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# PENS

Pathway in Enterprise Systems Engineering

Pathway in Enterprise Systems Engineering (PENS)

# BPM & Process Modeling

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# Outline

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1. Business Process
2. Business Process Modeling & Business Process Perspectives
3. BPM Approach
4. BPMN

# 1. Business Process

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- Hammer & Champy (2006) state that “a business process is a collection of activities that takes one or more kinds of inputs and creates an output that is of value to the customer”.
- Dumas et al. (2013) define a BP as a “collection of inter-related events, activities and decision points that involve a number of actors and objects, and that collectively lead to an outcome that is of value to at least one customer”.

## 2. BP Modelling & BP Perspectives

- It is essential to make a model of the process, which is a simplified view of a complex reality (Eriksson & Penker, 2000).
- A process model aims to capture the different ways in which a case (i.e., BP instance) can be handled (van der Aalst, 2013).
- Working with the models increases their understanding of the business and, hopefully, also their awareness of new opportunities for improving business.

# BP perspectives

Four main perspectives:

- **Functional perspective** represents which process elements are being performed.
- **Behavioral perspective** represents when process elements are performed.
- **Organizational perspective** represents where and by whom process elements are performed.
- **Informational perspective** represents informational entities produced/manipulated by a process.

# 3. BPM Approach

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BPM (Business Process Management) is also named Business Process Engineering.

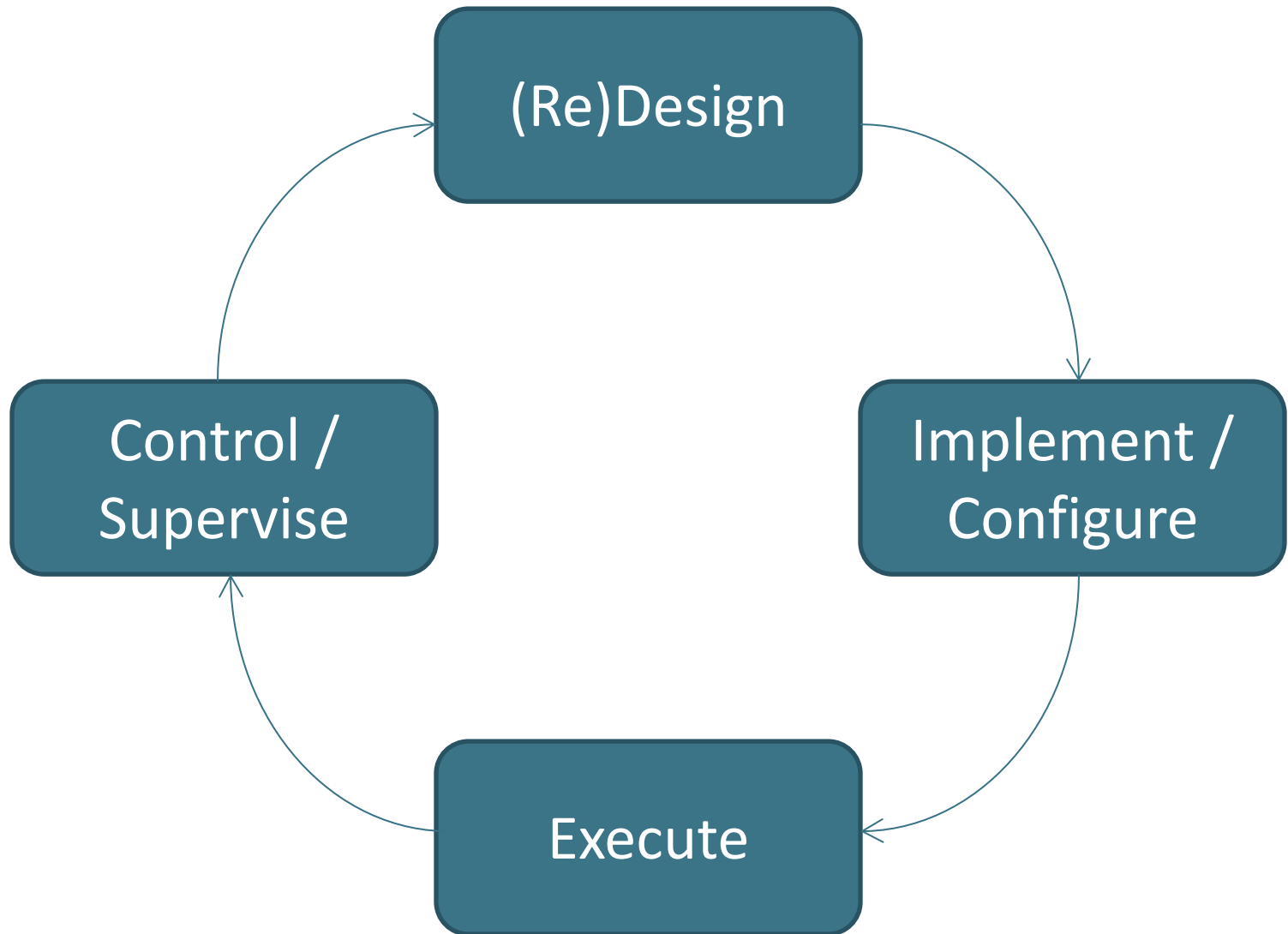
It is a contemporary approach allowing the improvement of productivity and reducing the costs through its innovative potential and continuously improves the business processes of an organization.

