The Car Builder

Due: Thu, Sept 14

You work for an automobile manufacturing factory named My Own Car that builds specially modified cars, located in the Toney area in north Madison County, Alabama.

Your factory assembles cars from large existing (pre-made) components: engine, body (body includes transmission and all other pieces, we're simplifying), wheel with tires.

Your car engines are made in Nashville, Tennessee. Your car body is made in Chattanooga, Tennessee. Your wheels and tires come from Gadsden, Alabama, the tires are from the Goodyear Tire & Rubber plant and the wheels are from a specialty store named Wheels for Us, also in Gadsden, Alabama. You will assume that Wheels for Us buys the appropriate tires for the wheels, so you will be provided with a wheel/tire combo. Your painters are located in Owens Crossroad, Alabama, and they won't come to you, so you have to ship the cars (or car parts!) to them.

Engines come in three forms:

- 150 horsepower
- 250 horsepower
- 400 horsepower

Car Bodies come in three models:

- Similar to Ford Fiesta
- Similar to Ford Fusion
- Similar to Ford Mustang

Wheels come in three models:

a) Wheel Type #1

b) Wheel Type #2

c) Wheel Type #3

You also allow paint color, separately for engines or wheels:

a) Red
b) Blue
c) Gold

Your task is to build a scheduling system that will provide appropriate parts so that each kind of car to be built. This will be web-based and will use AJAX because you really have to be asynchronous for this to work.

At your manufacturing facility in Toney, you have space available for the parts for 3 cars at one time. That is, you can store 3 engines, 3 bodies, and 3 wheel/tires while you are working on a fourth car. You will assume one big room for putting the car together, this will have room for all the parts for the one car. You will assume one small room for storing engines, one small room for storing bodies, and one small room for storing wheel/tires. You will have to move car parts from each of these rooms to the big room when a new car is to be put together. NOTE: the color matters!

Each of the small rooms will be filled by ordering parts from the appropriate external manufacturer. The engines will come from Nashville, the car body from Chattanooga, and the wheel/tires from Wheels for Us in Gadsden.

You will assume that all car parts: engines, body, wheel/tires are painted blue by default. Note that some of these parts, any that are not blue, have to make a pass through the painters first—except for engines, we don't care about engine color because in our cars the hood will usually be closed.

You will have a customer's web page using AJAX that can order a custom car from your factory, My Own Car. Then your web page will automatically access the various part provider web pages to order the parts. Then your web page will send appropriate parts to/from the painter. You will assume that each of these takes time! You will use sleep functions in PHP to simulate this time. In the meantime while these are taking place, a customer can order new cars. The idea is to be slow enough entering data that you can get 4 cars or more on order. If your car building backs up, then you have to be able to slow down ordering so you have a place to store parts when they arrive. You will handle the part providers and painter by writing web servers in PHP.

You will have a manufacturer's web page using AJAX that controls the actual car building itself. Note that car parts have to arrive in the correct order! Because you will assume the small rooms where car parts are stored will be handled in a first in/first out order. So for example, whatever engine was the first to arrive will be the engine you use when you build the next car. You will handle the small part storage rooms using PHP.

You will use ONLY JavaScript, PHP, and XMLHttpRequest to do this work. You will use Apache Web Server. You will not use any other more advanced technologies. You will store items such as car parts and cars in PHP or JavaScript arrays. You may NOT use a database instead.

You will use Chrome as your web browser.

Your code MUST run in the CS laboratories, direct. That is, you may NOT bring in your laptop and demo it here. You may NOT use servers located elsewhere. You may NOT use Virtual Box or other virtual machine to install extra software on, your code has to run direct on what we have installed here.

You need to find some way to illustrate how your accesses between client and server work, and that they are appropriate for asynchronous operation. I'll leave this up to you, but it must be convincing.

Grading:

All appropriate web servers and web client running:	35%
Asynchronous operation correctly handled with AJAX:	40%
Correct operation in regard to car building:	25%

Turn in:

Listing of your code (printed copy, hard copy):

Code itself on a CDROM or a (cheap) flash drive