Quiz 4

Nota de envio mais recente 90%

1. Select the three ways to remove behavior, i.e. allowed traces, from a Petri net. **1 / 1 ponto**

- [ ] Add transitions to the Petri net.
- [x] Remove transitions from the Petri net.

Correto
Ways to add or remove behaviour from a Petri net are discussed in more detail in lecture 4.2: 'Alternative Process Discovery Techniques'.

- [x] Add an input place to a transition in the Petri net.

Correto
Ways to add or remove behaviour from a Petri net are discussed in more detail in lecture 4.2: 'Alternative Process Discovery Techniques'.

- [ ] Remove a place, that is an input place to a transition, from the Petri net.
- [x] Add an arc from a place to a transition.

Correto
Ways to add or remove behaviour from a Petri net are discussed in more detail in lecture 4.2: 'Alternative Process Discovery Techniques'.

- [ ] Remove an arc from a place to a transition.

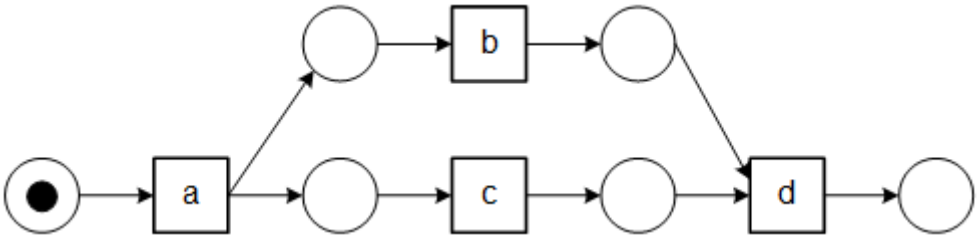
2. Which of the following brief algorithm descriptions describes how a language based region approach works? **1 / 1 ponto**

- (●) The algorithm tries to find feasible places between transitions by solving an optimization problem.
- ( ) The algorithm creates a collection of process models and evaluates them on one or more quality aspects, after which some models are changed and re-evaluated until one process model is returned as the end result.
- ( ) The algorithm tries to find splits of the event log that can be described by a control flow relation, and then repeats this approach on each of the split event logs.

✓ **Correto**

This algorithm, amongst others, is explained in more detail in lecture 4.2: 'Alternative process discovery techniques'.

3. Given the process model below and the following event log: [$\langle a,b,c,d \rangle^{10}$] **1 / 1 ponto**



What is the correct footprint-based conformance?

Footprint of the process model:

	a	**b**	**c**	**d**
a	#	→	→	#
b	←	#	||	→
c	←	||	#	→
d	#	←	←	#

Footprint of the event log:

	a	**b**	**c**	**d**
a	#	→	#	#
b	←	#	→	#
c	#	←	#	→
d	#	#	←	#

Of the 16 cells, 6 are different between the two tables, hence the footprint-based conformance is $1 - \frac{6}{16} = 1 - 0.375 = 0.625$

Footprint of the process model:

	a	**b**	**c**	**d**
a	#	→	→	#
b	←	#	||	→
c	←	||	#	→
d	#	←	←	#

Footprint of the event log:

	a	**b**	**c**	**d**
a	#	→	#	#
b	←	#	→	#
c	#	←	#	→
d	#	#	←	#

Of
the 10 cells that have values, 6 are different between the two tables, hence the footprint-based conformance is $1 - \frac{6}{10} = 1 - 0.6 = 0.4$

Footprint of the process model:

	a	**b**	**c**	**d**
a	#	→	→	#
b	←	#	→	→
c	←	←	#	→
d	#	←	←	#

Footprint of the event log:

	a	**b**	**c**	**d**
a	#	→	#	#
b	←	#	→	#
c	#	←	#	→
d	#	#	←	#

Of
the 16 cells that have values, 4 are different between the two tables, hence the footprint-based conformance is $1 - \frac{4}{16} = 1 - 0.25 = 0.75$

