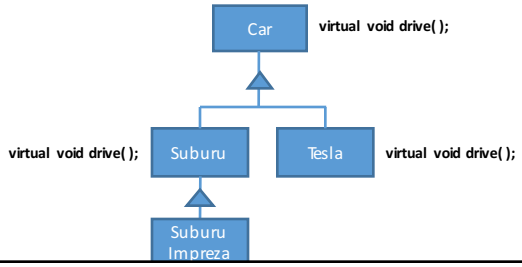
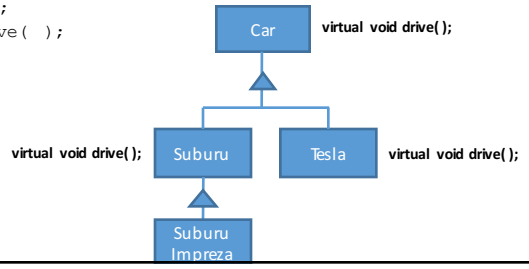


## `virtual` Methods Are Late Binding Methods

- `virtual` Marks Methods Whose Behavior Is Expected To Differ In Subclasses
- `virtual` Methods Are Not Decided At Compile-Time
- The Compiler Waits Until Run-time To Decide Which Version To Run
  - Yes, C++ Has Run-time Knowledge Of The Structure Of Your Classes

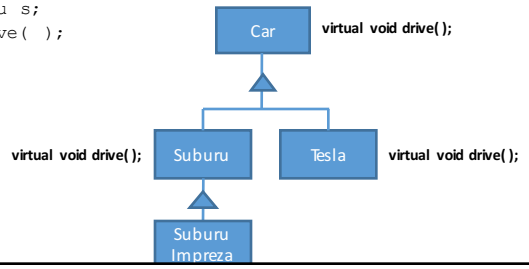
## Car Example

```
Car c;
c.drive( );
```



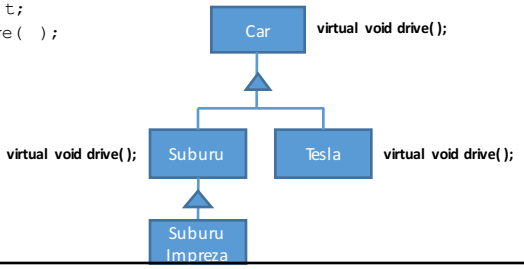

## Car Example

```
Suburu s;
s.drive( );
```



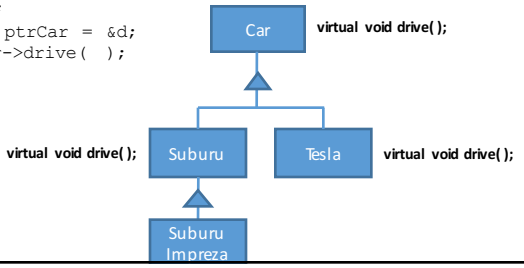
## Car Example

```
Tesla t;
t.drive( );
```




## Car Example

```
Car c;
Car * ptrCar = &d;
ptrCar->drive( );
```

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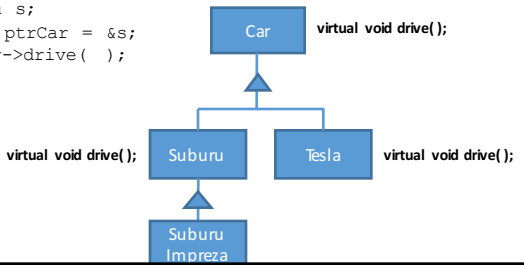

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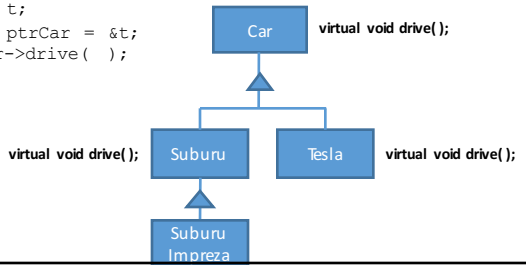


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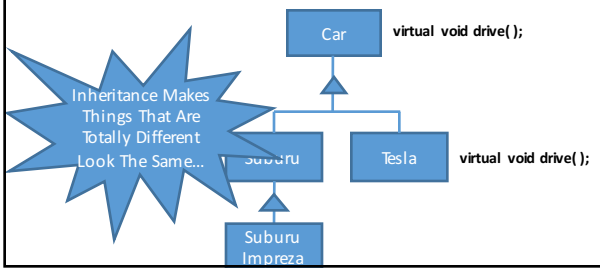


## Abstract Classes

- A Class Is Good For Doing Two Things
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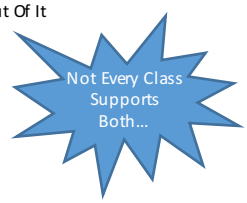


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  - Adjective
    1. thought of apart from concrete realities, specific objects, or actual instances:
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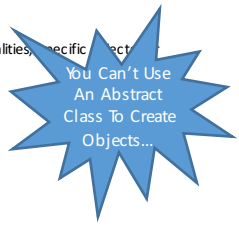

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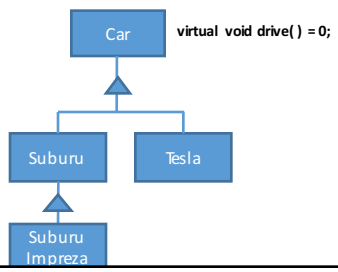

