

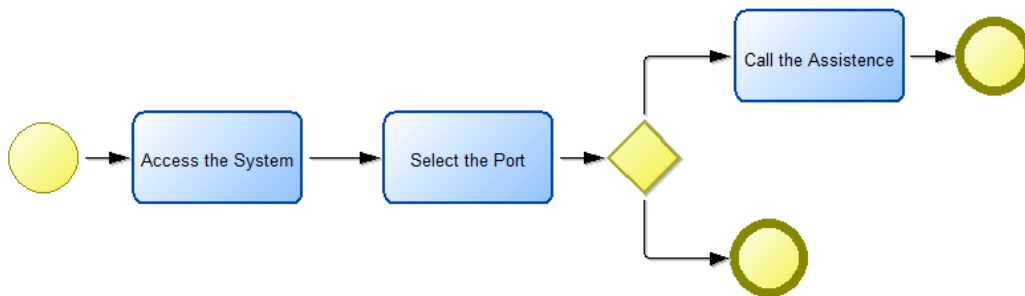
Process Mining



Lesson 1 – Business Process Management

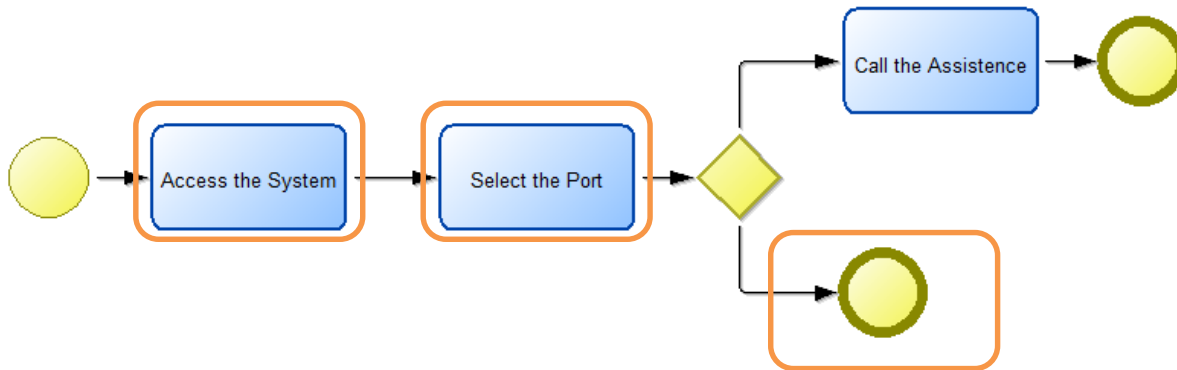
Business Process Definitions

A **Business Process** consists of a set of activities that takes one or more kinds of inputs and creates an output; they are performed in coordination in an organizational and technical environment to reach a business goal



Business Process Definitions

Business Process instance
represents a concrete case in the
operation business of an
organization consisting of activity
instances



Business Process Definitions

Business Process Perspective:

- **Functional Perspective:** It specifies which units of work compose the BP. Units of work are the activities (atomic or composed) that may be performed to reach a particular goal.
- **Behavioral Perspective:** It specifies the behavior of BP via control flow relationship between activities. BP elements that impact in this perspective are gateways and control edge.
- **Organization Perspective:** It specifies the different actors and roles that are involved in the BP.