The BPM is a cyclic approach for continuous improvement of Business Processes.

# Life cycle of BPM

Many representations exist for the BPM lifecycle. They all include four main steps which are the following:

- Design (or redesign)
- Implement/configure
- Execute
- Control and supervise





The four main steps of the BPM lifecycle are the following:

- (Re)design of business processes: the creation of BP Models « from scratch» or through the modification of an existent model.
- Implementation/configuration: the BP is often implemented by configuring a BPMS (Business Process Management System).
- Execution of business processes: the process is executed and many instances are generated and registered (in a log file).
- Diagnosis: controlling and supervising these executions and in learning from BPs knowledge to be used for improving BPs.

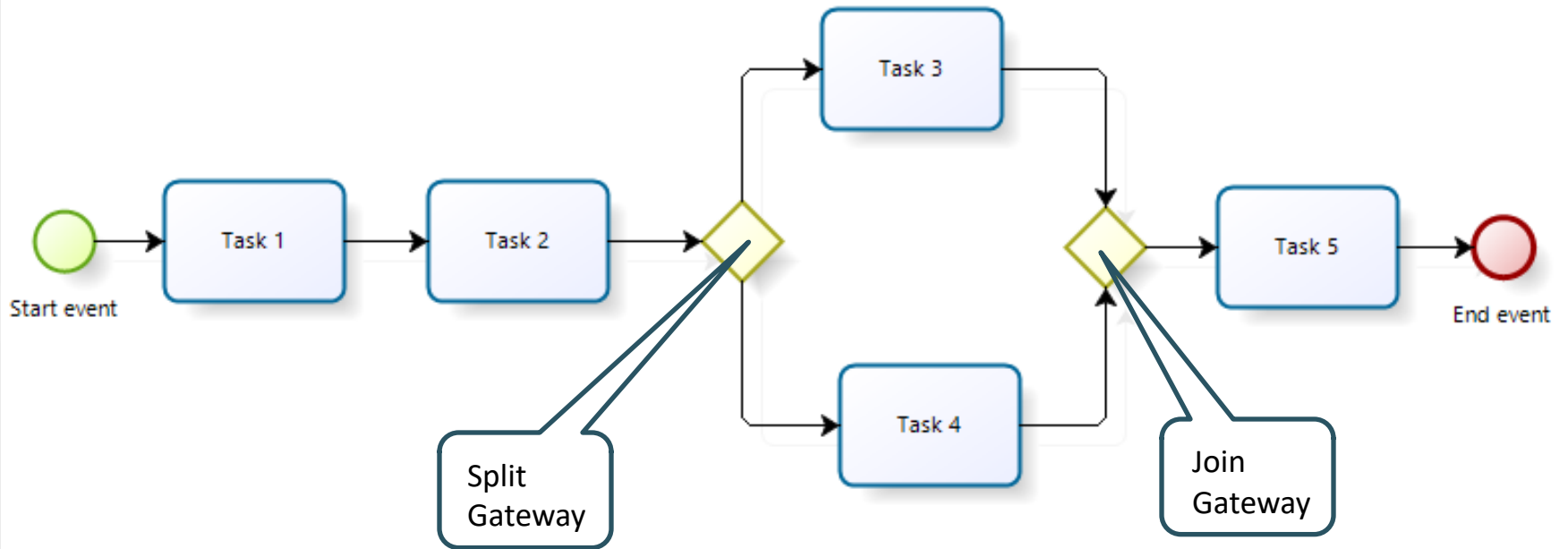
# 4. BPMN Notation

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- Modelling a process consists in representing it as a set of interconnected activities, conditions for triggering it or interrupting it and information associated to each activity (actors, called applications, used data).
- BPMN notation is becoming one of the most used languages used today for modelling Business Processes.
- It is a standard of the OMG.

