Reference: Mustafa Jarrar: Lecture Notes on BPMN 2.0 Analytical Constructs Birzeit University, Palestine, 2015

BPMN 2.0 Analytical Constructs

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Download the slides from

http://jarrar-courses.blogspot.com/2015/01/dataandbusinessprocessmodelling.html

Some content in this lecture are based on [4]: <u>http://www.bpmn-tool.com/en/tutorial/</u>

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Reading and practice

[1] Every material in these slides.
 [2] Chapter three of Mathias Weske BPM book.
 [3] Practice on using Signavio process editor.
 [4] Signavio Process Editor (Academic BPM initiative)

Keywords: Data Engineering, Data Modeling, Conceptual Data Modeling, ORM, Object Role Modeling, Information Modeling, Schema engineering, Business Rules, integrity constraints, Derivation rules, Logic, verbalization of business rules, rules contradictions, rules implications, Business Process Engineering, Business Process Management, Business Process Modelling, Process Mapping, Process identification, process re-engineering, process re-engineering, Process Optimization, Process execution. ومندسة الربيانات، مخطط بيانات المفاهيمية، النمذجة المفاهيمية للبيانات، مندسة الرعمليات، إعادة مندسة مندسة الربيات، مخطط بيانات المفاهيمية، النمذجة المفاهيمية للمعاهيمية للبيانات، مندسة الربيات، إعادة مندسة الربيات الربيات الربيات الربيات الربيات المفاهيمية، المفاهيمية المفاهيمية المفاهيمية المفاهيمية الربيات، مندسة الربيات، إعادة مندسة الربيات الربي

Practice on Signavio

Some time of this lecture time is dedicated to have workshop practical session of modeling using Signavio.

Analytics Constructs

- BPMN 2.0 supports descriptive and Analytical constructs.
- Descriptive constructs are covered in the previous lectures.
- Analytical constructs will be the focus of this lecture.
- Analytical constructs are designed to help us analyze and improve/optimize business processes

Activities



Collapsed subprocess: A whole process can be collapsed and used as subprocess or activity inside another activity, called.

This helps us to abstract and encapsulate details (hide internal details) of our model, and help re-use previously designed processes.



Connecting Objects

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Association (undirected), attaching a data object with an undirected association to a sequence flow indicates <u>hand-over of information between the activities involved</u>.

----->

Association (unidirectional), a directed association indicates information flow. A data object can be <u>read</u> at the start of an activity or <u>written</u> upon completion.

Connecting Objects

<----->

Association (bidirectional), a bidirected association indicates that <u>a data object is modified</u>, i.e. <u>both read and</u> <u>write</u> during the execution of an activity.

Course Registration for PhD Student



Process Diagrams are Good to Have

Process models/diagrams are good to have:

- 0 Errors
- 0 Warnings
- 0 Hints

However, the target in this course that diagrams have

- ✓ 0 Errors
- ✓ 0 Warnings (except layout warnings)

Layout warnings are useful to resolve for better readability of the business process models (BPMN 2.0).

Start Events



Start Conditional Event

A process instance is started based on <u>changed</u> <u>business conditions or matching business rule</u> (i.e., reached maximum limit of course admission)



Start Signal Event

A process instance is started based on signaling across different processes (one signal thrown can be caught multiple times).

End Events

End Escalated Event

The case is <u>escalated</u> with the <u>end of process</u>.

End Error Event The process ends in an error state. As result a named error is thrown.

End Signal Event

At the <u>end of process a signal is thrown</u> (one signal thrown can be caught multiple times.





Event-based Gateway

Is always <u>followed by catching events</u> or <u>receiving</u> <u>tasks</u>. Sequence flow is <u>routed to the subsequent</u> <u>event/task which happen first</u>.



Inclusive Gateway

When splitting, <u>one or more branches are activated</u> <u>based on branching conditions</u>. When merging, <u>it waits</u> <u>all active incoming branches to complete</u>.

Data Objects



Message

A message is used to depict the contents of communication between two participants.

Throwing Intermediate Events



Intermediate Escalation Event

This event triggers the escalation of the case to another role in the organization. After this, process execution is resumed.



Intermediate Message Event

The throwing message event <u>sends a message to a</u> <u>communication partner</u> and afterwards continues process execution.

Throwing Intermediate Events

Intermediate Signal Event



The throwing signal event <u>fires up a signal</u>. Afterwards it continues the process execution. One signal is thrown can be caught multiple times by different catching signal events. <u>Signals can happen across different</u> <u>processes</u>.



Intermediate Link Event

A throwing link event activates a link event with the same name somewhere <u>within the process</u>. Together the two corresponding link events <u>replace the sequence flow</u>.

Catching Intermediate Event



Intermediate Message Event This event reacts on the arrival of a message.



Intermediate Timer Event

Process execution is delayed until a certain point in time is reached or a particular duration is over.



Intermediate Conditional Event

Process execution is delayed until a changed business condition or business rule matches.

Catching Intermediate Event



Intermediate Error Event

Catches a named error, which was thrown be an inner scope (e.g. subprocess). This event need to be attached to the boundary of an activity.



Intermediate Signal Event

Process execution is delayed until a particular signal is catched. Signaling can happen across different processes.

Catching Intermediate Event



Intermediate Link Event

A catching end event waits for a throwing link event with the same name to triggered. Together the two corresponding link events replace a sequence flow.



Intermediate Escalation Event

This event reacts on the escalation of a case. It need to be attached to the boundary of an activity.

Project I: Graduation Clearance

Description: After graduation, each student is required to fill in a clearance form, and get it signed by several departments in the University. Students cannot obtain their certificate unless this form is ready and signed by the Financial department, Library, Student Affairs, and his/her Academic department. As this process takes lots of time and efforts from students and

involved departments. The university would like to automate the process, so that students can request easily it through Ritaj.