Business Process Definitions

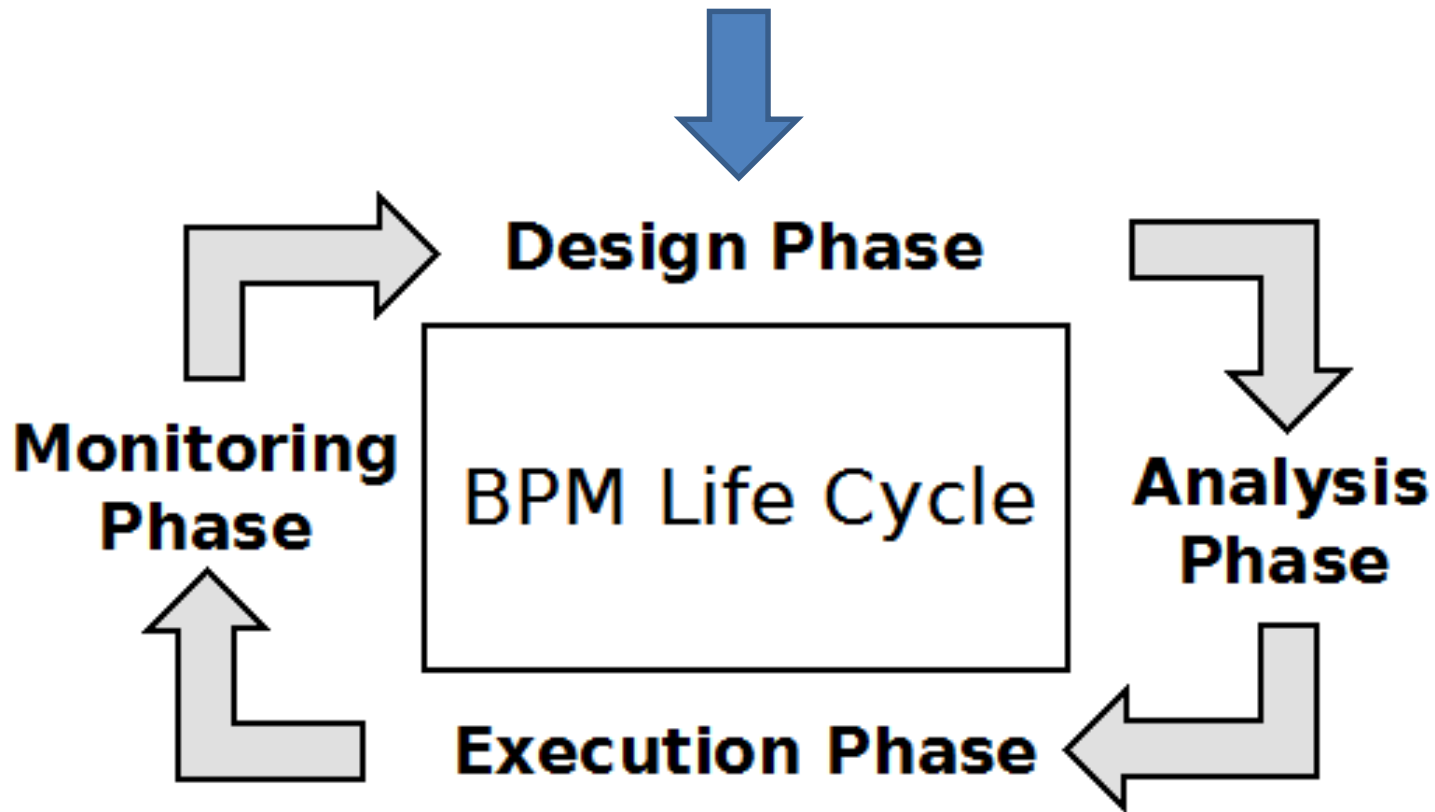
Business Process Perspective:

- **Information Perspective:** It specifies which information entities such data and data objects are used or generated during the BP execution
- **Temporal Perspective:** It specifies temporal constraints that may restrict the execution of activities
- **Operational Perspective:** It specifies how atomic activities are implemented. For each atomic activity many implementations can exist.