# Basic concepts

- Activity: It is a task or a set of tasks that can be realized by a human or a system.
- Event: an event indicates the start point or the end point of a process. We also can have intermediary events.
- Control Flow (or sequence flow): used for representing the sequence of activities.
- Gateway used for dividing (split) or merging (join) the flows.
  - Split gateway: has a unique ingoing flow and many outgoing flows
  - Join gateway: has many ingoing flows and only one outgoing flow.



# Logic operators associated to Gateways

Two logic operators are the most used with gateways :

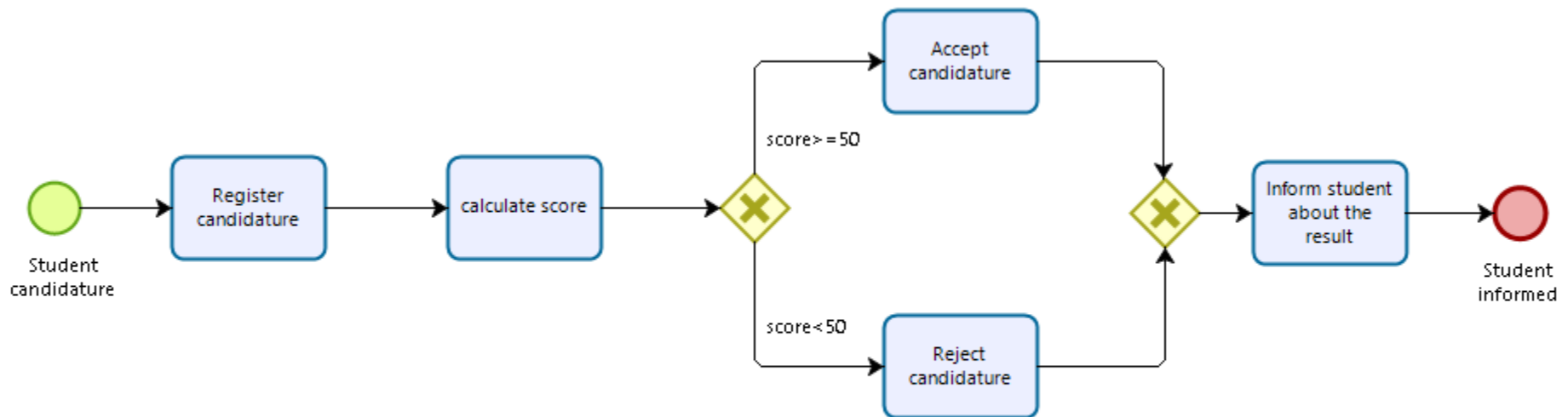
- AND

- AND-Split
- AND-Join

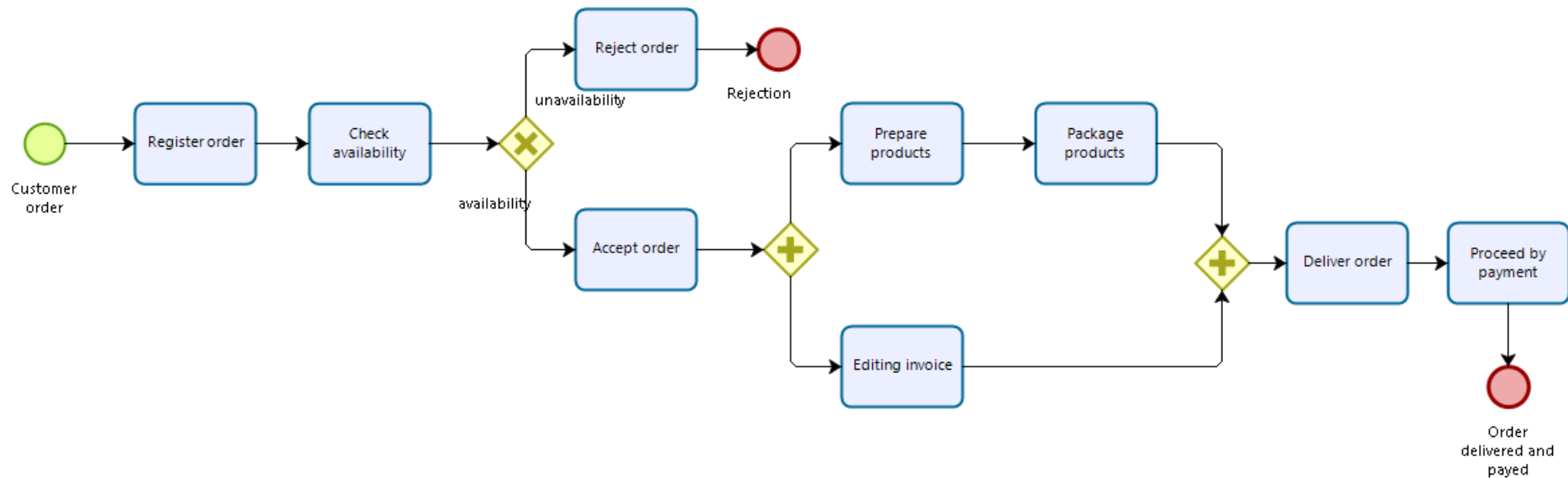
- XOR

- XOR-Split.
- XOR-Join.

