*Exercise 4*

## INVENT A COMMUNITY OF THINGS

*Many automatic systems are centralized: many sensors send information to a single central controller ('hub') which then sends commands out to many actuators – rather like the brain in the body, or the director of a company. But systems can be decentralized: there is no central controller – instead, sensors and actuators each have some intelligence and communicate directly to each other.*

*A natural example of a decentralized system is a colony of ants* (formiche). *It has no ''plan', no 'king' sends commands. And individual ants are not very clever. But ants are programmed to respond to the behaviour of other ants, so the colony as a whole has an 'emergent' and 'distributed' intelligence which can do very complex operations.*

*A fantasy example: The* calli *and* campi *of Venice are cleaned by Venbots, small robots similar to Roombas, the domestic vacuum cleaners. Venbots clean together in 'swarms'* (sciame)*, and can communicate ('talk') to each other. At intervals, they go to Venbars to get more electricity, detergent and water, and to excrete rubbish; so Venbots must also talk to Venbars. When a Venbar has no more detergent, or too much rubbish, it must ask robot Venboats to bring more detergent or remove the rubbish.*

*This is only an example, but note that:*

- *This system is a 'community of things': it has many members which communicate to each other and act cooperatively*
- *In this case there are three kinds of member: Venbots, Venbars, and Venboats*
- *The community's intelligence is distributed: there is no centralized computer/controller*
- *In this case all the members have some intelligence and are both sensors and actuators.*

1 Form teams of 3

2 For 10 minutes, invent a new (not existing) 'community of things':

- Start by brainstorming
- Choose a situation: home, work, university, city etc.
- Your community must have at least three kinds of member; they communicate to each other and act cooperatively
- Your community's intelligence is distributed: there is no centralized computer/controller

3 For 5 minutes, draw an abstract diagram of this community

4 For 5 minutes, draw a sketch of the community in action

5 Write your full names *(nomi e cognomi)* on the display

6 Fix it to the wall and be prepared to explain it to everyone.