Task: Model the above business process using BPMN 2.0 on Signavio, and deliver hard copy before, <u>April 30th 2015 at 9AM</u>, Please also save a soft copy on the shared folder "Graduation Clearance".

Project I: Graduation Clearance

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	خرج	إبراء ذمة لأغراض الت	
	-		
		لاسم:	1
		لرقم الجامعي:	1
		کلیت:	51
		تخصــمن:	31
			_
توقيع المسؤول	ملاحظات	الدائـــــرة	_
		عمادة شؤون الطلبة (قسم العمل التعاوني)	•
		عداد سوون الطنبة (هسم المساعدات المالية) المكتبة	+
		دائرة الخدمات العامسة	•
		دائرة الماليـــــة	•
		دائرة التسجيل والقبول	•
		دائرة الهندسة المدنية ومختبراتها	
		دائرة الهندسة الميكانيكية ومختبراتها	-
		دائرة الهندسة الكهريائية ومختبراتها	+
		دائرة الهندسة المعمارية ومختبراتها	-
		دائرة علم الحاسوب ومختبراتها	
		دادره هندسة انظمة الحاسوب	+
		دائره الأحياء ومختبراتها	
A CONTRACTOR OF CALLS		دائرة الفيزياء ومختبراتها	+

Project II: Faculty Traveling Permission

Description: Faculty member who want to travel during semesters are required to have a permission. Faculty member need to fill in a form and get it signed by the department chair and the dean of the faculty. The form includes (a) some information about the trip, destination, dates, and purpose; and (b) a plan on how they will make up the the missed lectures. The form is then sent to the department chair to decide whether this plan is acceptable, and send it to the dean who then decides to give the permission or not. The dean may take the recommendations of the dept. chair into account; and can refuse if the faculty member succeeded the allowed number of absence days (9 teaching days per semester). After acceptance/ rejection of the form, the faculty member and the chair are notified, and a copy of the decision is also sent to VP-academic.

As this process takes lots of time and efforts from faculty member and involved departments. The university would like to automate the process, so that faculty members can request it easily through Ritaj.

Task: Model the above business process using BPMN 2.0 on Signavio, and deliver hard copy before, <u>May 5th 2015 at 9AM</u>, Please also save a soft copy on the shared folder "Faculty Traveling Permission".

Project: Faculty Traveling Permission

تَحَادَيْنَ اللَّهُمِ عَنَّ الْمَعْنَى اللَّهُمِ عَنَّ الْمَعْنَى اللَّهُمِ عَنَّ الْمُعْنَى اللَّهُمِ عَنْ العمل خلال الفصل بدون دعم مثلي لغرض حضور نشاط علمي (مؤتمر/ندوة/ورشة عمل،)
 لمقدم الطلب:
 الاسم: محمود حمدان الرقم الوظيفي: 9999
 الكلية: الهندسة والتكلولوجيا الدائرة: علم حاسوب
3 طبيعة النشاط اجتماع لمشروع "NoorNet"
A منظمو التشاطر الاتحاد الاوروبي مكان الانعقاد: برشلونا، اسبقيا
ح. فترة الانعقاد: من تاريخ: 2015/11/20 إلى تاريخ: 2015/11/21
ي مجموع الفترة المطلوب غوابهها عن الجامعة: 2 <u>من: 2015/11/20 إلى: 2015/11/21</u>
7. مجموع أيام العمل خلال فترة الغياب: 1 يوم تدريس (محاضرة 1:30 رياضيات منفصلة ومحاضرة 1:30 قواعد بيقات)
8. طبيعة المشاركة: حضور لجنماع وفعاتيات مشروع
9 عنوان المشاركة مشاركة في اجتماع وفعاليات مشروع
10. هل سبق وأن حصلت على إذن للتغيب عن العمل خلال هذه السنة؟ = لا 🛛 تعم 🛛 (فصل مع تواريخ ومدد)
تقدمت بطلبين للسفر. الى القاهرة: ليوم واحد لحضور. اجتماع للفس المشروع، والى صنعاء ليوم واحد لمشركة علمية في مؤتس.
المساقات التي تدرسها خلال القصل الحالي: الرياضيات المنفصلة، قراعد البيانات
 الرجاء إرفاق معلومات مفصلة عن كيفية التعويض عن التدريس وأية أعمال أخرى تستلزم التعويض خلال فترة الغياب:
سيتم التعويض بوم الأحد الموافق 2015/10/19
 الرجاء ارفاق معلومات خطيه عن التشاط (مثلا منشور، رساله دعوة، البحث المقدم، الخ)
13. الشكرات العلمية منذ الذعم السابق _ لا يوجد _ يوجد _ الحدد : (() وجد يرجى طباعة الملخص من فاعدة بيقات ابحات الاستمادية بدائم الاكثر أساسة 21. ما 23. ما 25. من السابة من ما ما 10. (() وجد يرجى طباعة الملخص من فاعدة بيقات
الجمعة وإرفاق تعلمه على ورجة منتقلة إن ترم): (الرحمة منطقي من ممروع "Noorner") الاست: الأم أمه: الأكارية
• از نیس الدائر ق:
]. من توضي پد مع مدر الصليان و • ال تمر ، محمدت:
2 في حالة التوصية الايجابية، الرجاء إبداء الرأي في المعلومات المرفقة من قبل المدرس عن كيفية التعويض
الاسم: التوقيع:التاريخ
• قرار العميد
مع الموافقة اصنعم الديلا ، ملاحظات:
الاسم: التوقيع: التاريخ
larrar (0) 2015