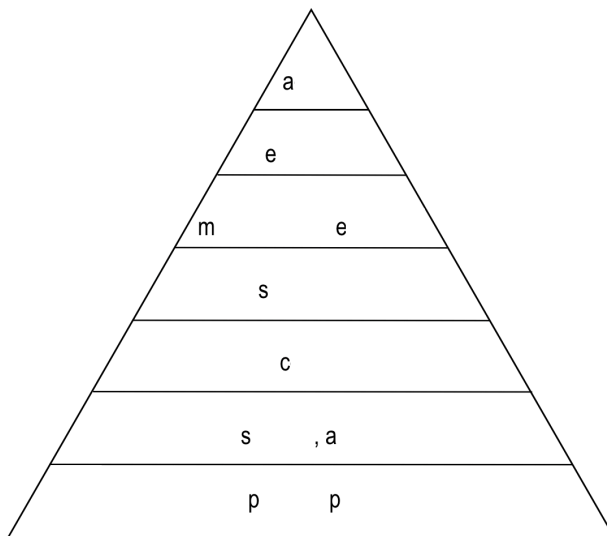


Exercise Sheet 1

1. a) Complete the layers of the automation pyramid



- b) On which layer of the pyramid is the schedule of the production of different chemical in a pharmaceutical plant created?
- c) What are the three functions of the operator interface? To which layer does this belong?
- d) On which layer are production goals set, sites coordinated, orders managed?
2. a) What is the relationship between hierarchical level, the response time, data quantity and complexity?
- b) What does that imply for the communication networks?
3. Give a high-level description of the architecture up to the supervision level of a home user washing machine (ignore communication networks in this exercise, assume that components can exchange information using some advanced magic)
- a) What are the main components of such a washing machine?
Give each component a name and describe in 1-2 sentences its functionality
- b) To which layers do the components and their parts belong?
- c) Describe the interaction between the components in 0-2 sentences per pair
4. a) Which parts of a washing machine are discrete and which are continuous?
- b) Give an example of closed loop and/or open loop control for a washing machine