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EXAM BUSINESS PROCESS SUPPORT
(237400) April 4th, 2007

Instructions:

This is an open book exam – it is allowed to consult any reading material provided by the teachers. Be sure to switch mobile phones off and store them in a closed bag. Be sure to indicate name, program and student number on each sheet. The total number of points for the exam is 180. The exam consists of two parts. The first part (120 points!) contains open answer questions and the second part (60 points) consists of twenty multiple-choice questions. Regarding the first part concise yet complete answers are better than long-winded answers.

Success!!

PART I (120 POINTS)

Question 1 (20 points)

The following case describes *existing* Claims-Handling Process (see As-Is situation modeled in Figure 1 below).

Case 1: Claims-Handling Process

1. The client notifies a local independent agent that she wishes to file a claim for damaged glass. The client is given a claim form and is to told to obtain a replacement estimate from a local glass vendor.
2. After the client has obtained the estimate and completed the claim form, the independent agent verifies the accuracy of the information and then forwards the claim too one of the regional processing centers.
3. The processing center receives the claim and logs its date and time of arrival. A data entry clerk enters the contents of the claim into a computer (mainly for archiving purposes). Then, the form is placed in a hard-copy file and routed, along with the estimate, to a claims representative.
4. If the representative is satisfied with the claim, it is passes in the processing chain, and a check eventually is issued to the client. However, if any problems are associated with the claim, the representative attaches a form and mails a letter back to the client for the necessary corrections.
5. Upon receiving the check, the client can go to a local glass vendor and have the glass replaced.

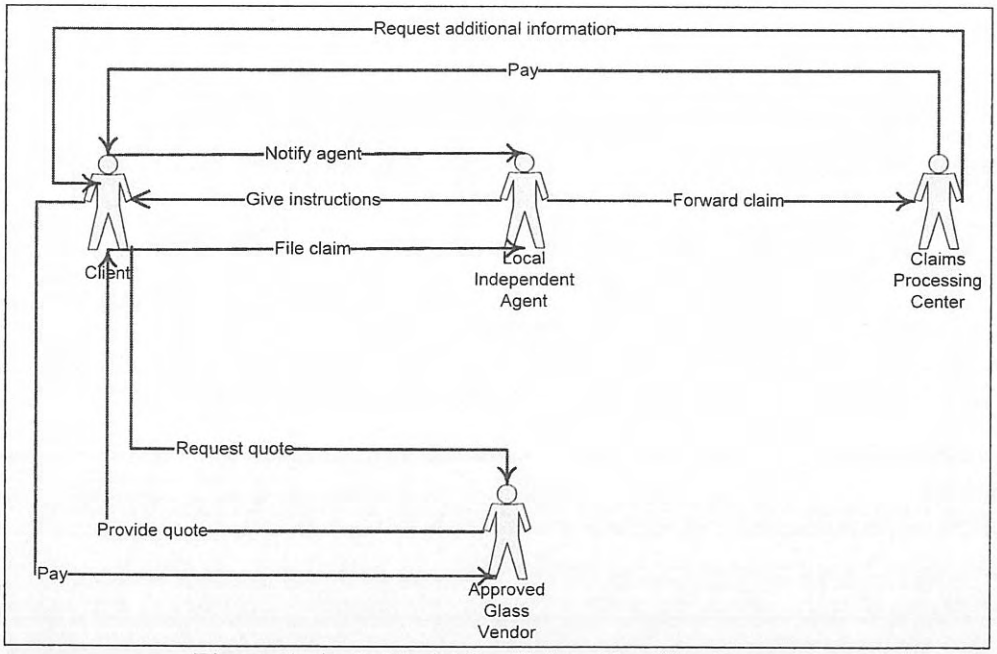
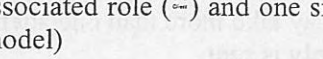


Figure 1. As-Is Model for Claims-Handling Process

Think about some problems associated with this process above. To give an example, consider the following: A client might have to wait for one week before being able to replace his or her automobile glass. If the glass happens to break on a weekend, the process could take longer.

By applying the *relevant* principles and heuristics often used in practice in relation to BPR (see the second lecture slides) redesign the AS-IS process. More specifically, answer the following questions:

Question 1-a (10 points)
Create a To-Be model for this process (use the same modeling constructs (an agent with a human picture and associated role () and one sides arrows with activity name (

) as used in the As-Is model)

Question 1-b (10 points)
Explain the rationale behind this To-Be Model (Namely, explain reasons on why to redesign the process as you propose. Hint: Relate your reasoning mechanisms to the relevant principles and heuristics)

Question 2 (20 points)
Case 2 below provides a description of a global process for a manufacturing company.