Footprint of the process model:

	a	**b**	**c**	**d**
a	#	→	→	#
b	←	#	→	→
c	←	←	#	→
d	#	←	←	#

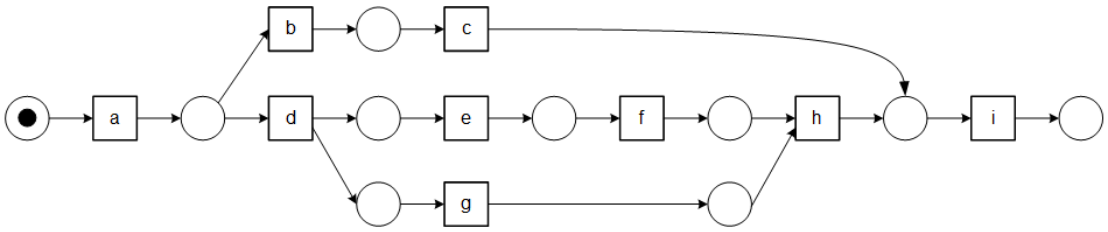
Footprint of the event log:

	a	**b**	**c**	**d**
a	#	→	#	#
b	←	#	→	#
c	#	←	#	→
d	#	#	←	#

Of
the 10 cells that have values, 4 are different between the two tables, hence the footprint-based conformance is $1 - \frac{4}{10} = 1 - 0.4 = 0.6$

Correto
These are indeed the correct footprints and application of the conformance formula.

4. Given the process model below and the following event log: [< a,b,c,h,i>^{5}, < a,b,e,f,g,h,i>^{4}, < a,d,e,g,f,h,i >] **1 / 1 ponto**



What is the correct footprint-based conformance?

- ○ $1 - \frac{27}{81} = 0.6667.$
- ○ $1 - \frac{20}{81} = 0.7531.$
- ◉ $1 - \frac{10}{81} = 0.8765$
- ○ $1 - \frac{17}{81} = 0.7901.$

Correto

This is indeed the correct answer, see the question level explanation for more details.

The footprint of the process model is:

	a	b	c	d	e	f	g	h	i
a	#	→	#	→	#	#	#	#	#
b	←	#	→	#	#	#	#	#	#
c	#	←	#	#	#	#	#	#	→
d	←	#	#	#	→	#	→	#	#
e	#	#	#	←	#	→	||	#	#
f	#	#	#	#	←	#	||	→	#
g	#	#	#	←	||	||	#	→	#
h	#	#	#	#	#	←	←	#	→
i	#	#	←	#	#	#	#	←	#

The footprint of the event log is:

	a	b	c	d	e	f	g	h	i
a	#	→	#	→	#	#	#	#	#
b	←	#	→	#	→	#	#	#	#
c	#	←	#	#	#	#	#	→	#
d	←	#	#	#	→	#	#	#	#
e	#	←	#	←	#	→	→	#	#
f	#	#	#	#	←	#	||	→	#
g	#	#	#	#	←	||	#	→	#
h	#	#	←	#	#	←	←	#	→

i	#	#	#	#	#	#	#	←	#

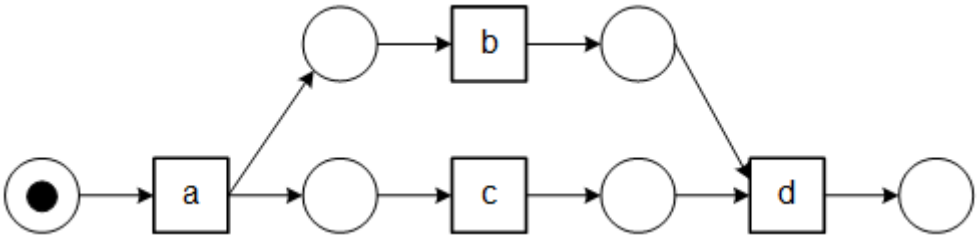
The following table indicates which cells have different values between the two footprints:

	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**
a									
b					x				
c								x	x
d							x		
e		x					x		
f									
g				x	x				
h			x						
i			x						

Of the 81 cells there are 10 mismatches between the two footprints. The footprint-based conformance therefore is $1 - \frac{10}{81} = 0.8765$.