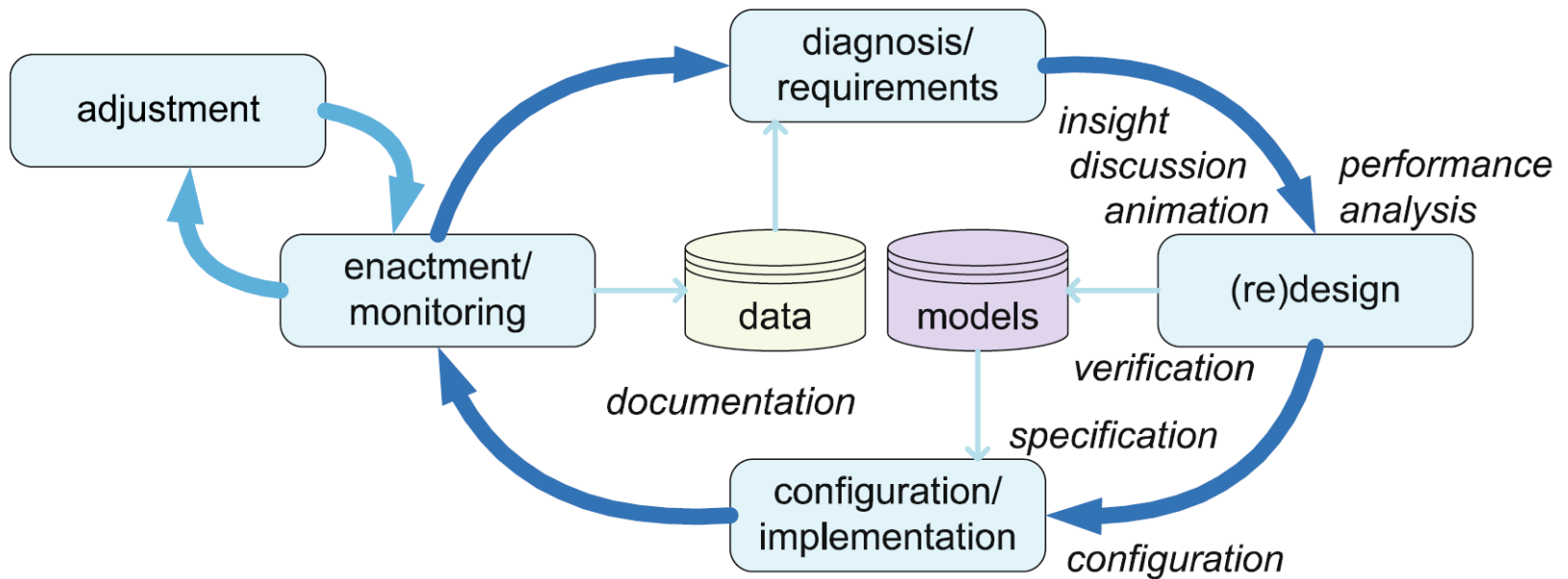
Business Process Management

- Business Process Management (BPM) includes concepts, methods, and techniques to support the design, administration, configuration, enactment, and analysis of business processes.
- It provides tool to observe that each product or service that a company provides to the market is the outcome of a BP.
- It means that BPM does not only cover the representation of BPs, contrariwise it covers all the life cycle phases of BPs

Business Process Management



...in your book (pag. 8)



BPM Life-Cycle

- **Design Phase:** Its aim is to identify BP goals, stakeholders and a BP model. Stakeholders are interviewed in order to derive the BP model that reaches the identified goal. Then, a BP model is designed via a modeling language by a BP designer. It describes the flow of activities performed by stakeholders
 - Story Telling
 - Software Engineering
 - Talk to people and stakeholders before design!
 - ...start from an existing BP model (if exist)
 - Different languages (graphical, mathematical and script based)

BPM Life-Cycle

- **Analysis Phase:** Its aim is to verify that the BP model designed in the Design Phase is correct. If the BP model is not correct it has to be re-designed. A BP is correct if it has not structural problems (i.e. deadlock) and if it has not behavioral problems. For the behavioral problems I mean that the BP model does not archive some target goals
 - Verification properties (LTL, deadlock, etc...)
 - Simulation
 - Sintattically correctness
 - Behavioral correctness
 - Process Algebra, map to petri-net, algorithm, etc...

