PODS EXAM: Theoretical Part

Name _____

Sudent ID _____

The following of questions represent the first part of the exam. For every question, select the correct answers by crossing the letters. Notice that in some questions (e.g., the first question), more than one selection needs to be done in order to answer correctly the question. For each question, an all-or-nothing policy will be applied: it will only be considered in the grade if it is answered exactly as expected.

1._____ Select the necessary information in a tabular event data so that it can be used by process mining techniques (Multiple-choice):
   a) Case ID
   b) Role
   c) Cost
   d) Activity Name
   e) Timestamp
   f) Resource

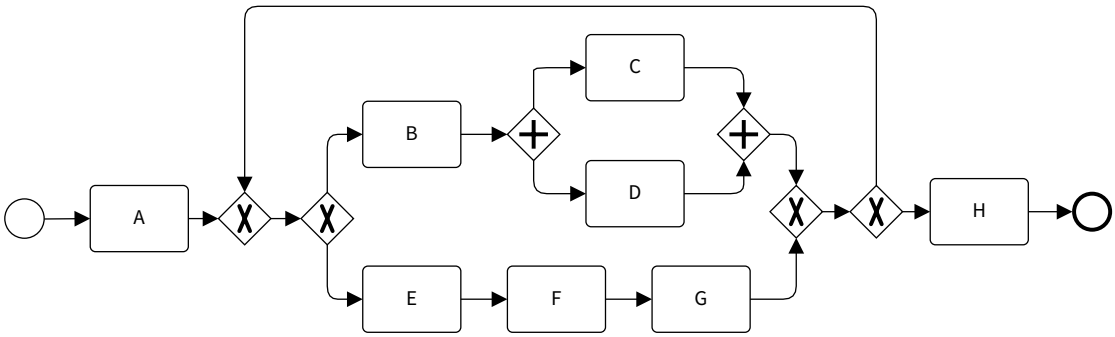
2._____ A workflow net is (Single-choice):
   a) A Petri net that has a single input place and a single output place, and it is connected
   b) a) + where every transition is live
   c) A Petri net where all the places can have at most one token

3._____ What are the limitations of the alpha algorithm (Single-choice)?
   a) It cannot discover self-loops
   b) a) + it cannot discover length-2 loops
   c) b) + it cannot discover non-local dependencies

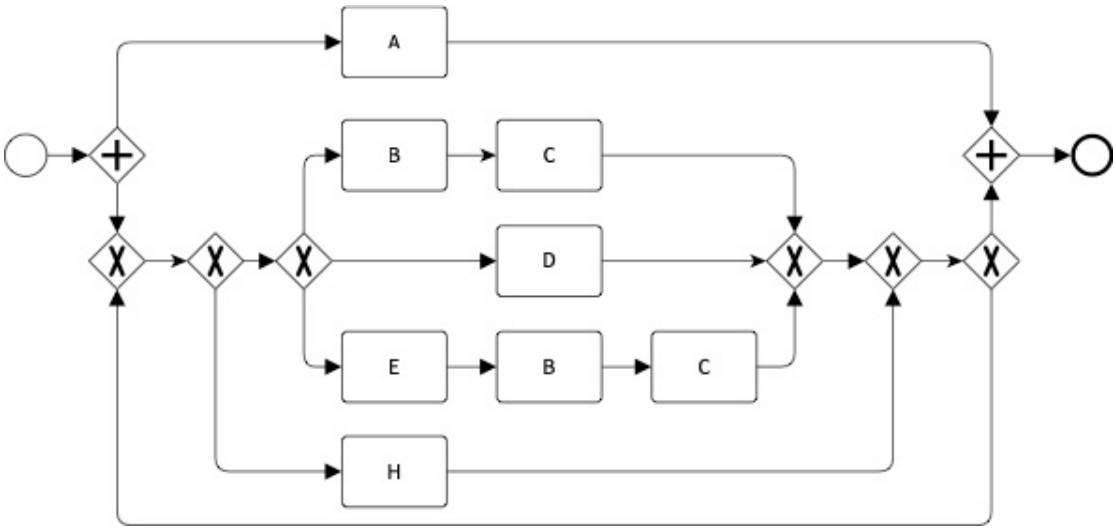
4._____ Given an event log trace that cannot be replayed by a process model, mark the quality metrics that may be decreased by this (Single-choice/Multiple-Choice):
   a) Simplicity
   b) Precision
   c) Fitness
   d) Generalization

5._____ In the following figures there are three examples of process models, namely M1, M2 and M3. Given the trace <*A, E, B, C, B, D, H*>, choose which model fits best the trace (Single-choice).