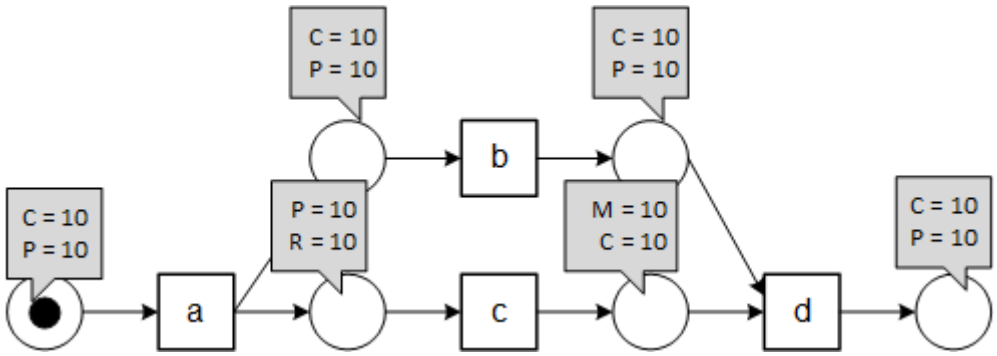
Footprint-based conformance is explained in detail in lecture 4.4: 'Conformance checking using causal footprints'.

5. Given the process model below and the following event log: [< a,b,d>^{10}] **1 / 1 ponto**



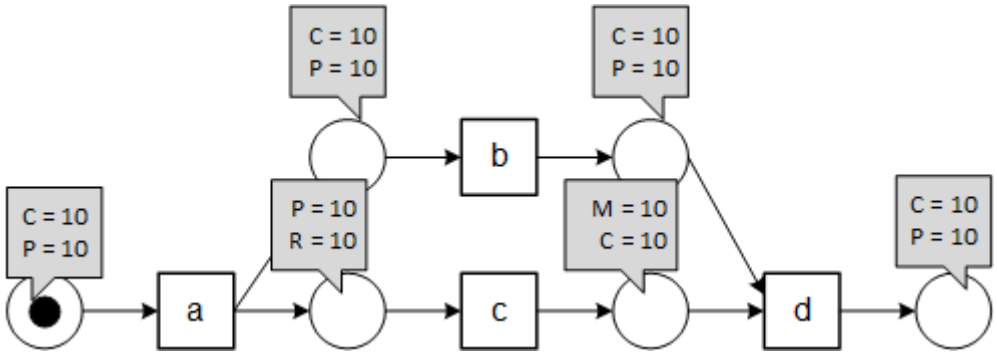
link

What is the correct token-based conformance?