Case 2: Major Activities in a Manufacturing Company

When a customer wants a container then first a tender is made by a specialist in the company. This tender is sent to the customer by a sales person. Then the company waits for a reaction from the customer. When the customer decided that he really wants a container then an order with some drawings is produced and sent to the customer by a specialist. After that there are two options either the customer agreed with the order he received or the customer wants to see some changes. If the customer wants some changes then the changes are made by the specialist and the new order is sent to the customer by the sales person. If the customer doesn't want something to change then the order is sent to production department to manufacture the product.

Consider Case 2 and the modeling elements of OPM and RAD such as *agent*, *goal*, *activity, role.* Answer the following questions.

Question 2-a (10 points)
List *agents*, *activities*, *associated goals* and *roles* as described in Case 2. (Hint: be careful about if certain roles are not explicit)

Question 2-b (10 points)
Create a model of context (what aspect) and a model of goals (why aspect) where three agents (customer, specialist, sales person) interact.

Question 3 (20 points)

The model below describes a travel booking process and is created by BMPN. The Process begins with the receipt of a request for a travel booking. After a check on the credit card, reservations are made for a flight, a hotel, and a car. The car reservation may take more than one attempt before it is successful. After all three reservations are confirmed, a reply is sent.

Question 3-a (15 points)

Model this Travel Booking Process by using RAD constructs? (Hint. be careful about if certain roles are not explicit in that model)

Question 3-b (5 points)

Which constructs of BPMN used in the model provided are not captured by RAD?

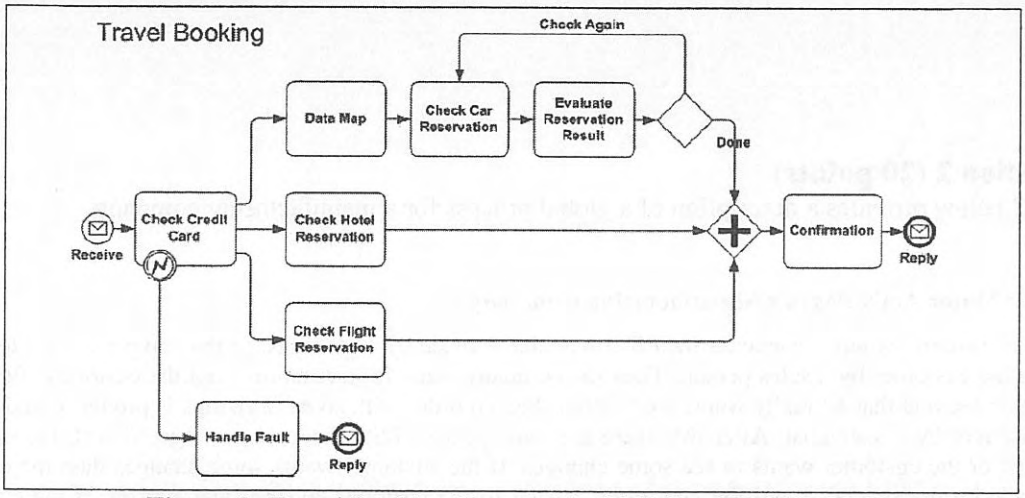
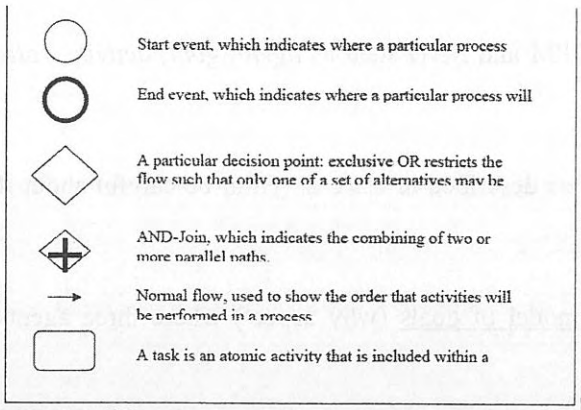
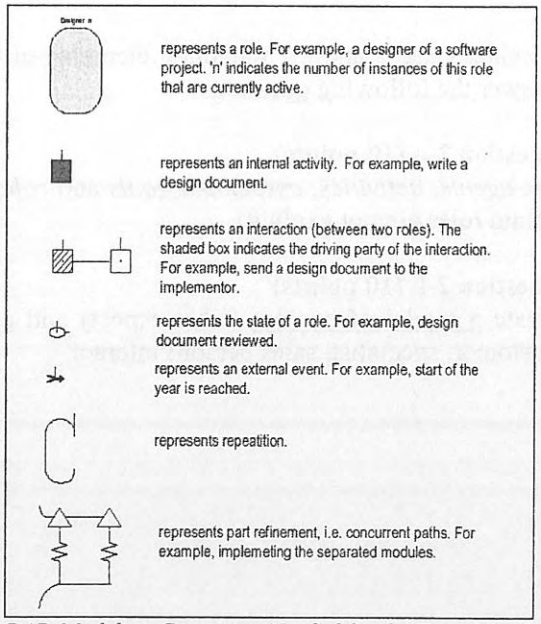