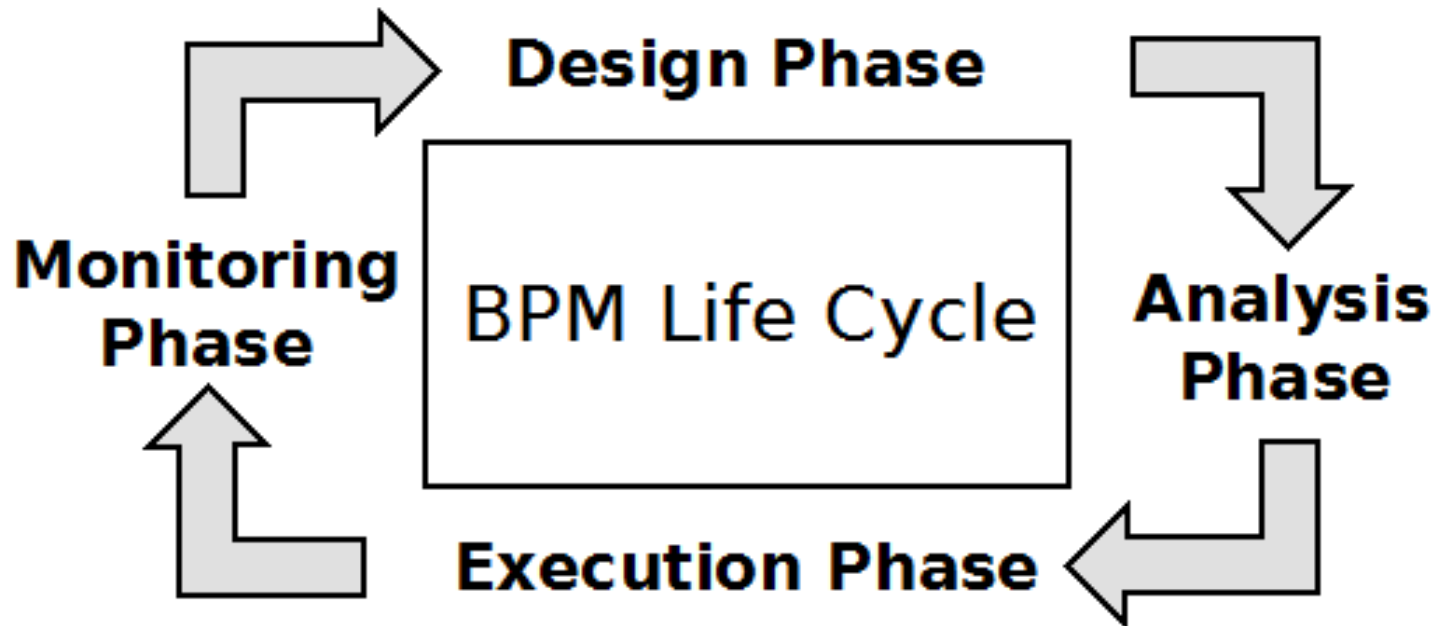
BPM Life-Cycle

- **Execution Phase:** It is the phase in which the BP is executed by stakeholders. For each stakeholder execution a BP instance is performed in order to reach the defined goals
 - After the implementation
 - Develop a Logs system
 - Many stakeholders can be involved