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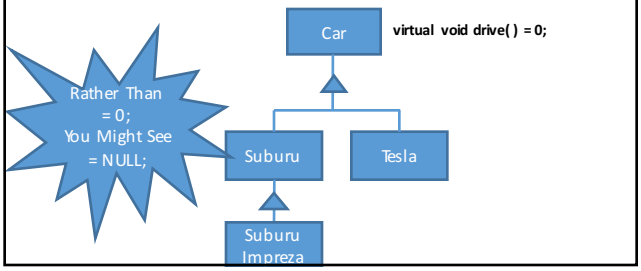


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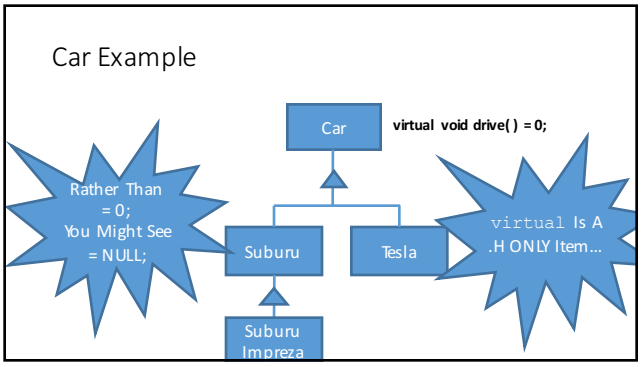


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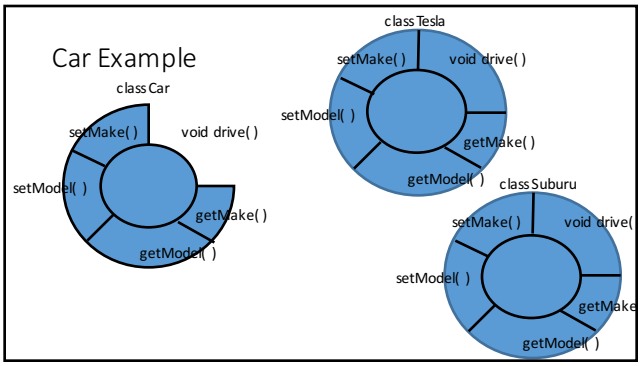
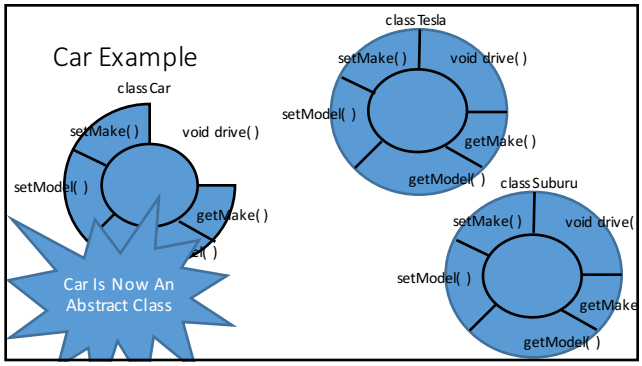
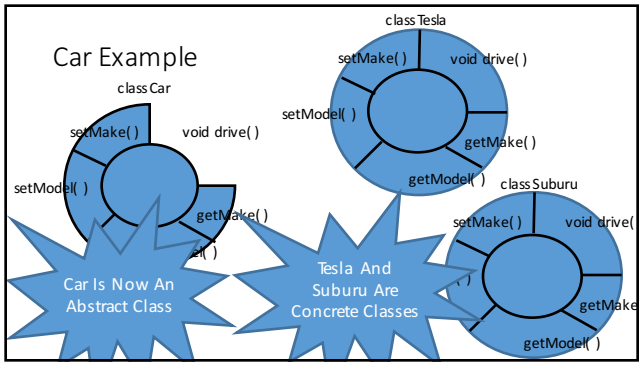
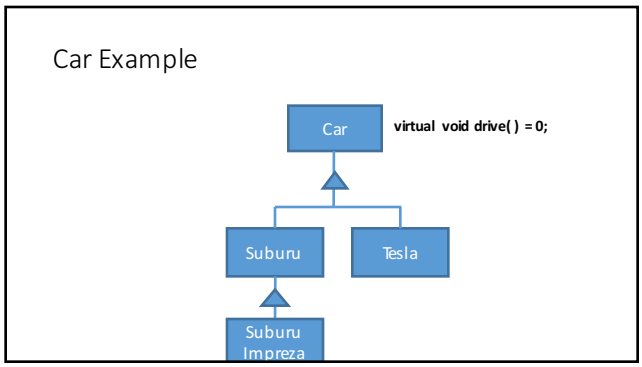
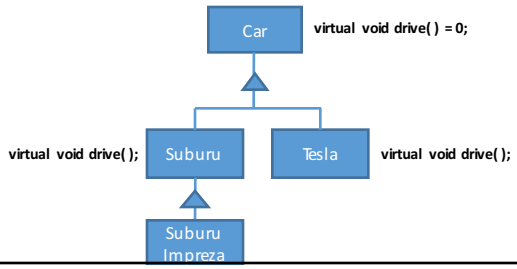



Car Example
class Car
setMake( )
void drive( )
setModel( )
getMake( )
Car Is Now An Abstract Class
class Tesla
setMake( )
void drive( )
setModel( )
getMake( )
getModel( )
class Suburu
setMake( )
void drive(
setModel( )
getMake
getModel( )


Car Example
class Car
setMake( )
void drive( )
setModel( )
getMake( )
Car Is Now An Abstract Class
class Tesla
setMake( )
void drive( )
setModel( )
getMake( )
getModel( )
Tesla And Suburu Are Concrete Classes
class Suburu
setMake( )
void drive(
getMake
getModel( )


Car Example
Car
virtual void drive( ) = 0;
Suburu
Tesla
Suburu Impreza

## Car Example

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