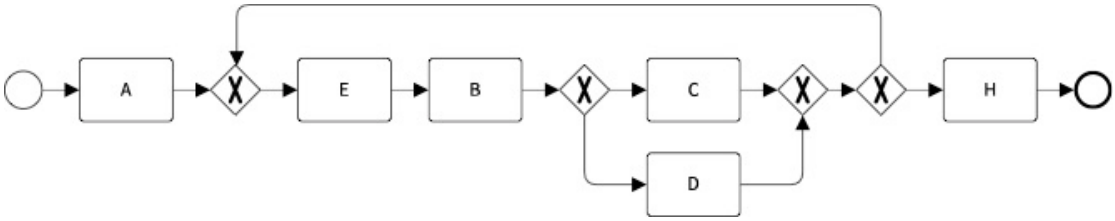
M1:



M2:



M3:



a) M1
b) M2
c) M3

6._____ Which conformance checking technique provides the most accurate diagnostics (Single-choice):

a) Rule checking
b) Token-replay
c) Alignments

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7._____ Select the type of rules you can analyise with rule checking (Multi-choice):

a) Ordering rules
b) Boundedness rules
c) Cardinality rules
d) Precedence rules
e) Response rules
f) Indirectly-follow rules

8._____ In the model enhancement phase, which types of techniques you can apply (Multi-Choice):

a) Log and model repair
b) Process discovery
c) Performance analysis (waiting times, service times, bottlenecks, …)
d) Decision-point analysis
e) State-graph analysis
f) Social-network analysis

9._____ When applying social-network analysis, please select the event data is needed (Multi-choice):

a) Case ID
b) Role
c) Cost
d) Activity Name
e) Timestamp
f) Resource

10.____ Multi-perspective conformance checking (Single-choice):

a) Provides a narrow view to flat conformance checking since it only focuses in roles and resources
b) Enables explaining deviations from different angles: control-flow, cost, resources, etc …
c) Can only be applied over the standard cost function

PODS EXAM: Practical Part

Name:	
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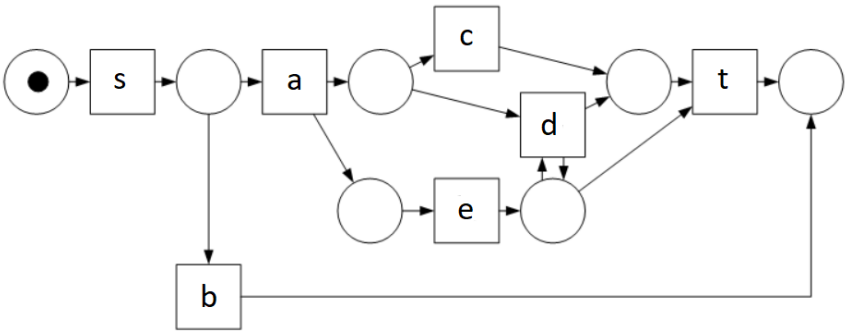
Exercise 0.1 The following event log was extracted from an enterprise information system $L = [\langle a, d, f, h\rangle, \langle a, c, e, g, c, e, h\rangle, \langle b, f, g, d, f, h\rangle]$

- Derive the $\rightarrow_L$ relation.
- Use the eight steps of the α-algorithm to construct the corresponding Petri net and draw the Petri net (delivering all of the intermediate results is not necessary, only the resulting Petri net is required).
- If possible, give a trace possible according to the discovered model but not (yet) observed in the log.

Exercise 0.2 Consider event log $L = [\langle s, a, c, e, t\rangle^5, \langle a, e, d, t\rangle^3, \langle s, a, e, t\rangle^4, \langle s, b\rangle^{10}]$ and the following Petri net:



1. Compute fitness of the event log with respect to the model using token-based fitness.
2. Give an optimal alignment for the trace $\langle a, b, d, c, d, e, t\rangle$, and, its corresponding fitness. Use the standard cost function, i.e. log/model moves have cost 1, synchronous moves have value 0.