

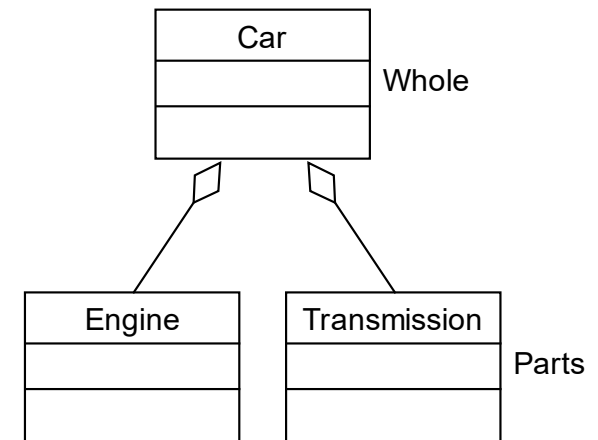


# AGGREGATION

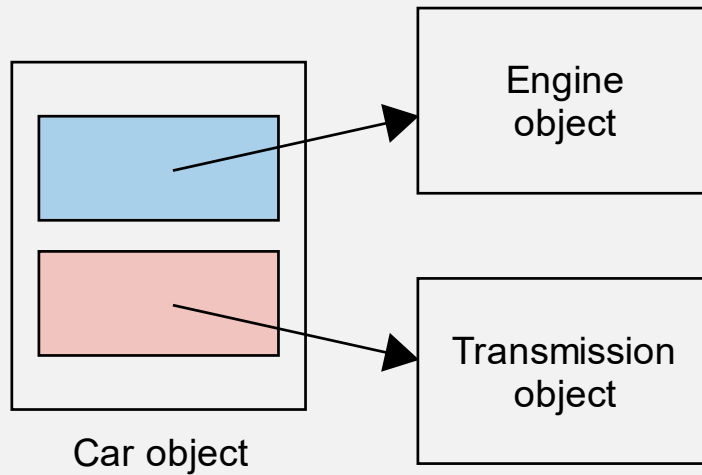
Pointer member variables

# AGGREGATION CHARACTERISTICS

- Parts are bound weakly or loosely to the whole object with pointers
- Parts and the whole may be created and destroyed at different times, so they have independent lifetimes
- Parts can be changed or replaced whenever it is convenient
- The parts may be shared with other objects in the program, making ownership of the part an important issue
- Parts are implemented as pointer member variables in the whole class



# IMPLEMENTING AGGREGATION



```
class Engine
{
    . . .
};

class Transmission
{
    . . .
};

class Car
{
    private:
        Engine*      motor = nullptr;
        Transmission* trans = nullptr;
    . . .
};
```