Figure 2. Travel Booking Process Model Using BPMN constructs



BPMN Modeling Constructs Used in the Travel Booking Case



RAD Modeling Constructs Needed for the Travel Booking Case

Question 4 (22 points)

Consider the following Petri Net:

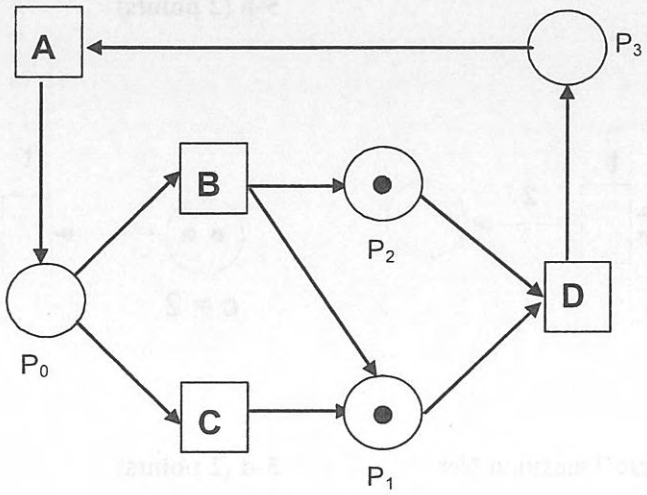


Figure 3: Marked Petri Net

Question 4-a (12 points)
Determine the set of all reachable states; i.e., perform a *reachability analysis* for this Petri Net (cf. Figure 3). Use a table to structure your answer!

Question 4-b (6 points)
Draw the *reachability graph* for the Petri net from Figure 3.

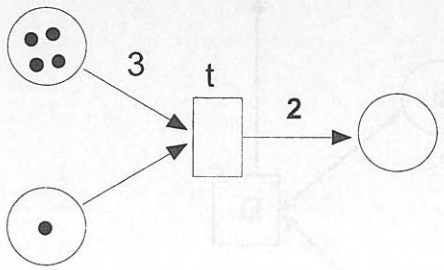
Question 4-c (4 points)
Apply a minimal, addititve change to this Petri Net such that the net becomes deadlock-free.

Remark: *Minimal* means that the number of change operations being applied (e.g., add transition, add arc) shall be kept minimal; *additive* means that Net elements (places, transitions, arcs) must not be deleted.

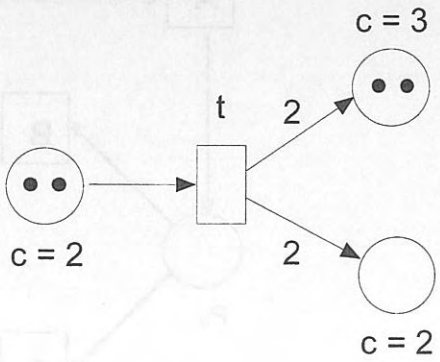
Question 5 (8 points)

Consider the following four Petri Nets (places have unlimited capacity except there is an an explicit value c specified):

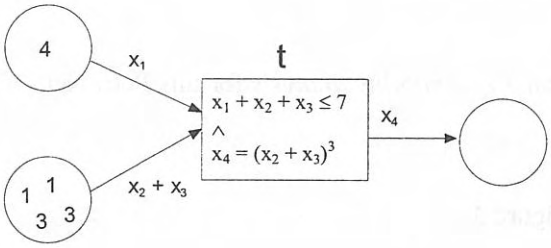
5-a (2 points)



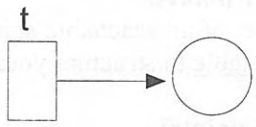
5-b (2 points)



