VU UNIVERSITY AMSTERDAM

Department of Computer Science

Exam Business Process Management (FEW_X_405115_2014_110),
Tuesday October 21st, 12:00 - 14:45 hours.

R E A D T H I S

For this written exam a maximum number of 10 points can be obtained. It is NOT allowed to use the book, notes, or any other course-related material during the examination. It is, however, allowed to use a basic calculator and a dictionary. The solutions for the assignments should be formulated in ENGLISH, concisely, and list any assumptions that are not explicitly stated in the assignment. Only use the pre-printed forms for your solutions and stay within the text boxes or pages assigned to the assignments – only those inputs will be corrected. Note the mnemonic appendix at the end of the exam.

Assignment 1 (2.5 points)

a) Draw the BPM lifecycle, identifying all involved phases with their respective names and their outputs (1 points).

b) List the following types of BPMSs in *decreasing* order of the support they deliver for business process execution: Ad-hoc workflow systems, Case handling systems, Groupware systems, and Production workflow systems (0.5 points).

c) For each of the four process fragments in Figure 1, briefly characterize the problem of using the respective synchronization gateways. Use examples if needed (1 point).

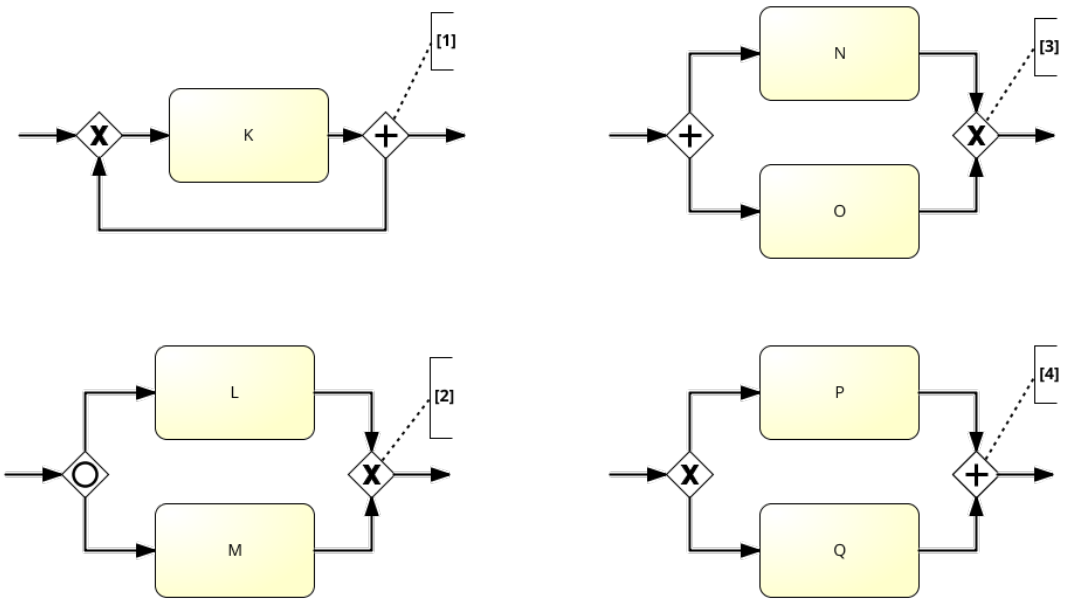

Figure 1: Process fragments

Assignment 2 (2.5 points)

In Figure 1, a BPMN model is displayed for the intake process of a health care institution. It is the same model as presented in Chapter 8 of the text book. In this process, family doctors notify the health care institute of elderly patients that need medical attention. Please show how the model should be changed to accommodate each of the following changes. Hint: for each part of this assignment you may just model the updated parts; however, you must then clearly indicate how that part connects to the rest of the model.

a) The case-based redesign heuristic is applied to the process with respect to the activity where intakers are assigned (0.5 points).

b) It is decided that the meeting with the first intaker should only take place *after* both intakers have had a telephone call with each other. This call should take place *after* the meeting with the second intaker has been completed. Note: the potential for parallel work in the old situation should be preserved as much as possible; for example, the separate meetings may still be planned in parallel (1 point).

c) The medical file is directly accessible from a database, which is shared between family doctors in the region that the institution operates in. Note: the institute still needs to update its own patient files with this information (0.5 points).

d) The conversation of the second intaker with the patient is automatically recorded (0.5 points).