# Example 1

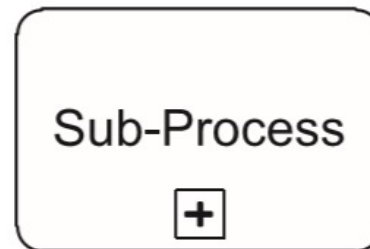
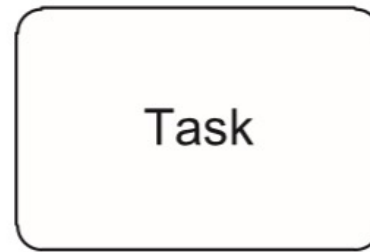


# Example 2



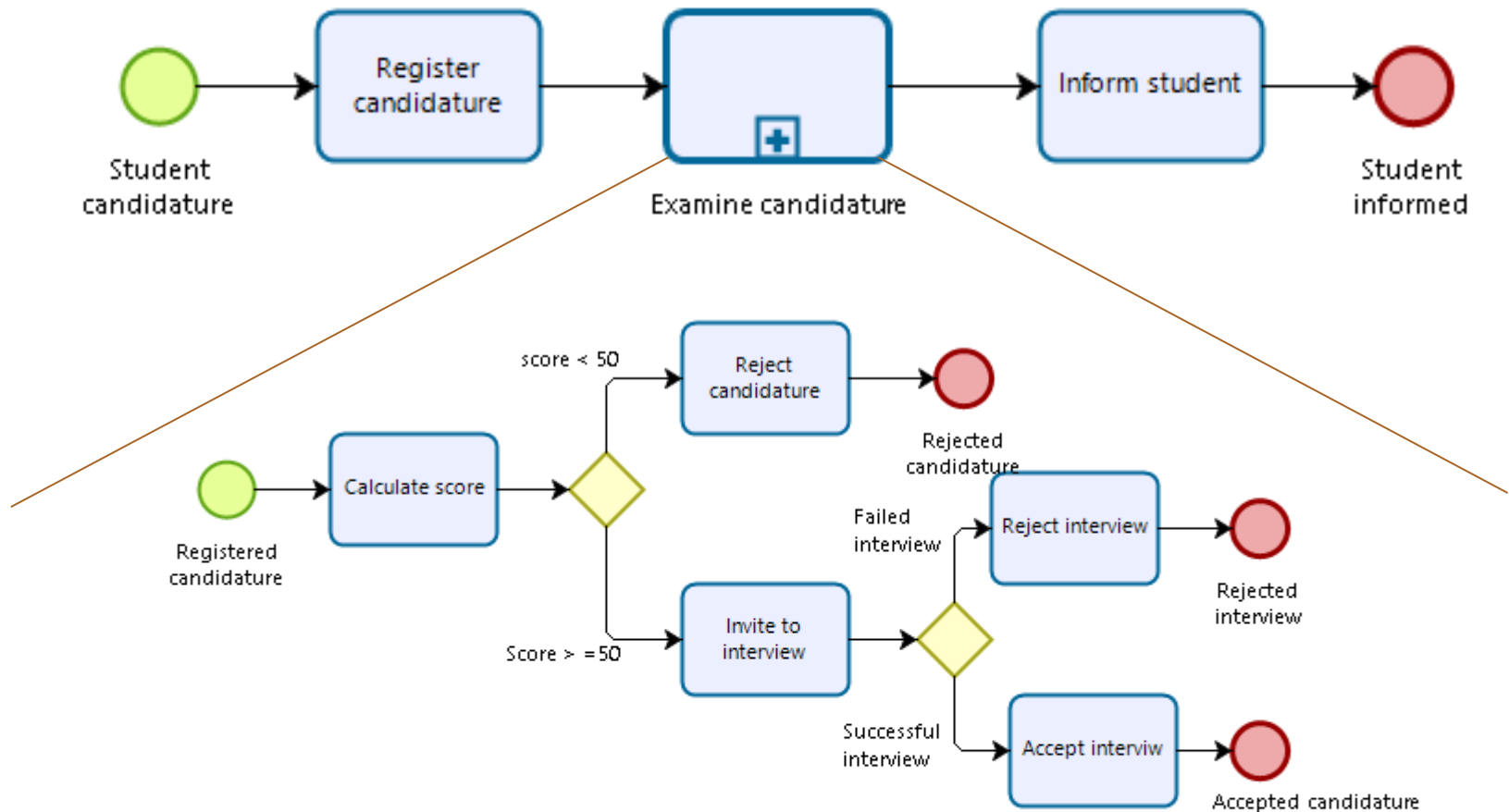
- Types of activities:

- Tasks
- Sub processes





# Example 3: with a sub-process



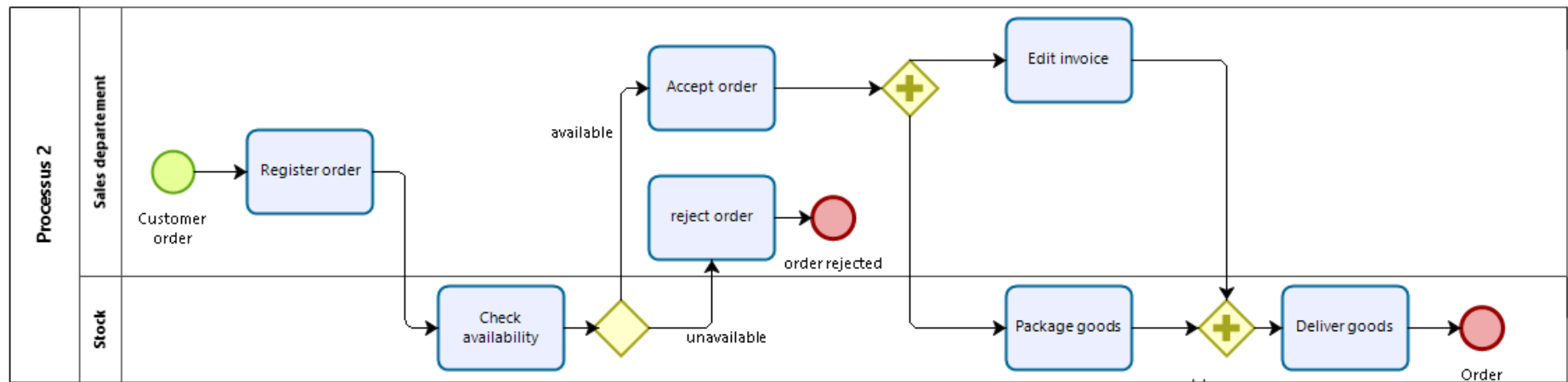
# Supplementary concepts

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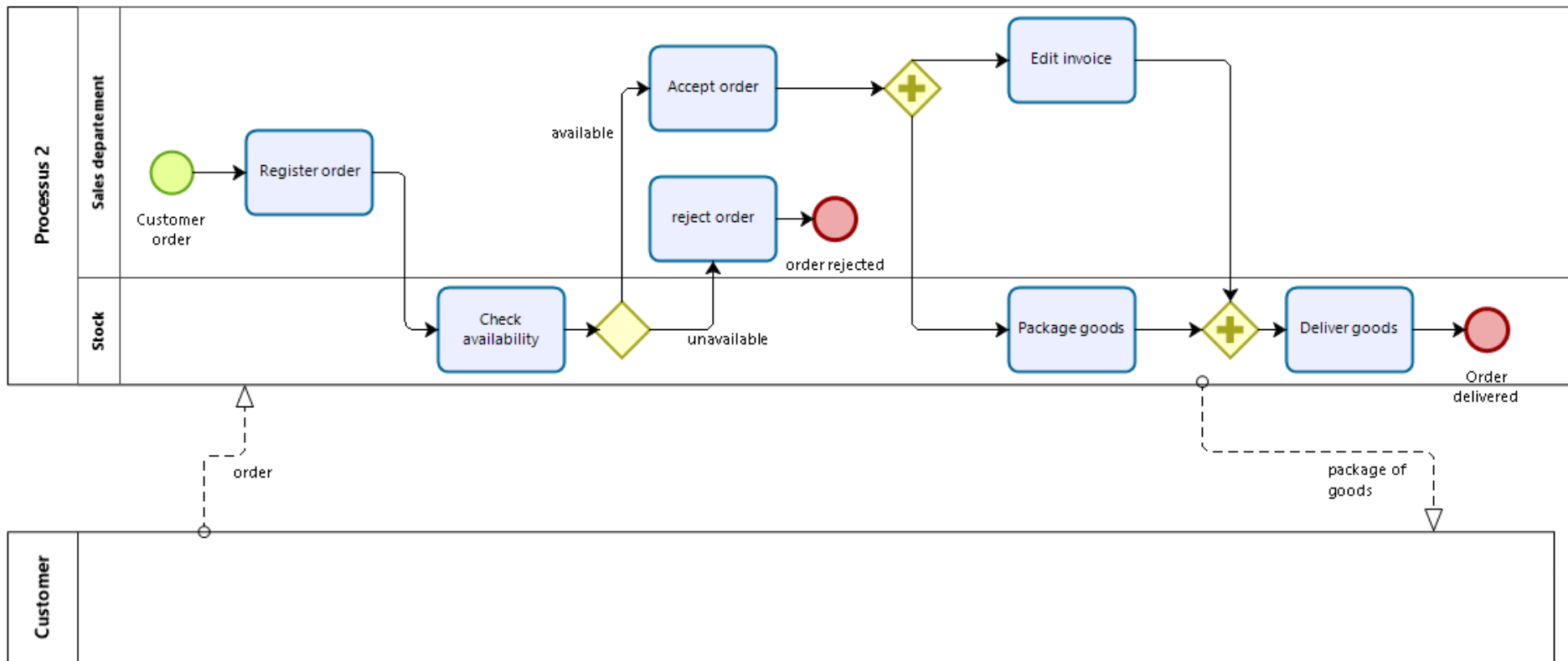
- Organizational concepts
  - Pools and lanes can added to the diagram.
  - Each participant is represented by a pool.
  - The main pool is decomposed in a set of lanes



