Gas Station Specifications

1. There will be four pumps at the gas station, and a unique number will identify each pump.
2. All pumps are “self serve.”
3. Each pump has three nozzles for different type of gas—regular, plus, and premium—denoting different octane content in the gasoline. The prices for the three types of gas vary.
4. Each pump has one meter. At any one time, only one person can use one pump.
5. All pumps are connected to common storage tanks, one for each of the three types of gas. When the level of gas in a storage tank gets below a set threshold, a request for a refill is issued to an external system.
6. It is possible for a customer to pump gas during storage tank refill.
7. A customer must pay first. The single gas station attendant accepts cash only.
8. Upon payment, the attendant enables a given pump to dispense the paid-for amount of gas.
9. The customer can change the decision on the type of gas (s)he wants to fill before starting to fill. Once the customer has started to fill, then the decision cannot be changed.
10. Should the customer pre-pay more than (s)he spent to fill the car tank, the gas station attendant will return to the customer his/her change.
11. The pump nozzle has a sensor that stops the gas flow once the tank is full.
12. The system should handle race conditions, such as
   a. one customer paying while, in the meantime, another beginning to pump gas at the paid-for pump, and
   b. one customer beginning to pump at a pump without paying, before another is able to retrieve his/her change.