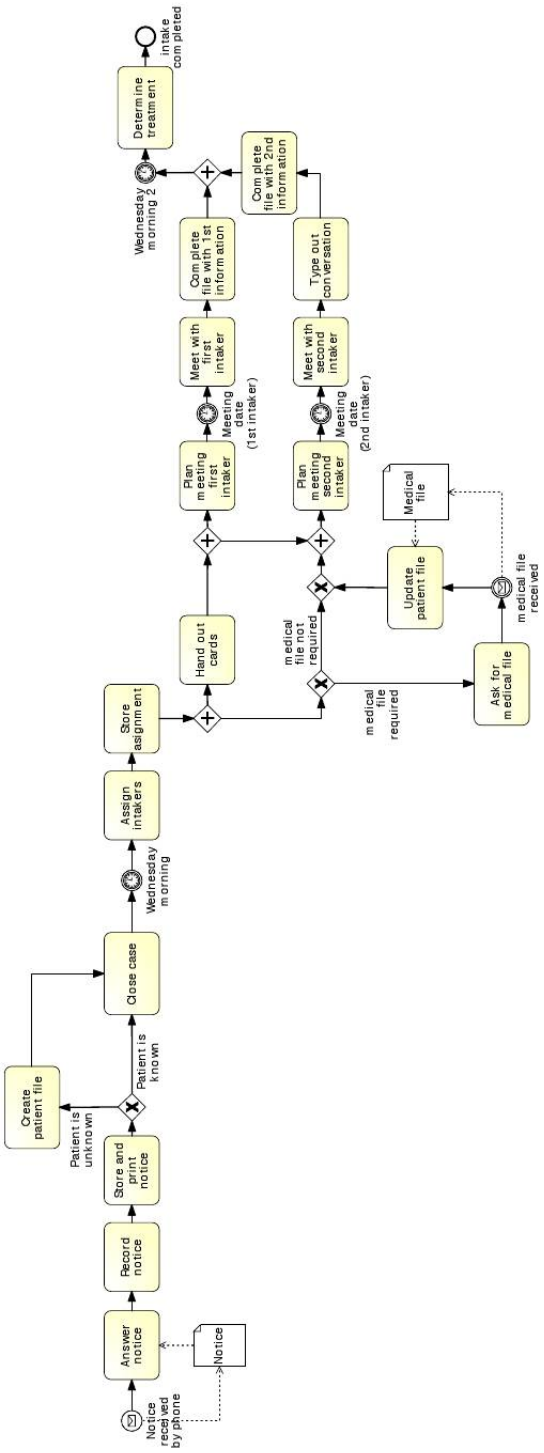

Figure 2: The Intake Process

Assignment 3 (2.5 points)

Assume that there are two competitors delivering the same service but with different process lay-outs. Competitor Gamma executes the following process (see Figure 3). It starts with a check Q, which leads either to the execution of task MA or MB. In many cases, as specified by the process model, check C is performed, which either may lead to completion of the process or the additional execution of MU. The arrival process is Poisson, with an average arrival of 10 cases per hour. For each of the tasks, exactly one dedicated resource is available. The execution time for each task has a negative exponential distribution. The average service times for tasks Q, MA, MB, C, and MU are respectively 4, 2, 2, 5 and 2 minutes. Routing probabilities are given in Figure 3.

