31269: Business Requirements Modelling

Week 4 Lecture - Business Process Modelling

- References
  - http://www.bizagi.com/docs/BPMN_Quick_Reference_Guide_ENG.pdf
  - http://www.bizagi.com/docs/Introduction%20to%20BPMN.pdf
  - https://online.uts.edu.au/bbcswebdav/pid-1060785-dt-content-rid-5232924_1/courses/31269M01/BPM%20-%20EGD%20%20Ver.%201.pdf
  - BABOK Guide

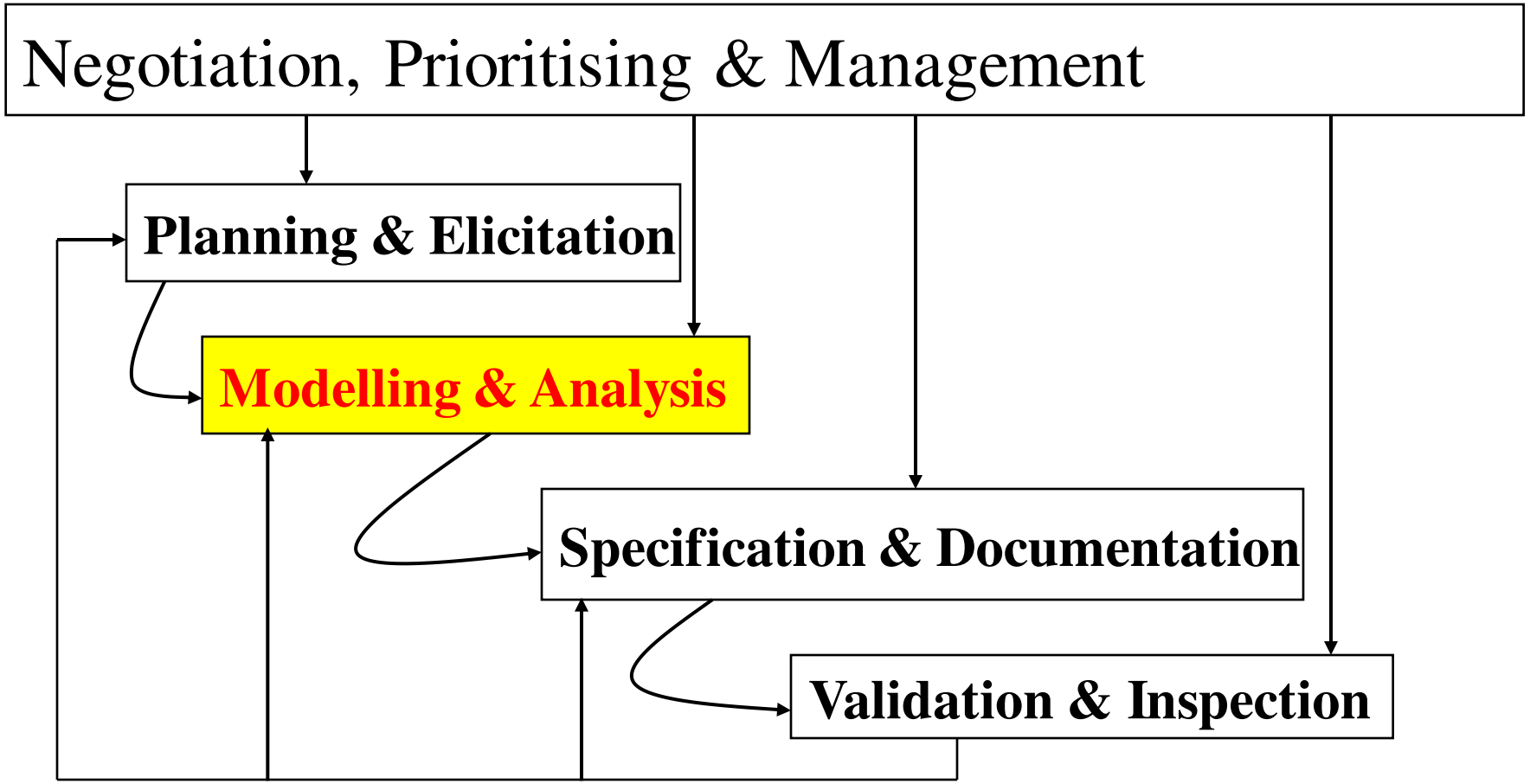
Objectives

- Appreciate how modelling techniques can help to understand the working of business systems
- Discover how modelling can be used to specify system and user requirements
- Discover how Business Process Model (BPM) can be used to model, analyse and **understand the business processes in an organisation**

Topics

- Requirements Analysis & Modelling
  - Business Process Modelling using BPMN

Requirements Process



Requirements Analysis

- Last week - How are the requirements collected?
  - Interviews, workshops, prototypes, surveys, observation, document review, etc.
- This week - How do we analyse and model these requirements?
  - Business Process Modelling

Business Processes

- Experts from IT and business engineering disciplines argue that successful systems deployment starts with the **understanding of the business processes of an organisation.**

- A business process has a strong emphasis on **how the work is done within an organization**.