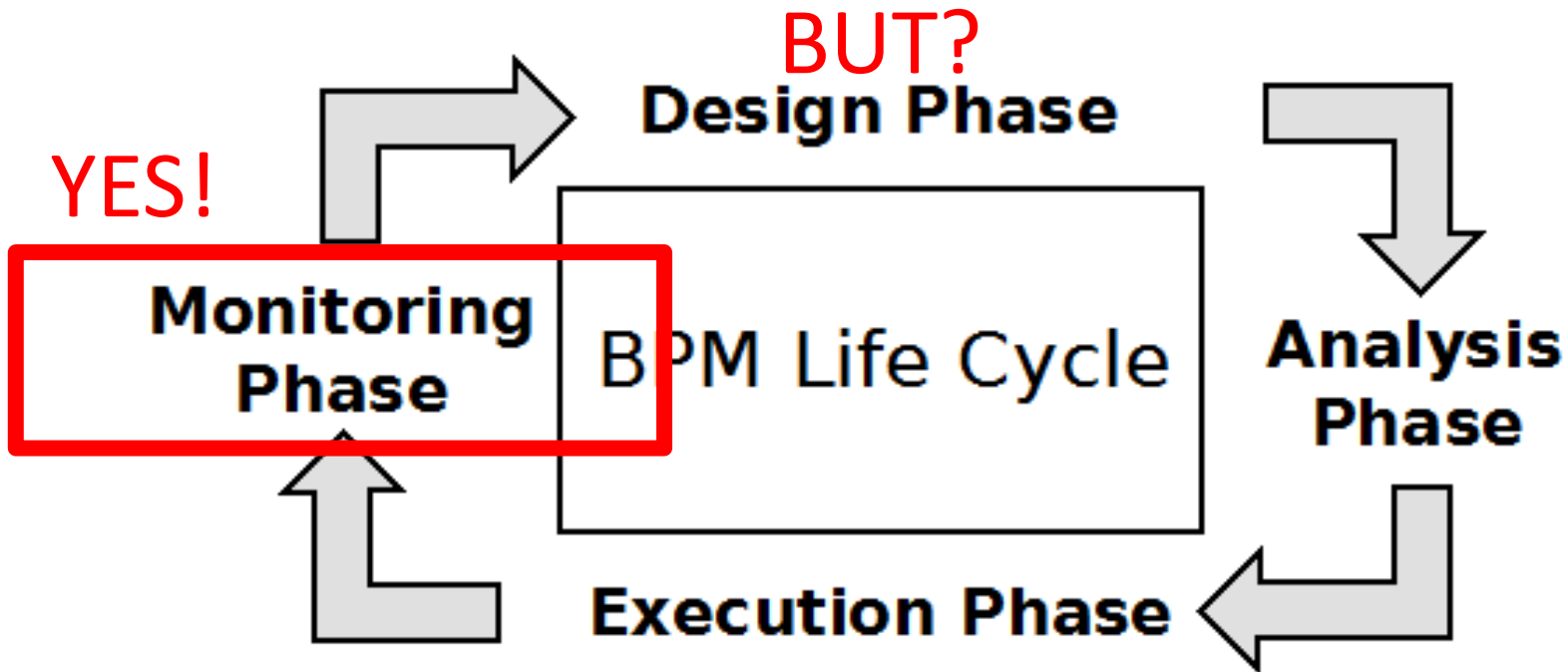
BPM Life-Cycle

- **Monitoring Phase:** The aim of this phase is to monitor the running BP instances in order to improve the BP model. In the case some issue in the BP are found, BP designers can re-design it and restart the BPM life cycle
 - Check execution error
 - Check if the instances are possible (considering the designed model)
 - Process Mining!!

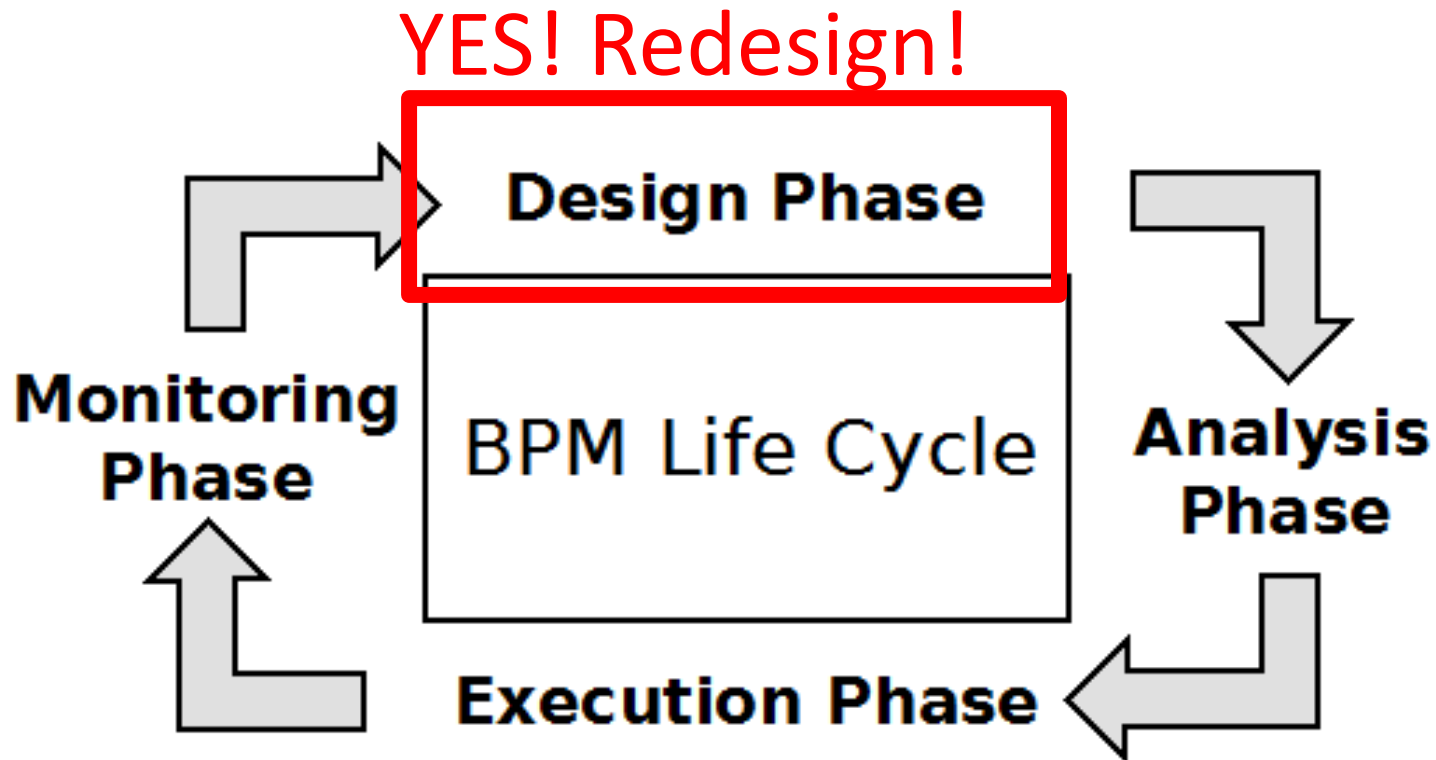
BPM Life-Cycle & Process Mining?