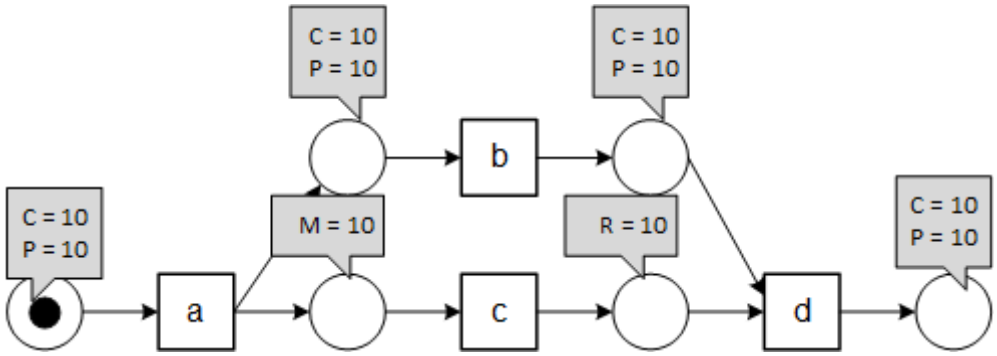
link

Hence the token-based conformance is $\frac{1}{2}(1 - \frac{10}{50}) + \frac{1}{2}(1 - \frac{10}{50}) = \frac{1}{2} \times 0.80 + \frac{1}{2} \times 0.80 = 0.80$



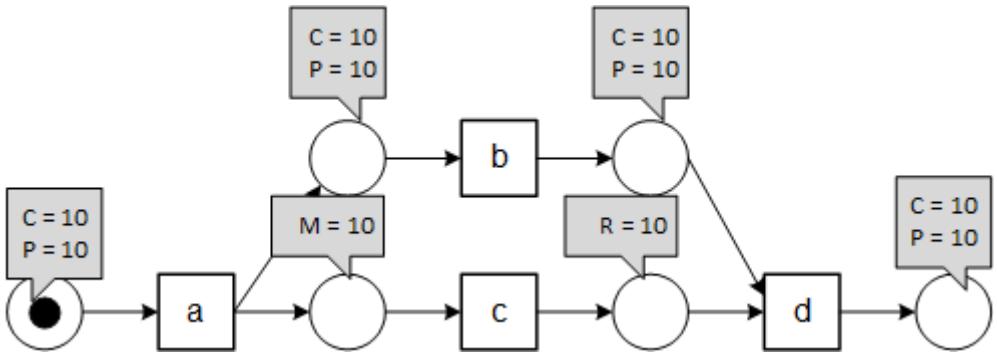
link

Hence the token-based conformance is $1 - \frac{10+10}{50+50+10+10}) = 1 - \frac{20}{120} = 0.8333$



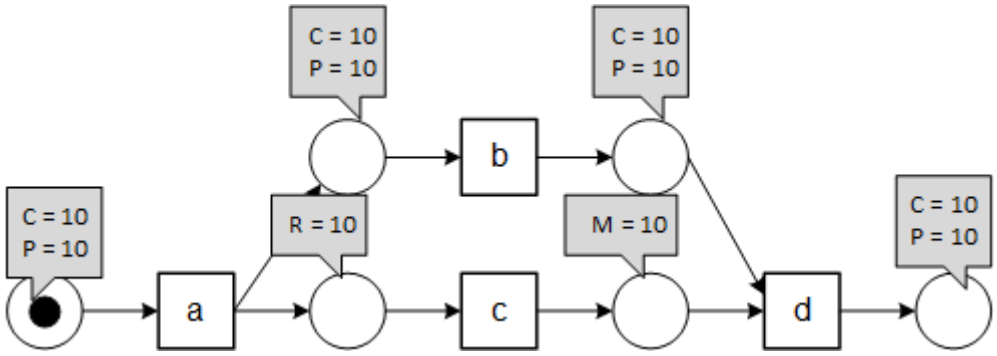
link

Hence the token-based conformance is $1 - \frac{10+10}{40+40+10+10}) = 1 - \frac{20}{100} = 0.80$



