MTAT.03.083 – Systems Modelling

Due on 06.10.2015 at 8 am
complete the homework in groups of 2 students.

Grading criteria:

- 1 pt. Actors correctly identified
- 1 pt. Use Cases and boundary of the system correctly identified
- 1 pt. Correct use of use case relationships
- 2 pts. Correctness and level of detail of the Use Case document (the one to be completed starting from the use case template provided on the course website)

Sales Information System at ODS

Goal: Design a use case diagram of the sales information system described in the following (you can use Magic Draw for doing it). Write the use case(s) for handling an RFQ starting from the use case template provided on the course website.

Task: ODS is a manufacturer of electronic devices, specialized in GPS and electronic monitoring devices. ODS does not maintain ready-made devices on stock, but instead it manufactures the devices "on demand" based on customer orders. A customer order includes an assembly drawing and a Bill of Materials (BOM). The BOM is a list of electronic components that are required to manufacture the electronic device (circuit board, resistors, capacitors, etc.).

A sample BOM for a GPS device can be retrieved at the following URL: http://www.arenasolutions.com/templates/resources/excel-bom-templates.zip (see the sheets "Explanation" and "Example with Levels"; other sheets can be ignored). A BOM describes all the materials required to produce an electronic assembly. An assembly consists of sub-assemblies and electronic components. Sub-assemblies may consist of other sub-assemblies and electronic components and so-on. Every assembly, sub-assembly or electronic component consists of a part number, a part name, a revision identifier, the amount of parts needed, the unit of measure (UOM), an indication of whether the part is available in stock (off-the-shelf) or has to be made on demand (made-to-specifications), and in the case of parts that are to be placed inside a Printed Circuit Board (PCB), textual nodes, and a list of so-called "reference designators", which indicate the area of the PCB where the part will be placed. Before ordering an electronic device, a customer first contact ODS with a Request For Quotes (RFQ). The RFQ includes an RFQ reference number, customer data (business name, business registry number, contact person, e-mail, phone number, billing address and shipping address), the assembly drawing and the BOM. We will treat the assembly drawing as a black-box (i.e. an array of bytes with no specified structure). We will also assume (as a simplification) that in an RFQ,

a customer asks only for one copy of a device, although in practice a customer typically asks for multiple copies of a device. Upon receiving an RFQ from a customer, a Sales Engineer enters the details of the RFQ (including the BOM) into a sales information system. The sales engineer then needs to determine the cost of the requested device. To do so, the sales engineer needs to produce a costed BOM, which is a BOM in which every assembly, sub-assembly and component has a cost associated to it. The sales information system maintains data about the price of every electronic component that is used by ODS. Based on these component prices, the system calculates a preliminary costed BOM as follows: The cost of an assembly in the BOM is equal to the sum of the costs of its sub-assemblies and components (taking into account the required number of units of each component) multiplied by 1.3 (i.e. there is a 30% cost overhead for manufacturing the assembly). Once the sales system has calculated a preliminary costed BOM, the sales engineer can adjust the prices of sub-assemblies taking into account his own estimates. Every time the sales engineer adjusts the cost of a sub-assembly, the costed BOM is adjusted accordingly. Once the sales engineer is satisfied of the cost estimates, she marks the costed BOM as final. Similarly, the sales engineer needs to determine the lead time, which is the amount of time (in working hours) that it takes to manufacture the requested device. The sales information system maintains the lead-time of every electronic component that is used by ODS. The lead-time of a component is the amount of time it takes for ODS to obtain the component from its suppliers. Based on the component lead times, the leadtime of an assembly is calculated as the maximum of the lead times of its subassemblies multiplied by 1.2 (i.e. there is a 20% additional lead-time for an assembly on top of the lead time for obtaining its sub-assemblies or components). As with the costs, the sales engineer can adjust the lead times of sub-assemblies. Every time the sales engineer adjusts the lead-time of a sub-assembly, the lead times of other assemblies are adjusted accordingly. Once the sales engineer has a costed BOM with lead times, she sends a quote to the customer including the total cost and the lead-time of the device and the costed BOM with lead times included. Sometimes, customers ask for a revised quote due minor adjustments in the assembly drawing and/or in the BOM. In this case, the customer sends a revised RFQ that includes a revised drawing and a revised BOM. A revised RFQ is handled in the same way as an initial RFQ, except that it is only necessary to re-calculate costs and leadtimes for items in the revised BOM that have changed with respect to the initial BOM.

Notes:

1. Submissions: one of the members of the group has to login and submit the assignment using the link "submit" on the course webpage. **Please specify in a comment the members of the group**. The submission should consist of one single pdf file.