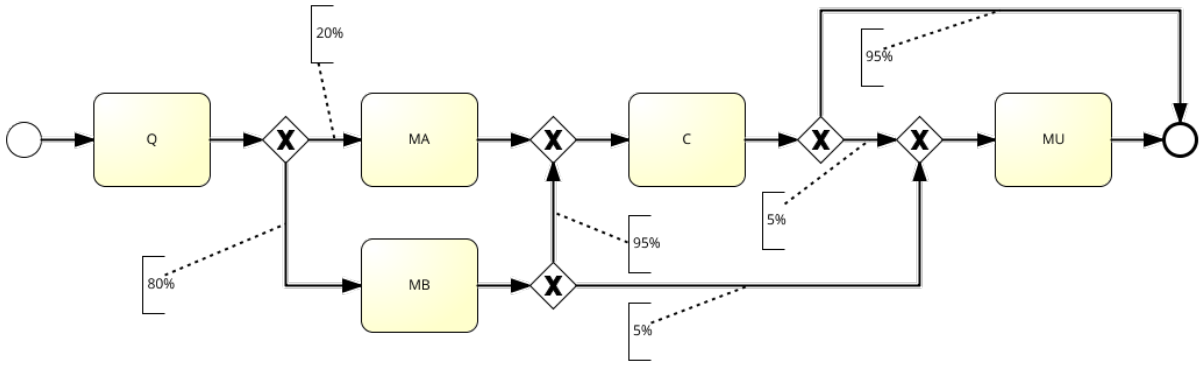

Figure 3: Competitor Gamma

Competitor Delta, on the other hand, carries out the process in the way as shown in Figure 4. The arrival rate for the process, processing times, and resource availability are the same as for competitor Gamma.

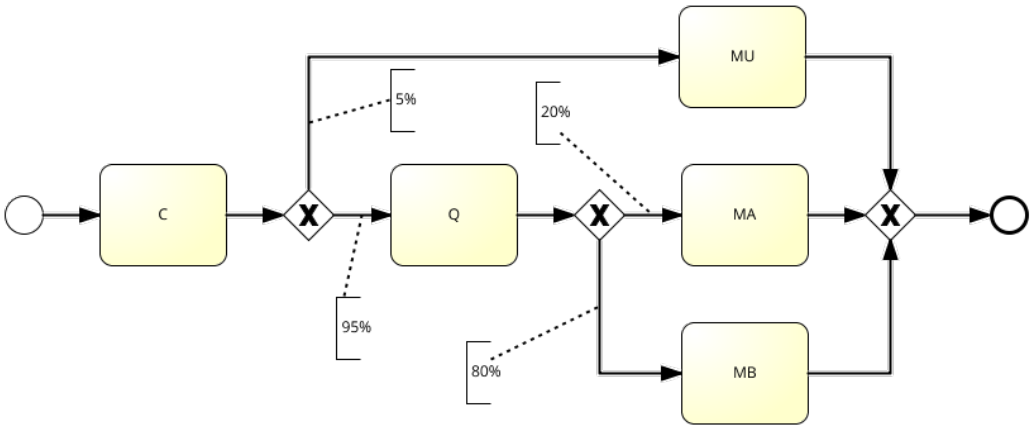

Figure 4: Competitor Delta

a) Which competitor has the lowest average number of cases in the process (system)? Motivate your answer with a computation of this figure for both competitors (1.5 points).

b) Determine the average cycle time, rounded in minutes, for a case that runs through the process of the competitor that you indicated for part a) of this assignment (1 point).

Assignment 4 (2.5 points)

a) Consider the workflow log L = [< *a*, *b*, *e*, *f*, *g*, *h*, *i*, *j*>, < *a*, *b*, *e*, *f*, *g*, *i*, *h*, *j*>, < *c*, *e*, *f*, *g*, *i*, *h*, *j*>]. Provide the set T_I of first tasks, the set T_O of last tasks, and the footprint matrix (1 point).

b) Provide a workflow log that contains all possible execution sequences for the process of competitor Gamma (see Figure 3) (0.5 points).

c) Consider the footprint represented in the matrix below (see Figure 5). Assume that only task *a* is in the set T_I of first tasks and that only task *g* is in set T_O of last tasks. Construct the process model in BPMN according to the α–algorithm (1 point).

	a	*b*	*c*	*d*	*e*	*F*	*g*
a	#	→	→	#	#	#	#
b	←	#	||	#	#	#	→
c	←	||	#	→	→	#	#
d	#	#	←	#	#	→	#
e	#	#	←	#	#	→	#
f	#	#	#	←	←	#	→
g	#	←	#	#	#	←	#

Figure 5: Footprint matrix

Appendix

M/M/1-queue

$\rho=\lambda/\mu$, $L = \rho/(1-\rho)$, $Wq = \rho/(\mu-\lambda)$, $W = 1/(\mu-\lambda)$.

Redesign heuristics

Control relocation
Contact reduction
Integration
Case types
Activity elimination
Case-based work
Triage
Activity composition
Resequencing
Parallelism
Knock-out
Exception
Case assignment
Flexible assignment
Centralization
Split responsibilities
Customer teams
Numerical involvement
Case manager
Extra resources
Specialist-generalist
Empower
Control addition
Buffering
Activity automation
Integral technology
Trusted party
Outsourcing
Interfacing