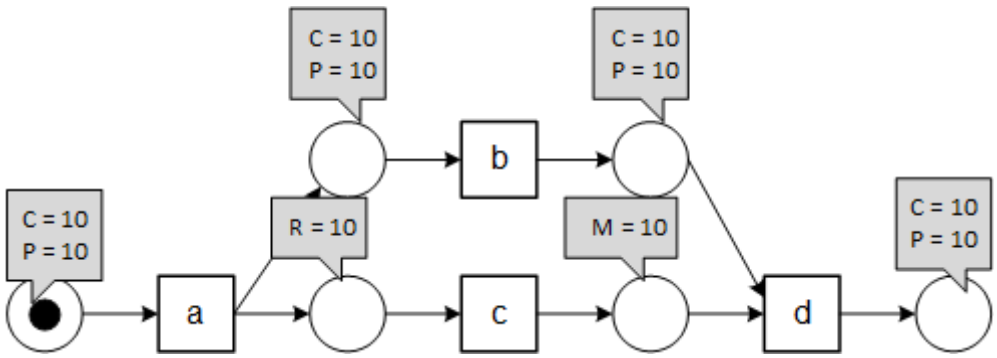
link

Hence the token-based conformance is $\frac{1}{2}(1 - \frac{10}{40}) + \frac{1}{2}(1 - \frac{10}{40}) = \frac{1}{2} \times 0.75 + \frac{1}{2} \times 0.75 = 0.75$



link

Hence the token-based conformance is $1 - \frac{10+10}{40+40+10+10}) = 1 - \frac{20}{100} = 0.80$



link

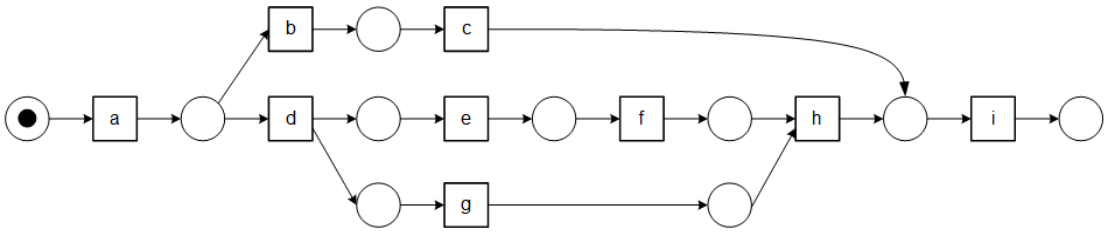
Hence the token-based conformance is $\frac{1}{2}(1 - \frac{10}{40}) + \frac{1}{2}(1 - \frac{10}{40}) = \frac{1}{2} \times 0.75 + \frac{1}{2} \times 0.75 = 0.75$

Correto

This is indeed the correct answer. First of all the Petri net correctly records the remaining and missing tokens after replay, including the 10 tokens produced in the initial place and consumed from the final place.

Furthermore, the correct formula is used (the full formula is shown in the explanation of the next question).

6. Given the process model below and the following event log: [< a,b,c,h,i >^{5}, < a,b,e,f,g,h,i >^{4}, < a,d,e,g,f,h,i >] **1 / 1 ponto**



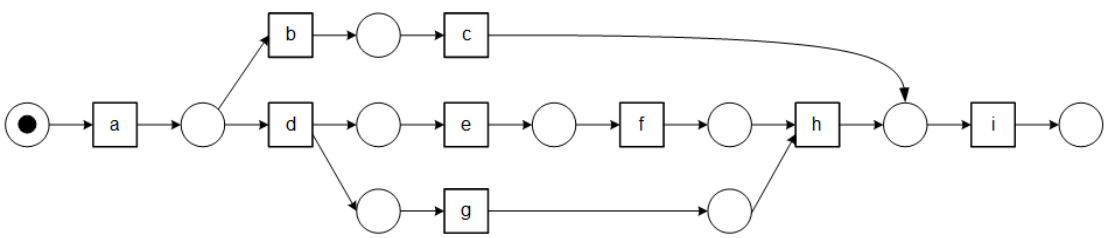
link

What is the correct token-based conformance?

- (selected) $\frac{1}{2}(1-\frac{18}{80})+\frac{1}{2}(1-\frac{9}{71})=0.8241$
- $\frac{1}{2}(1-\frac{4}{25})+\frac{1}{2}(1-\frac{2}{23})=0.8765$
- $\frac{1}{2}(1-\frac{18}{70})+\frac{1}{2}(1-\frac{9}{61})=0.7977$
- $\frac{1}{2}(\frac{66}{70})+\frac{1}{2}(\frac{59}{61})=0.9550$

Correto
This answer is correct, see the detailed explanation above.

