Exercise Sheet 3 – Identifying Classes
F28SD [Introduction to Software Engineering]

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1. EasyBicycle is a company that hires bicycles. You have been set the task designing a computer-based system that will support the staff at EasyBicycle in hiring bicycles to their customers. Below is a description of how bicycles are currently hired out and returned.

   EasyBicycle has a fleet of one hundred hire bicycles. They have a set of existing customer records. Their bicycles come in one size and are fully adjustable. EasyBicycle operates a first come first served basis, i.e. no reservations. In order to hire a bicycle a customer must specify their name, address, mobile number and the return date. A customer can borrow up to six bicycles per hire, but they can only have one active hire at any moment in time. Each bicycle has a unique identifying number, as does each customer and hire. Records of past hires are kept for future reference.

   a) Based upon the narrative above write down your ***assumptions*** about the system you are being asked to design.
   b) Apply ***Noun-Verb*** analysis to the narrative given above.
   c) Based upon your Noun-Verb analysis, identify your initial design classes using the ***Class-Responsibility-Collaboration (CRC)*** modelling technique.

2. Below is a description of microwave control system. Using the ***Analysis Stereotype*** technique, construct a model of the required microwave control system.

   *We are looking for a software system to control our new high-powered **microwave device.** The device is housed within a protective unit. Access to the microwave is via a door which protects users when the power unit within the device is switched on. The door is controlled electronically and has an associated sensor – your system will need to control the door. Because our device is high powered, we need to be able to lock and unlock the device. A console has been included on the front of the device that will enable your system to communicate with users. In order to switch on the power unit a user must supply the duration of the required power cycle. A power sensor has been embedded within the device which your system will be able to access. A special feature of the microwave is that it has a sensor that is able to weight any object that is placed within the microwave. Moreover, if an object of more than 10kg is detected your system should request that the user supplies the power setting for the power unit. Not all users should be able to lock and unlock the device, i.e. only Supervisors. Supervisors have a PIN which they should use to lock and unlock the device. However, once unlocked the device should be usable by any Technician. The verification of a Supervisor's PIN will be performed by our existing computer based Admin system. Finally, the system should maintain a log that reflects the usage of the device, i.e. locked, unlocked and power cycle.*