5-c (2 points) Predicate/Transition Net



5-d (2 points)

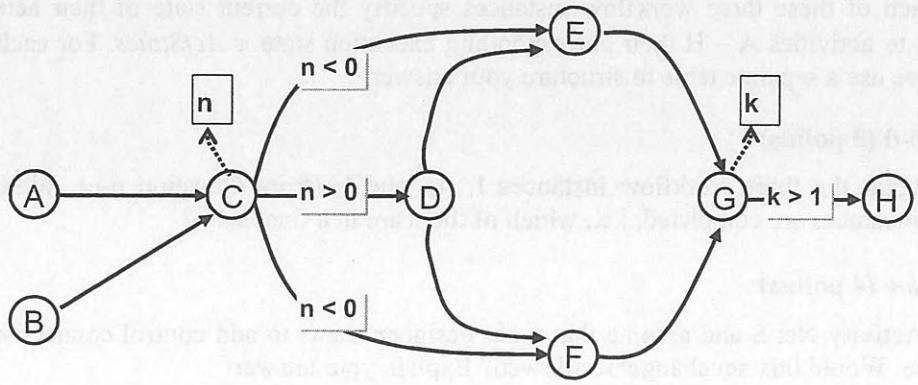


For each of these four Petri nets give a statement whether transition `t` can fire under the current marking or not.

For cases where tranisition t can fire, additionally draw the Petri net (with its marking) resulting after firing `t`.

Question 6 (30 points)

Consider the following Activity Net S. Assume that all activities have join semantics `AT_LEAST_ONE` and that output containers `n` and `k` have type `REAL`.



Let *ActStates* bet the set of possible execution states of a single workflow activity:

ActStates:= {*not_activated*, *activated*, *running*, *completed*, *skipped*}

Remark: An activity is in state running if it has been already started but not yet been finished.

Question 6-a (2 points)

Which activities will be always executed for workflow instances running on schema S?

Question 6-b (4 points)

Consider the following execution log:

START(A)	START(B)	END(A)	END(B)	START(C)	END(C)[n= -1]	START(E)

END(E)	START(G)	END(G)[k=2]	START(H)	END(H)

Could this log have been produced by a workflow instance running on Net S? Explain your answer!

Question 6-c (15 points)

Let I_1, I_2, and I_3 be workflow instances running on workflow schema S and having the following execution logs:

Execution log of workflow instance I_1:

START(A)	START(B)	END(A)	END(B)	START(C)	END(C)[n= 2]

Execution log of workflow instance I_2:

START(A)	END(A)	START(B)	END(B)	START(C)	END(C)[n= 0]

Execution log of workflow instance I_3:

START(A)	START(B)	END(A)	END(B)	START(C)	END(C)[n= -3]	START(E)

END(E)	START(F)	END(F)	START(G)	END(G)[k=0]

For each of these three workflow instances specifiy the current state of their activities; i.e., assign to activities A – H their corresponding execution state $\in$ *ActStates*. For each workflow instance use a separate table to structure your answer!

Question 6-d (3 points)

Consider again the three workflow instances I_1, I_2, and I_3 (from Question 6-c). Which of these workflow instances are completed, i.e., which of them are in a final state?

Question 6-e (4 points)

Consider Activity Net S and assume that a net designer wants to add control connector H $\rightarrow$ F to this schema. Would this net change be allowed? Explain your answer!

Question 6-f (2 points)

Which of the following tools uses Activity Nets as process specification language?

a. TIBCO Staffware
b. COSA
c. MQSeries Workflow
d. ARIS Toolset

PART II. MULTIPLE CHOICE QUESTIONS (60 POINTS)

For each of the following 20 questions you can reach 3 points!

Question 1

Suppose as part of a typical business process engineering project, senior management decides to implement an ERP package in organization. Suppose further that senior management commands the project team to take into account both end users' needs and the "best practice" embedded in the package to come up a fine-tuned enterprise process model. How is this implementation approach called?

a. Middle-out
b. Bottom-up
c. Top-down
d. None of above

Question 2

Which view in Curtis et al. (1992) deals with roles and responsibilities in a process?

a. functional
b. behavioural
c. organizational
d. informational

Question 3

Which specific kind of responsibilities can be modelled as problem solving activities?

a. broader responsibilities
b. general responsibilities
c. well-defined responsibilities
d. particular responsibilities

Question 4

Which characteristic of a process is not considered as an important criterion to choose it for business process support application?