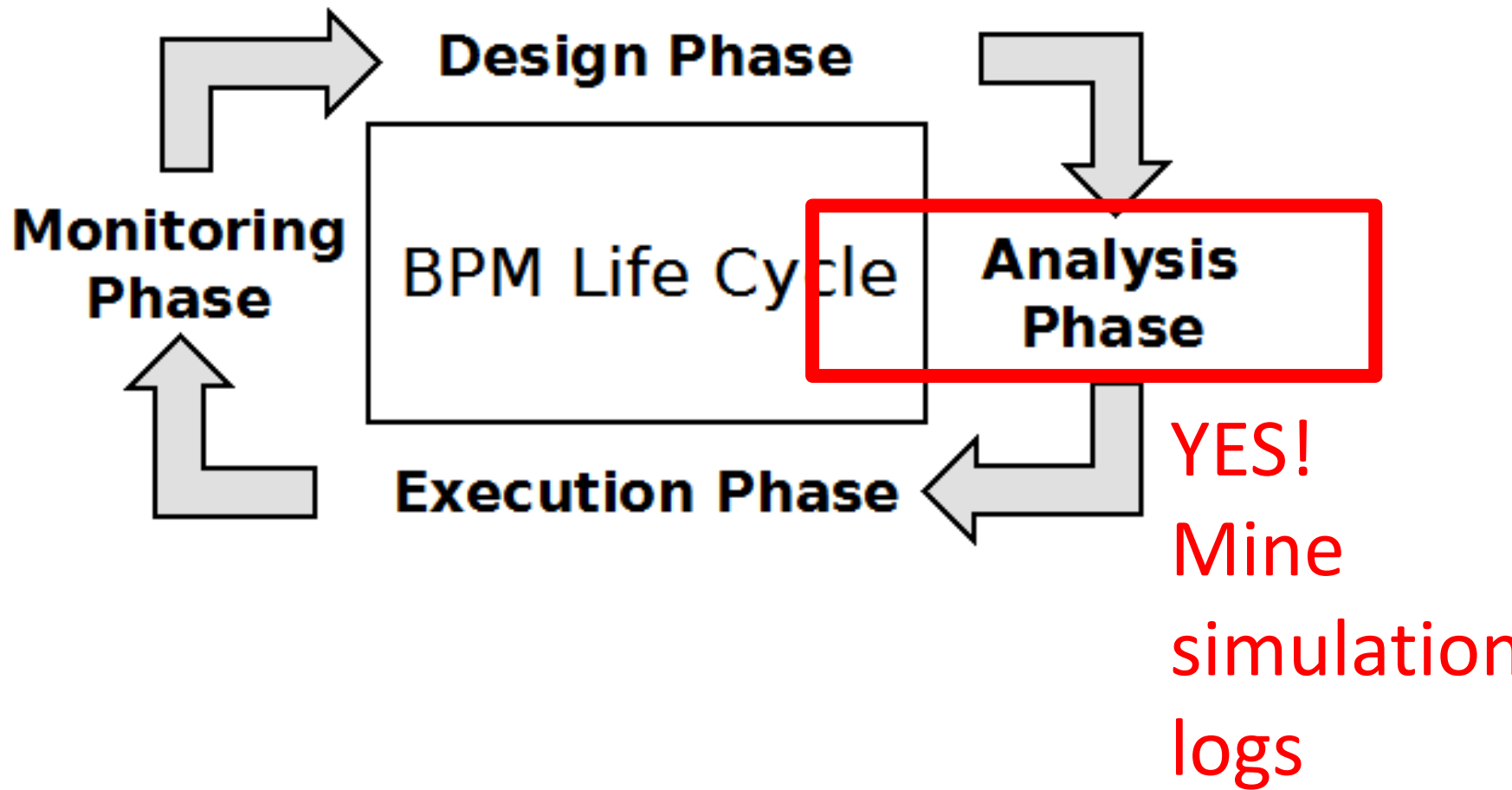
BPM Life-Cycle & Process Mining?