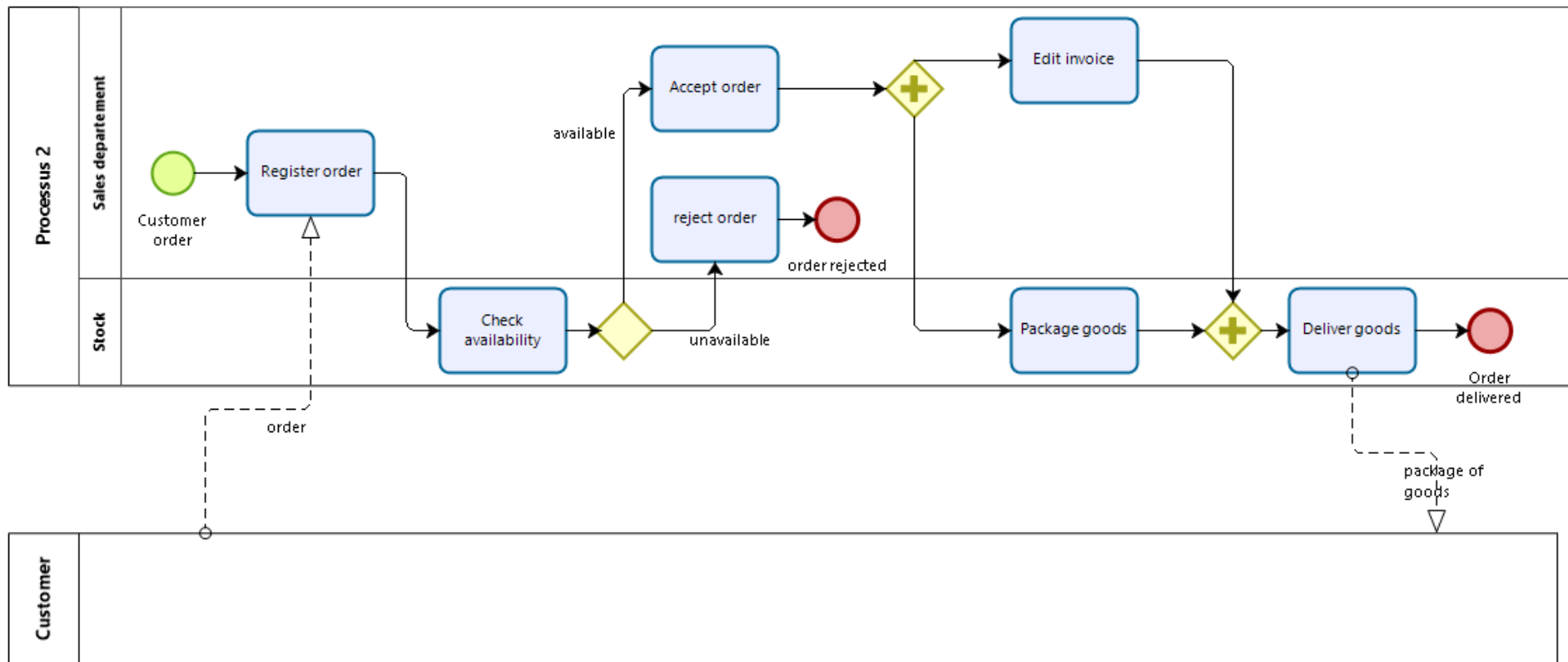
# Example 4: with lanes



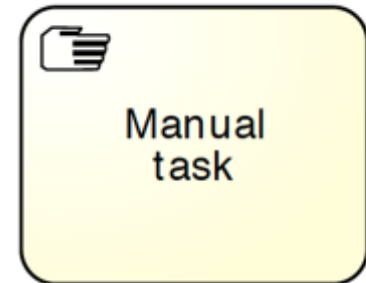
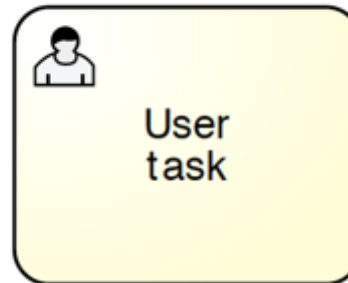
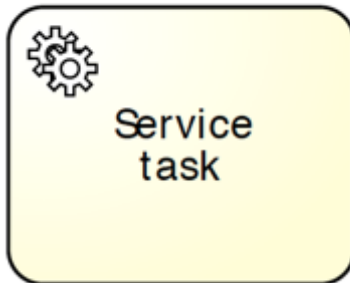
# Example 5: with pools and lanes



