V602 -- Polymorphism I

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What is a Factory Function? What is your thought about using a global function to do this versus a static member function?

A Factory Function is a static function of a class.

The function returns an object of the class's type.

I can see both the global method and the static member function being useful in different circumstances. The static example provided in class was interesting to observe, and I can see how mastery of this skill allows for greater simplicity when dealing with complex patterns.

Research what a vtable is. How does C++ use these?

From Wikipedia: A virtual method table (VMT), also called a vtable, is a mechanism used in a programming language to support dynamic dispatch.

Dispatching here refers to the compilers task of finding the right function to call.

Sometimes, such as when we use virtual functions, the compiler may have a challenge in finding the right function to call. This process is called dynamic dispatch or late method binding.

The vtable tracks the implementations of a virtual function, ensuring that the proper version of the function is executed at runtime.

Why would we use a pure virtual function? Give a practical example of using an abstract class.

We use pure virtual functions when there is no need for a default implementation.

For example, if we were to create a `class Vehicle {};` that had derived classes such as `class Bus : public Vehicle` and `class Motorcycle : public Vehicle`, we may with to make a function that returns the maximum speed of the vehicles. The base class has no maximum speed, as it is an abstract class, while the Bus and Motorcycle classes would each have a max speed. In this scenario, a pure virtual function would be useful for creating the initial function, with the overriding functions providing specific details for each function.