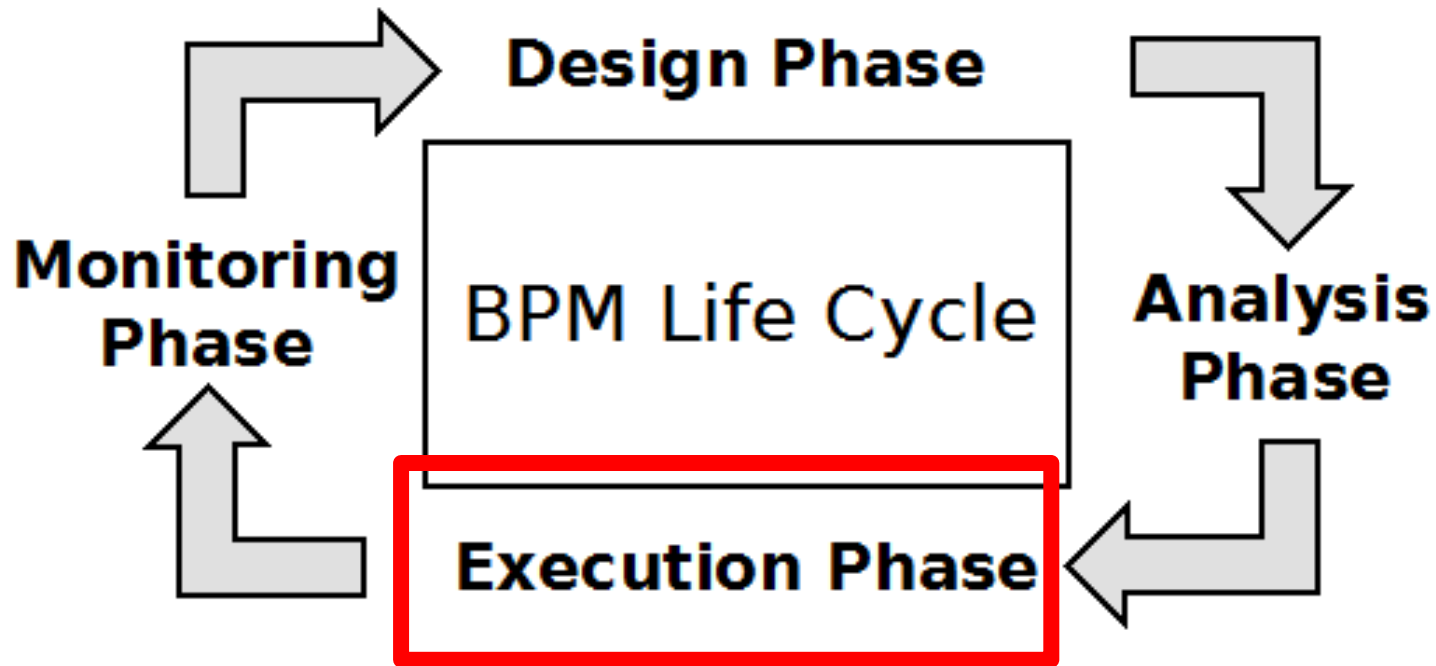
BPM Life-Cycle & Process Mining?



BPM Life-Cycle & Process Mining?