Business Processes

- A business process is the combination of a **set of activities within an enterprise with a structure** describing their logical order and dependence, whose objective is to produce a desired result.
- A business process is a collection of activities designed to produce a specific output for a particular customer.
- A business process is thus **a specific ordering of work activities** across time and place, with a beginning, an end, and clearly defined inputs and outputs.

Introduction to BPM

- **Business process modelling** (BPM) in systems engineering is the activity of representing processes of an enterprise, so that the **current process may be analyzed or improved.**
  Source: http://en.wikipedia.org/wiki/Business_process_modeling

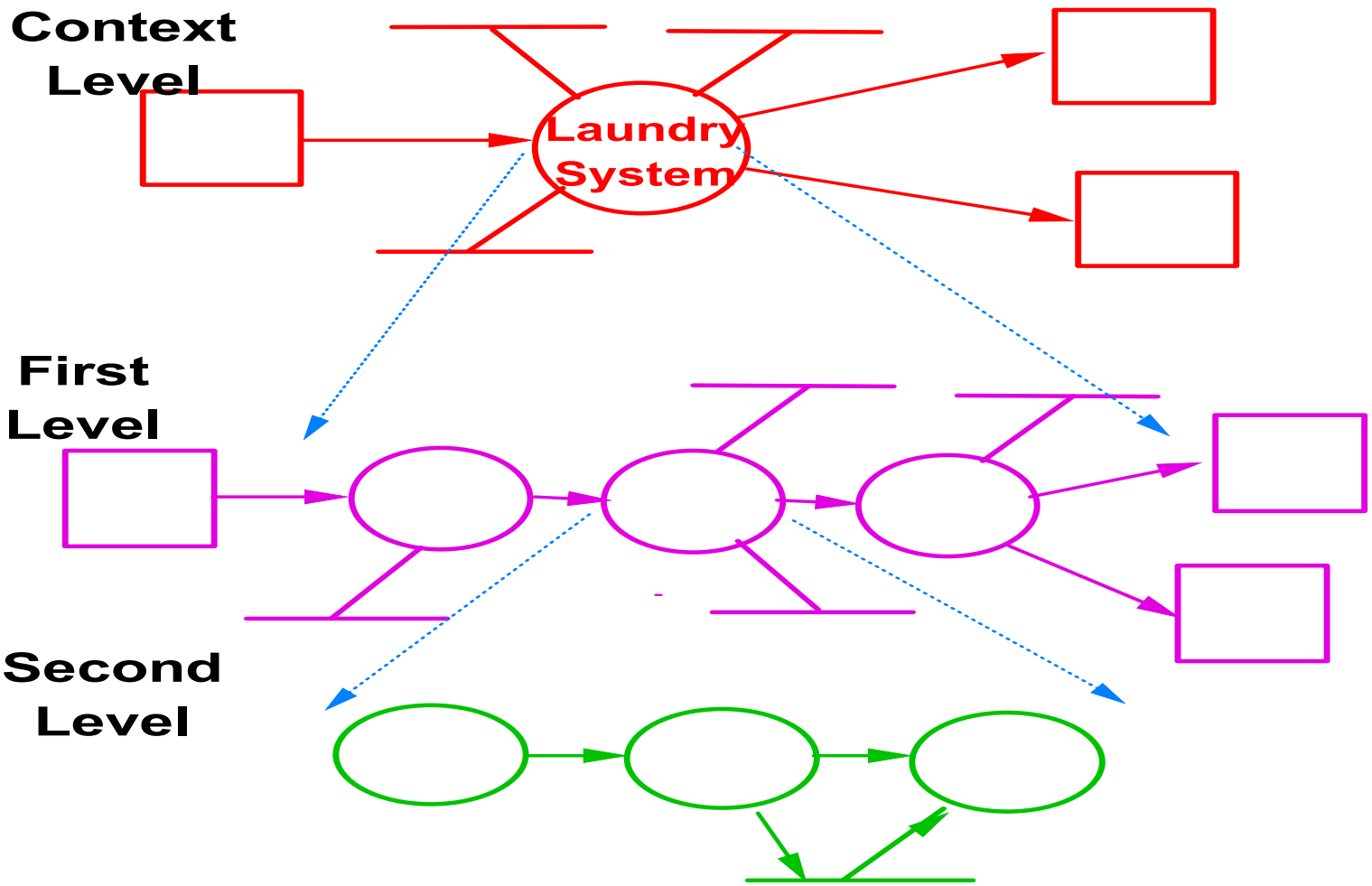
- Conceptual modelling of business processes is performed:
  - to facilitate the development of software that supports the business processes, and
  - to permit the analysis and improvement of the business processes.