7. Given the process model below and the following trace: < a,b,e,f,g,h,i > **1 / 1 ponto**



Which of the following is the optimal alignment, assuming all costs for move on model and move on log, for all activities, are 1.

trace	a	b	>>	e	f	g	h	i
model	a	>>	d	e	f	g	h	i

trace	a	b	>>	e	f	g	h	i
model	a	b	c	>>	>>	>>	>>	i

trace	a	b	>>	>>	e	f	g	h	i
model	a	>>	c	d	e	f	g	h	i

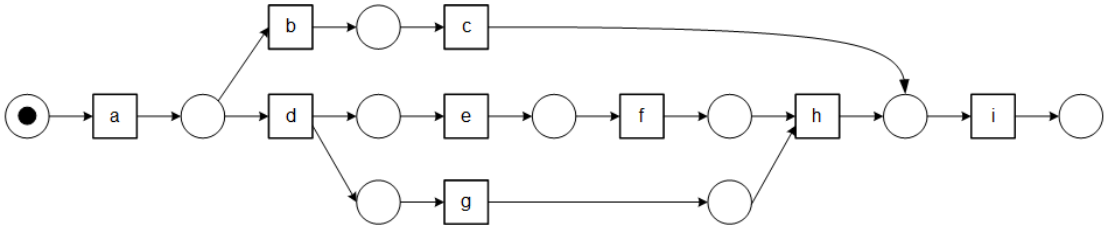
trace	a	b	>>	>>	>>	e	f	g	h	i
model	a	>>	c	i	d	e	f	g	h	i

Correto

This is indeed a correct alignment that also has the minimal cost of 2.

Alignments based conformance is explained in more detail in lecture 4.7: 'Aligning observed and modeled behavior'.

8. Given the process model below and the following event log: [$< a,b,c,h,i >^5$, $< a,b,e,f,g,h,i >^4$, $< a,d,e,g,f,h,i >$] **1 / 1 ponto**



link

What is the correct alignment-based conformance for this event log, assuming all costs for move on model and move on log, for all activities, are 1?

Hint: first calculate the fitness per trace, as is explained in the lecture. Then calculate the weighted average (or weighted arithmetic mean) using the trace frequency as weight.

- (selected) $(\frac{8}{9} \times 5 + \frac{9}{11} \times 4 + 1 \times 1)/(5 + 4 + 1) = (\frac{40}{9} + \frac{36}{11} + 1)/10 = 8.7171/10 = 0.87$
- $(\frac{1}{9} + \frac{2}{11} + 0)/3 = 0.2929/3 = 0.10$
- $(\frac{8}{9} + \frac{9}{11} + 1)/3 = 2.4432/3 = 0.81$
- $(\frac{8}{10} \times 5 + \frac{9}{10} \times 4 + 1 \times 1)/(5 + 4 + 1) = (\frac{40}{10} + \frac{36}{10} + 1)/10 = 8.6/10 = 0.86$
- $(\frac{2}{10} \times 5 + \frac{1}{10} \times 4 + 0 \times 1)/(5 + 4 + 1) = (\frac{10}{10} + \frac{4}{10} + 0)/10 = 1.4/10 = 0.14$
- $(\frac{1}{9} \times 5 + \frac{2}{11} \times 4 + 0 \times 1)/(5 + 4 + 1) = (\frac{5}{9} + \frac{8}{11} + 0)/10 = 1.2828/10 = 0.12$

Correto
This is indeed correct, as is shown in the question level explanation.

9. Which of the following conformance checking techniques suffers from the problem that because decisions in the algorithm are made locally it can produce misleading results? **0 / 1 ponto**

- (selected) Conformance checking using alignments.
- Conformance checking using token-based replay.