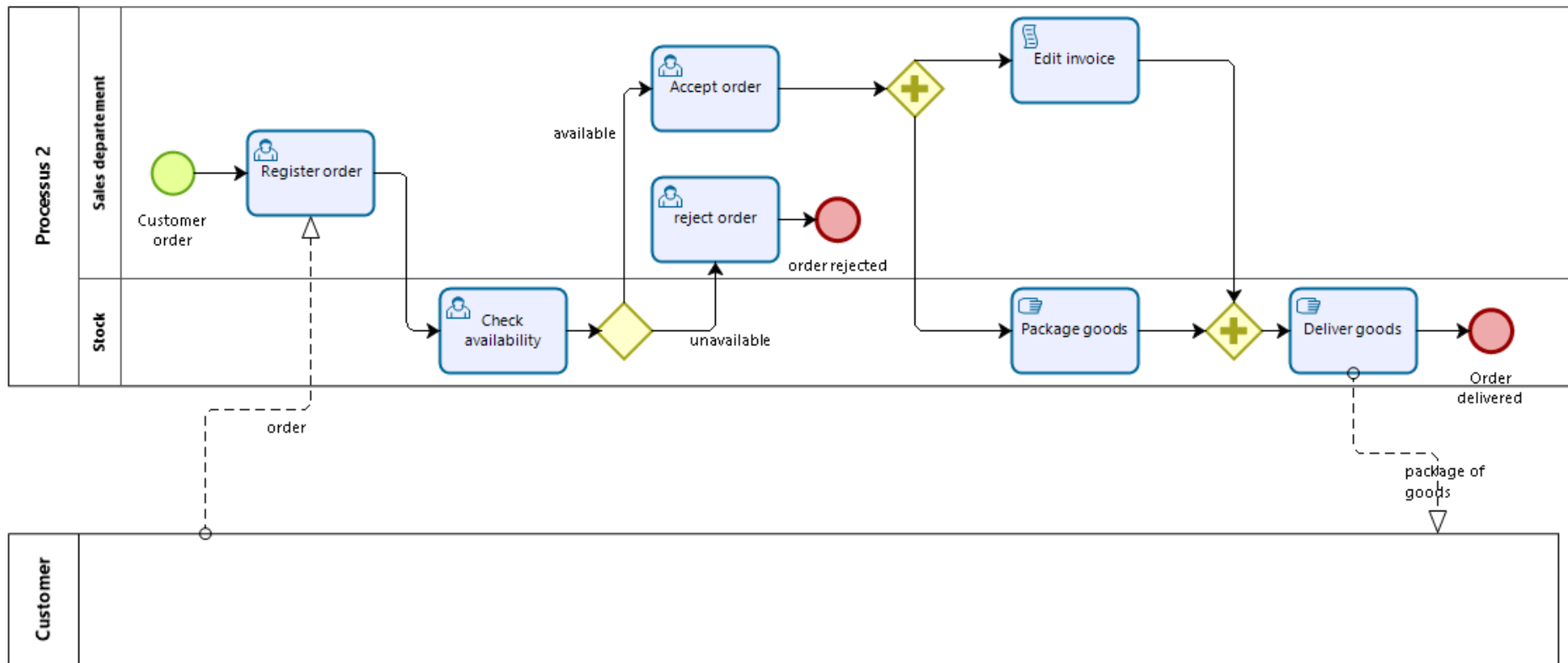
# Example 6 : Another representation



- Types of tasks
  - Manual
  - Interactive
  - Automatic



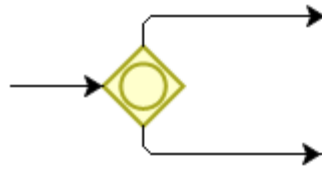
# Example 6: with types of tasks



# Advanced concepts

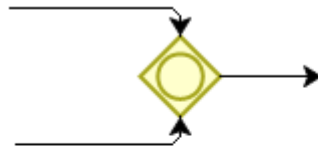
A third logic operator can be associated to a gateway :  
OR

Split OR Gateway :



In this case, during the execution, one of the outgoing flows will be followed or both simultaneously will be followed.

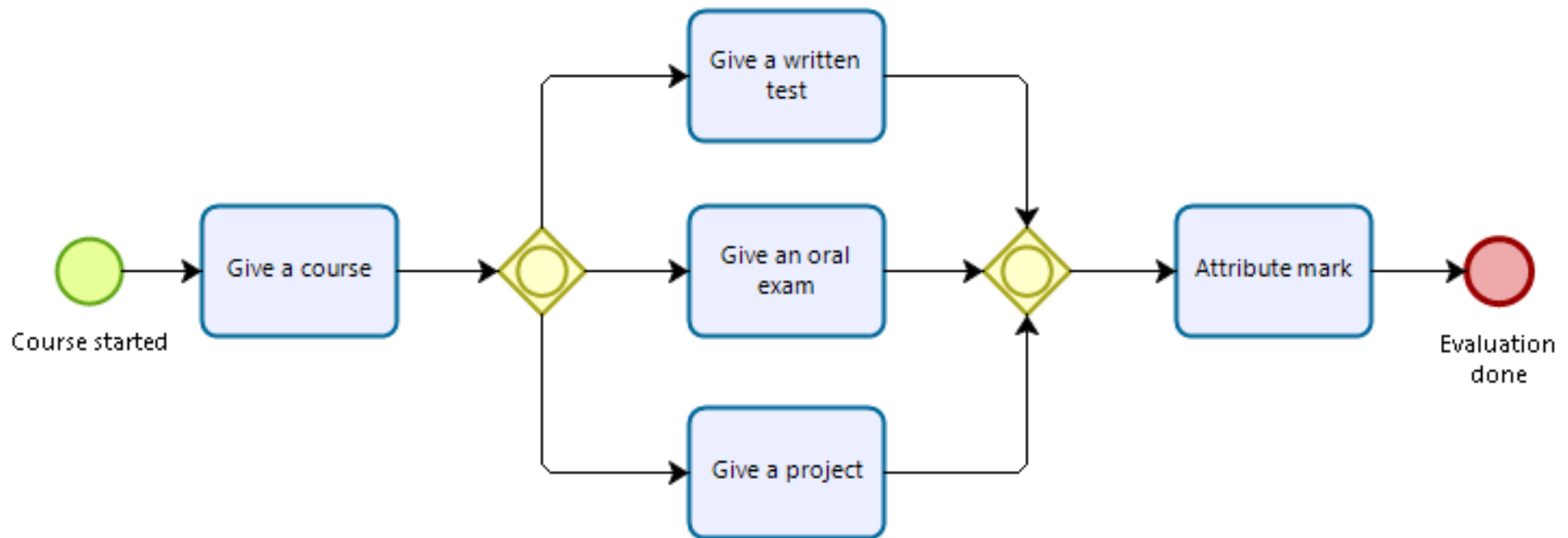
Join OR Gateway :





# Example with OR

## Process of continuous control evaluation



## More about Events

Three types of events :

- Start event



- End event



- Intermediary event



A start event can only have outgoing flows.

An end event can only have ingoing flows.

An intermediary event can at the same time have ingoing and outgoing flows.

An intermediary event is an event that occurs during the execution of the process.



Two cases are possible :

- It can cause an interruption of the execution of the process until the event arrives (It is a Catch Event).
- It can just correspond to sending or causing the arrival of the event ( It is a Throw Event).

Events can be of various types :

- Timer event



- Message event



- Etc.

They correspond to a date or a time, to the emission or the reception of a message, etc.

# Example with intermediary event

Process of constructing master degree final list:

