



METHODS AND TOOLS FOR BUSINESS PROCESS MODELING

MODULE 1 - EXERCISES ON METHODS AND TOOLS FOR BUSINESS PROCESS MODELING

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Exercises

Business Process Modeling

1) EXERCISE IDEFO

Using IDEFO to model the process described hereafter.

Hereafter it is described the process of preparing the "pasta all'uovo" in the traditional way.

- 1) Dough: according to the recipe, durum wheat semolina and fresh eggs are mixed in a mixer, kneading slowly for about twenty minutes. In this way, the product does not suffer temperature alteration.
- 2) Laminate: The dough is extruded through the dies from which, by a slow and gradual reduction process, you get the pasty. It is cut in the required format, and then arranged on appropriate wooden boards.
- 3) Form: the pasty, obtained by the lamination process, is now cut with knives according to the required format, and then all provisions are arranged on appropriate wooden boards.
- 4) Dry: the boards are placed into a cell where a slow drying process starts, with a temperature between 42 and 47 Celsius degrees, which allows achieving a dry and an elastic product but intact in its characteristics.
- 5) Ripen: after the drying phase, the product has to ripen for about 12 hours.
- 6) Package: After the maturation phase, the hand-weighing, the packaging and the labeling phases are performed. It is important not to break the product and to take care of the final appearance.

All stages of production must follow the regulations defined by the Ministry of Health for the food production.

2) EXERCISE ARIS

Use ARIS to model the process described

A car dealer is provided with a repair shop, hereafter the repairing process is formalized.

When the customer brings his car to repair shop, at first the Director checks the repair feasibility considering the skills of workers. If the workshop staff is skilled at performing the repair, the Director instructs for repairing, otherwise the car is sent back to the customer.

If the repair is carried out, the foreman, with the staff, schedules the activities necessary to repair the car. Then the availability of the material and equipments needed in the warehouse is checked.

After the purchase of any missing material, the staff performs the repair in accordance with the instructions of the head quarter for the specific car.

3) EXERCISE IDEF0

Use IDEF0 to model the process described here

The Simic Srl produces tin cans for edible oils and industrial lubricants.

The 1-liter cans' production flow shop starts from a two-color lithograph machine that prints on a raw tin plate sheet (0.6 x 0,8 m) n. 12 different images and / or writings (12 tin cans for sheet) for each product / customer. The screen-printed sheets move then in two shearing presses that mill the 12 can sides; from a raw sheet of the same kind of tin (0.75 x 0,70 m), n.72 discs with 82mm diameter are punched (bottom and lid of the cans).

The side and the closing discs of the cans are then joined by the automated line, which packages cans in according to the type of product / customer. The finished cans are palletized and stored.

The production process is subject to quality control in all its phases.

4) EXERCISE ARIS

Use ARIS to model the process described here

Here the repair process of electronic media carried out by Wally spa is described.

When a product arrives at the headquarters of Wally Spa of Udine, it is accepted by an appointed person, and the product and customer information are registered in the information system (DB).

After that, a technician performs the functionality check and the technical analysis of the failure. If the product can be repaired, the repair is estimated (processing, spare parts and transport costs), otherwise the product irreparability is communicated, and the product is sent back to the customer.

The estimation is discussed with the customer. If the estimation is accepted, it is possible to proceed with the repairing. Therefore, the failed components are replaced and tests are performed. If additional anomalies are found a deeper analysis of the failure is carried and again the repair and the following tests are executed. If the tests fail again the not repaired product is sent back to the customer.

If the final test is successful, the product is cleaned and packaged. Finally, the product is dispatched to the customer.

5) EXERCISE IDEF0

A company that produces Radar also deals with the repair of the same.

(Phase 1) The non-functioning radar is received by an operator who controls its type and makes a first inspection to identify any evident and clearly visible faults.

(Phase 2) The received and inspected radar then passes to a testing phase, where the faults are identified by means of equipment which, controlled by a second operator, simulates operating cycles, taking into account the design parameters of the Radar.

(Phase 3) At this point, thanks to the information collected during the testing, the actual repair takes place, consisting, in general, in the replacement of damaged components by specialized operators.

(Step 4) The repaired Radar undergoes a check to verify that the repair has been successful and that all features of the product have been restored. If the repair has not been successful, the Radar is sent back to the testing phase.

(Step 5) Radars that have passed the check can be prepared to be returned to the customer.

6) EXERCISE ARIS

A loan application is approved if it passes two checks: (i) the applicant's loan risk assessment, done automatically by a system, and (ii) the appraisal of the property for which the loan has been asked, carried out by a property appraiser. The risk assessment requires a credit history check on the applicant, which is performed by a financial officer. Once both the loan risk assessment and the property appraisal have been performed, a loan officer can assess the applicant's eligibility. If the applicant is not eligible, the application is rejected, otherwise the acceptance pack is prepared and sent to the customer. The acceptance pack includes a repayment schedule which the customer needs to agree upon by sending the signed documents back to the loan provider. The latter then verifies the repayment agreement: if the applicant disagreed with the repayment schedule, the loan provider cancels the application; if the applicant agreed, the loan provider approves the application. In either case, the process completes with the loan provider notifying the applicant of the application status.

7) EXERCISE IDEFO

The Feldschloesschen group takes care of the production of beer from raw materials to ready-to-drink beer. The malt production process, which will then be used to produce the beer, is described below.

Phase 1) The wheat that arrives at the brewery is coarsely milled in large mills and mixed in special boilers with water, which must be pure, soft and neutral in taste.

Phase 2) The must, at this point, is slowly heated at different temperatures depending on the type of beer, for a period ranging from two to four hours. When certain temperatures are reached, the enzymes contained in the malt are developed. These enzymes convert starch into maltose and proteins into aminoacids.

Phase 3) Subsequently, in sterile boilers, the must is cleansed of all the solid components, as specified in the recipe. These residues, the so-called "Treber", is used as a precious animal feed.

Phase 4) The cleansed must then ends up in a further boiler, where for about one or two hours, depending on the type of beer to be produced, it is boiled.

Phase 5) Then the hops are added, in the quantities indicated in the recipe, which will attribute to the beer that pleasantly bitter taste and also the characteristic aroma. The hop also encourages the inalterability of beer and has a positive influence on beer foam.

Phase 6) The pure must is then quickly cooled (the speed of cooling depends on the type of beer to be produced), reaching a temperature of 5 °, to arrive subsequently to the first fermentation tanks.

8) EXERCISE IDEFO

Cutting the matchsticks

During this phase thin sheet of wood (pine or aspen) called veneer are used. Veneer sheet is about 0.1 in (2.5 mm) thick and it is stacked and fed into a chopper. The chopper has many sharp blades that cut down through the stack to produce as many as 1,000 matchsticks in a single stroke.

Treating the matchsticks

The cut matchsticks are dumped into a large vat filled with a dilute solution of ammonium phosphate. After they have soaked for several minutes, the matchsticks are removed from the vat and placed in a large, rotating drum, like a clothes dryer. The tumbling action inside the drum dries the sticks and acts to polish and clean them of any splinters or crystallized chemical.

Forming the match heads

The sticks are then put on a conveyor belt that transfers them to be inserted into holes on a long, continuous, perforated steel belt. A typical belt may have 50-100 holes spaced across its width. Any sticks that do not seat firmly into the holes fall to a catch area beneath the belt and are transferred back. The perforated belt holds the matchsticks upside down and immerses the lower portion of the sticks in a bath of hot paraffin wax. After they emerge from the wax, the sticks are allowed to dry. The belt loops up and down several times as the matches dry for 50-60 minutes.

Packaging the matches

When the matches are dry, the belt moves them to the packaging area, where a multi-toothed wheel pushes the finished matches out of the holes in the belt. The matches fall into hoppers, which measure the proper amount of matches for each box. The matches are dumped from the hoppers into the inner portions of the cardboard match boxes, which are moving along a conveyor belt located below the hoppers. Ten or more boxes may be filled at the same time.

9) EXERCISE ARIS

The textile company Stampi&Co produces fabrics printed with two main technologies: traditional printing and inkjet printing. Below are the main production planning activities.

Based on customer's specifications, the technical department creates the drawing to be printed on the fabric. Then, it creates the drawing master data within the information system. This master data contains a unique code for the drawing and all its technical specifications (number of colors, printing technology, and other specific data). After creating the drawing, the "printing order" is generated. This document contains all the data necessary for production, including the customer code, the print background (type of fabric to be printed on), the drawing code, the technology to be used, the necessary equipment, the production cycle, the quantity requested by the customer, the quantity to be put into production and the date requested by the customer. After creating the "printing order", the Material Requirement Plan (MRP) is launched by the planner. The MRP, taking into account the "printing orders", the availability of the fabrics in the warehouse and the arrivals of fabrics (from external suppliers), checks whether the print background is available and associates a date of availability of the fabric accordingly. If the fabric is not available, the MRP creates a list of requests to purchase fabrics.

Subsequently, based on the factory load, the required work cycles, the calendar, the shifts and the availability date of the fabric defined by the MRP, the planning system proposes a delivery date that can be confirmed to the customer. The planner evaluates the date proposed by the system and can decide whether to confirm or modify it. In case of modification, the planner manually enters the new date in the system. The sales office then sends the order confirmation to the customer, followed by a possible phase of negotiation among customer, sales department and planning department for the definition of the final date. At this point, the planner prints the "printing order" with the confirmed date and sends it to the production department.

9) EXERCISE IDEFO

Making a Parma Ham is a long process. All producers of Prosciutto di Parma share one goal: to cure a leg of pork with pure sea salt in order to keep the meat as sweet-tasting as possible.

SELECTION

The hams are made from the rear haunches of the pig. The first phase of the ham production is the selection of the pig by the quality manager. The pig used must be born and reared in 10 regions of Central-Northern Italy, exclusively of Large White Landrace and Duroc breeds, fed on quality food, over 9 months old and weighing an average of 160 kg.

TRIMMING AND SALTING

These phases are carried out by a specialized operator. First it performs trimming to give Parma Ham its characteristic round shape. It is carried out by removing the part of the fat and rind with special knives. During this operation, legs with even the smallest imperfections are discarded. After trimming the operator use wet or dry salt and put it on the leg. The leg is then placed in a cold room at a temperature between 1 and 4 C°, with about 80% humidity.

WASHING - DRYING

The leg is then washed with warm water to remove any salt crystals or impurities. Then, drying takes place in special 'dryers' in which the convective movements of the air are exploited.

SEASONING

At the 7th month, the ham is transferred to the "cellars" of the factory, which must be located in the typical production area, where the particular environmental characteristics have an influence during the maturing process. During the seasoning important biochemical and enzymatic processes also take place. They determine the characteristic aroma and taste of Parma Ham.

SAMPLING AND MARKING

After 12 months, and after specific checks carried out by the inspectors of the Parma Quality Institute, the fire mark of the '5-pointed crown' is affixed with a specific instrument.

PACKAGING

Finally, the ham is specially packaged with selected plastics suitable for food products.

All stages of production must follow the regulations defined by the Ministry of Health for the food production.

10) EXERCISE ARIS

Orange juice quality is checked throughout the production process. Once the oranges arrive at the plant for juice processing, an inspector takes a 18 kg sample to analyze in order to make sure the fruit meets maturity requirements for processing. If the fruit fulfills the requirements, the certified fruit is transported along a conveyor belt and it is washed with a detergent. The fruit that does not meet the requirements is sent back to the suppliers.

Then the fruit is rinsed, dried, extracted and concentrated. After extraction and concentration, the product is checked to ensure it meets the sugar level. If the orange juice does not pass this check, adjustments are manually made by the operator to reach the desired sugar level.

After this check, the orange juice is pasteurized. The final juice product is evaluated by an inspector for a number of key parameters, such as acidity, citrus oil level, pulp level, pulp cell integrity, color, viscosity, microbiological contamination, mouth feel, and taste. In case of problems with one of these tests, the orange juice is further evaluated by a quality control unit, which makes the needed adjustments. If the problem cannot be fixed, the orange juice is discarded.

To ensure sterility, the pasteurized juice should be filled while still hot. Where possible, metal or glass bottles and cans can be preheated. Packaging which cannot withstand high temperatures (e.g., aseptic, multilayer plastic juice boxes which do not require refrigeration) must be filled in a sterile environment.

After the filling process, units are inspected to make sure they are filled and sealed appropriately. Then, the orange juice is stocked in the final product warehouse.