a. level of formality
b. degree of uncertainty
c. level of stability
d. degree of strategic importance

Question 5

Which item below is not the central issue for an active model?

a. modelling relationship
b. the active links between the model and the business process
c. the dynamic link between the model and the business process
d. the reactive link between the model and the business process

Question 6

Introduction of business process support systems often requires changes with respect to several aspects of an organization. In case the change is aimed to routine correction of errors as they become evident while the processes are enacted, how is such a change referred in Warboy et al.?

a. Development
b. Enhancement
c. Maintenance
d. Improvement

Question 7

If a (process) model states how activities should be performed in a business situation, how is it termed?

a. Normative
b. Proscriptive
c. Prescriptive
d. Descriptive

Question 8

Which perspective below is not captured by RAD explicitly (Role Activity Diagram)?

a. functional
b. behavioural
c. organizational
d. informational

Question 9

For the separation of concern as adopted by Warboys et al., which one below is not included in a series of dialectics?

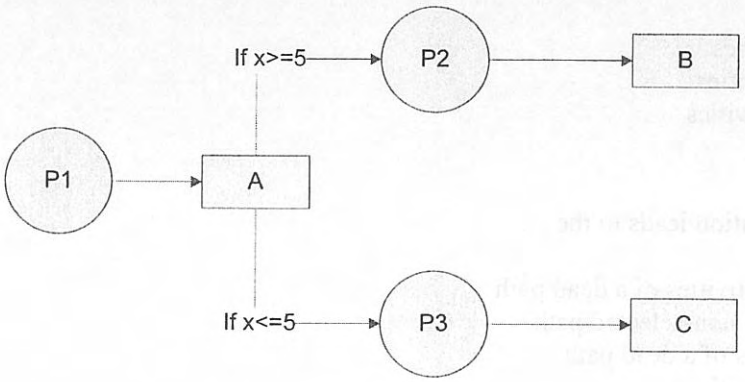
a. Process context
b. Process capture
c. Process design
d. Process enactment

Question 10

Which one below is not considered as primitive of a Context Model created in OPM?

a. *Interacts with* relationship
b. *Agents* represented by ellipse
c. A *hashed line* to mark the study domain
d. *Goals* represented by ellipse

Questions 11 and 12 refer to the following workflow net.



For the above workflow net, we can identify it as a Multiple Choice Pattern.

The product evaluation regarding this pattern is as follows:

	Staffware	FLOWer	SAP	Eastman
m-choice	-	+	-	+/-

Question 11

The above pattern is a:

a. Control flow pattern
b. Data flow Pattern
c. Resource allocation pattern
d. Exception handling pattern

Question 12

Which of the following products DIRECTLY supports the implementation of this pattern?

a. Staffware
b. FLOWer
c. SAP
d. Eastman

Question 13
In a process-aware information system the progress of a workflow instance can be

a. created
b. modelled
c. monitored
d. layouted

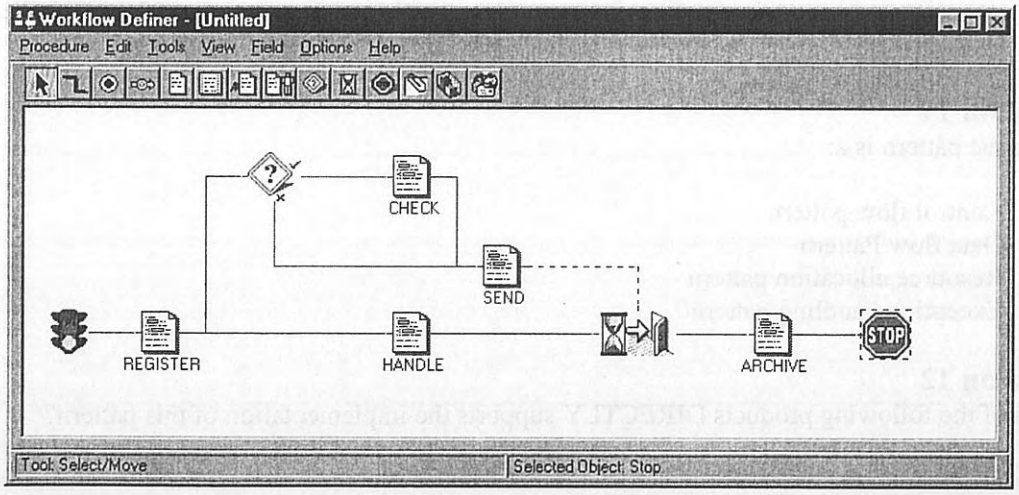
Question 14
In a process-aware information system a user worklist contains the work items of …

a. non-activated activities
b. activated and running activities
c. completed and skipped activities
d. completed and archived activities

Question 15
In an activity net a deadpath elimination leads to the …

a. elimination of all running activities of a dead path
b. skipping of all activities of a non-selected path
c. compensation of all activities of a dead path
d. abortion of all workflow activities

Question 16
Consider the following screen.