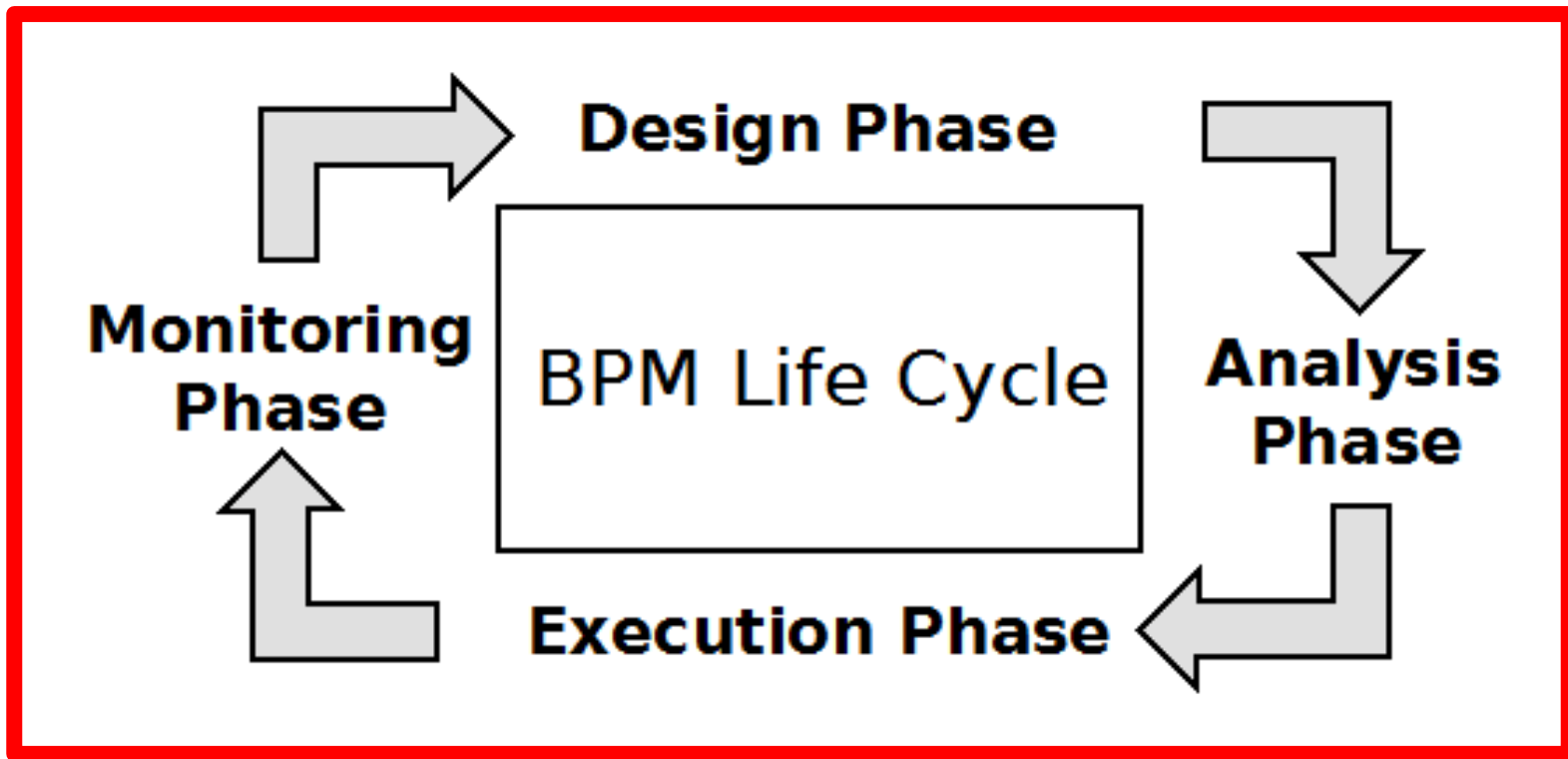


BPM Life-Cycle & Process Mining?



YES! Mine
Real Logs

BPM Life-Cycle & Process Mining?



BPM Reserach Topics

- **Process Analysis:**

- Verification: check new approaches

In general, BPs are mapped to Formal Languages (i.e. Petri Net) and then some properties are check

- Simulation

Algorithm are used to check the quality of the designed model

BPM Reserach Topics

- **Process Flexibility:**

- Variability

BP variants, general Process Families are designed

- Adaptability

Change the instances «execution path» at runtime using some pattern or with the aim of a stakeholder

BPM Reserach Topics

- **Process Flexibility:**

- Looseness

No imperative BP is designed! Declarative modelling (CMMN)

- Evolution

Change the model at runtime

QUESTIONS??