WIDGET FACTORY EXERCISE

This exercises evaluates critical thinking and problem solving skills, specifically **system design**. Use any tools or resources that you normally would for programming tasks.

INSTRUCTIONS

Design and implement a prototype factory that assembles widgets from specification and order files, taking into consideration design and software engineering best practices. It should output a list of the assembled widgets and the specific parts used to build them, including serial numbers.

Try to envision some additional requirements that a real-world factory might need and some circumstances that a real-world factory might want to simulate. The exercise is purposefully vague in order to give room for design flexibility.

SUBMISSIONS SHOULD CONTAIN THE FOLLOWING:

- Code that solves the problem above
- Instructions for how to compile and run your code
- A description of your solution and any assumptions it makes

SPECIFICATION

Our **Factory** is pretty neat, in that it can construct arbitrary objects (called **Widgets**). All that we need is a list of the **Parts** that comprise an object.

To sketch out how the factory is going to work, we are going to write a simulator to work out the factory internals before we break ground.

Fortunately, we already have a contractor to supply the warehousing, parts ordering and delivery, and they've supplied us with a **Warehouse** simulator. The simulator binary is supplied.

Our customers will send us a specification list of widgets and which parts they are comprised of. This is currently a simple text file. Unfortunately, we don't have a formal specification of the file, but we do have an example (see **example widget specification file**).

Additionally, we receive a file containing the list of widgets that the customer wants us to make, and the order in which they want us to make them (see **example order file**).

For now, we are mostly concerned with processing orders from these files. Our engineering team can model other processes more closely later.

EXAMPLE WIDGET SPECIFICATION FILE

```
motorcycle: wheel, wheel, engine, seat, handlebar
car: wheel, wheel, wheel, wheel, engine, seat, steering wheel, sunroof
truck: wheel, wheel, wheel, wheel, engine, seat, steering wheel,
truck-bed
```

EXAMPLE ORDER FILE

```
car
car
motorcycle
truck
car
truck
motorcycle
car
car
```