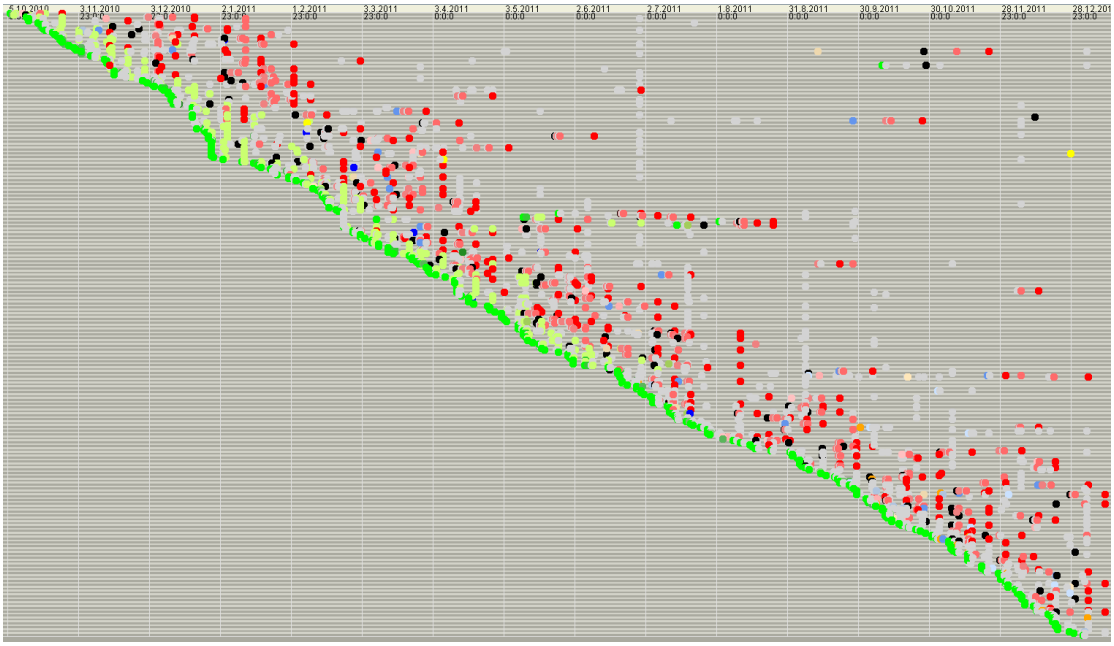
Incorreto

Currently conformance checking with alignments is the most robust conformance technique, mainly because it finds an optimal explanation of observed deviations.

This technique is discussed in more detail in lecture 4.7: 'Aligning observed and modelled behavior'.

10. Consider the Dotted Chart shown below (click to enlarge). The default settings are used: each row is a case, time goes from left to right, each dot is an event and the color of the dot indicates the activity performed. **1 / 1 ponto**

Which of the following observations can be made based on this chart?



link

- [x] Certain activities are executed in batches (e.g. for multiple cases on the same time).

Correto
This is indeed the case. The grey activities form vertical lines, an indication of batch execution of this activity. See also the 'Batching' box in the annotated Dotted Chart above.

- [ ] Each resource performs one type of activity.

- [x] For some cases events are recorded a long time after their arrival, while for the majority of cases most activities are observed in the first couple of months after arrival.

Correto

This is best visible in the top right corner: activities are recorded for some of the cases that arrived roughly a year ago. For most of the other cases no further activities are recorded since the area in the top right is not as densely populated with dots as the area closely after arrival of the case.

See also the 'Late Activity' box in the annotated Dotted Chart above.

- [x] The arrival rate of cases is steady in general.

Correto

We can draw a straight line alongside the green dots, indicating a relatively steady arrival of cases (with a small peak around end of 2010). See also the 'Arrival Rate Line' in the annotated Dotted Chart above.