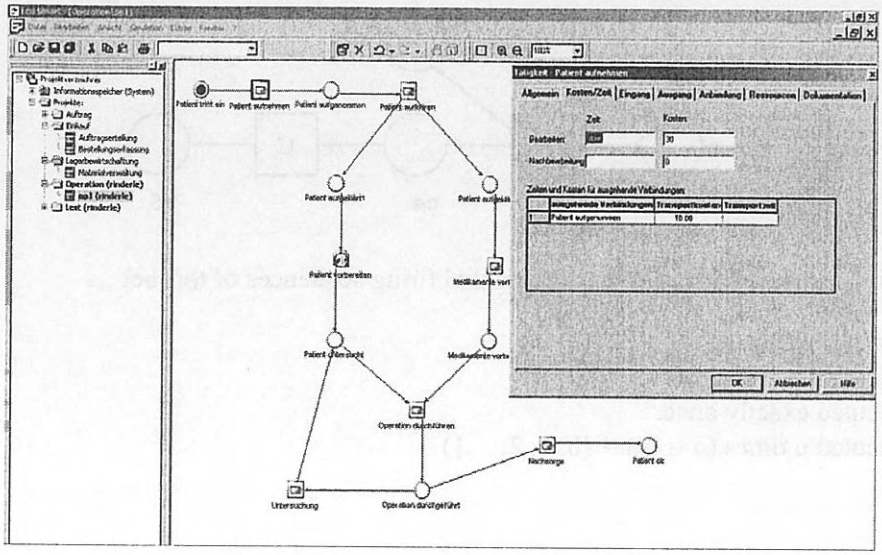


This screen shows the workflow editor of …

a. MQSeries Workflow
b. ADEPT
c. Staffware
d. COSA

Question 17

The following screen shows the process modeling tool LeuSmart:

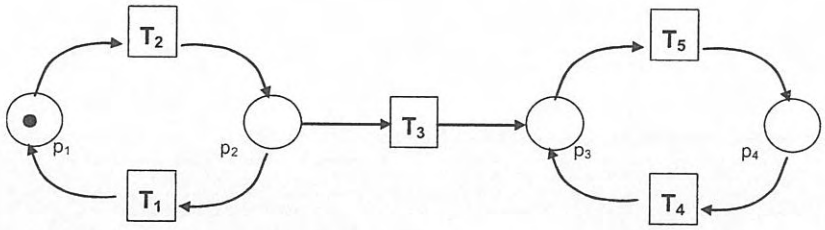


The process modeling formalisms of LeuSmart is based on …

a. Activity Nets
b. Statecharts
c. Petri Nets
d. Leucharts

Question 18

Consider the following Petri Net:

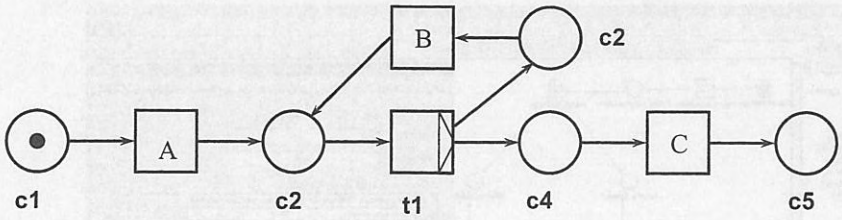


Which of the following statements is true?

a. The net is deadlock-fired.
b. The net contains one deadlock.
c. The net contains two deadlocks.
d. The net is deadlock-free.

Question 19

Consider the following WF Net:



Which of the following statements is true? In all potential firing sequences of this net …

a. B will be executed at least once.
b. B will be executed at most once.
c. B will be executed exactly once.
d. B will be executed n times ($n \in N_0 := \{0, 1, 2, \ldots\}$)

Question 20

A point within a workflow model where a single thread of control splits into two or more threads which are then executed in parallel within the workflow is called

a) AND-Split
b) OR-Split
c) XOR-Split
d) OR-Join