- Modelling of a business process typically shows events, actions and links or connection points, in a logical order from end to end.

Process Decomposition

- A large or complex process is more easily understood when broken down using process decomposition.
- Decomposition is the process of starting at a high level and dividing entities into smaller and smaller related parts.
- The main purpose of process decomposition is to **break up a large or complex business process into smaller and more manageable chunks/components (sub-processes and tasks).**
  It therefore facilitates understanding of the business process and hence is a useful tool in conducting analysis and design.

Process Decomposition into different levels



Context Diagram

- A System Context Diagram (SCD) is a diagram that defines the **boundary between the system**, or part of a system, **and its environment**, showing the entities that interact with it.
  Source: http://en.wikipedia.org/wiki/System_context_diagram

- A Context Diagram allows a team or an individual to produce a high-level model of an existing or planned system that **defines the boundary of the system of interest** and its interactions with the critical elements in its environment.
  Source: http://www.burgehugheswalsh.co.uk/uploaded/documents/CD-Tool-Box-V1.0.pdf

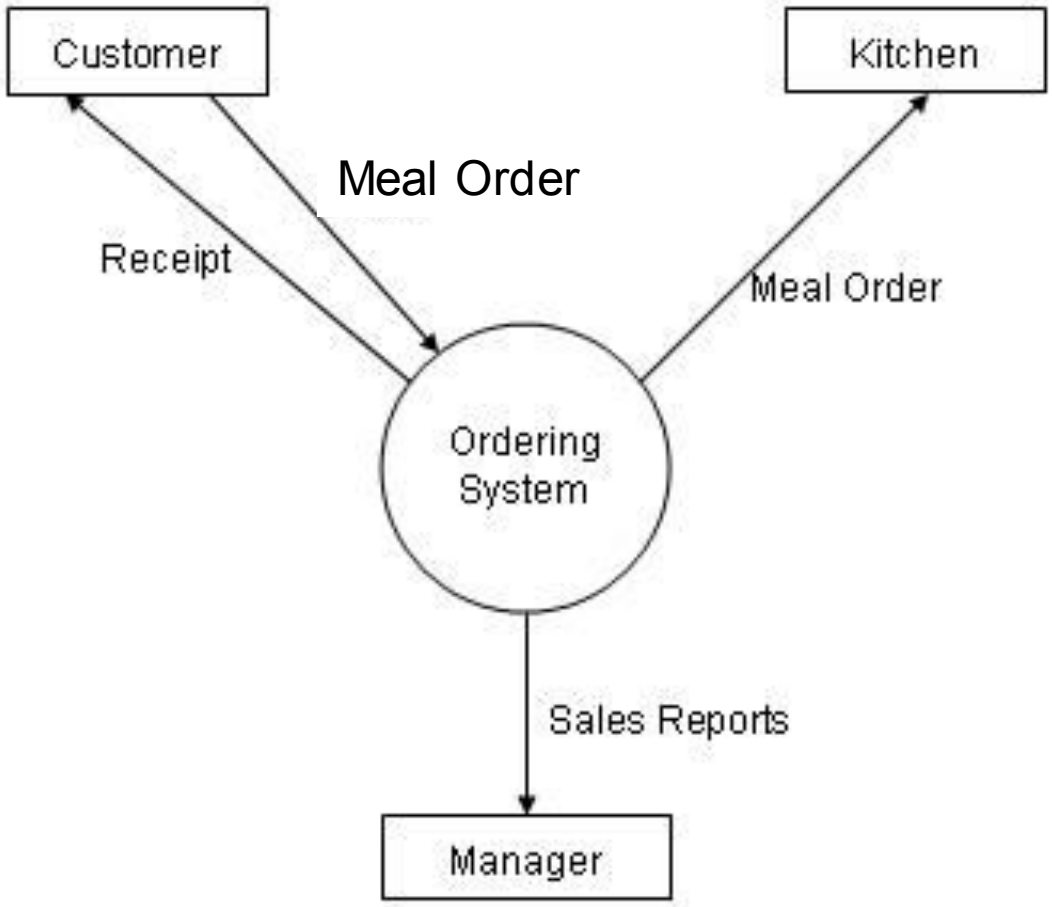
- A context diagram shows **(parts/components)**:
  - The **system** that is being analysed.
  - The **entities** (other systems, people and organisations) that interact with the system.
  - The **information/data** (not the processes) that flows between the system and each entity.

Why have a Context Diagram?

A Context Diagram can:

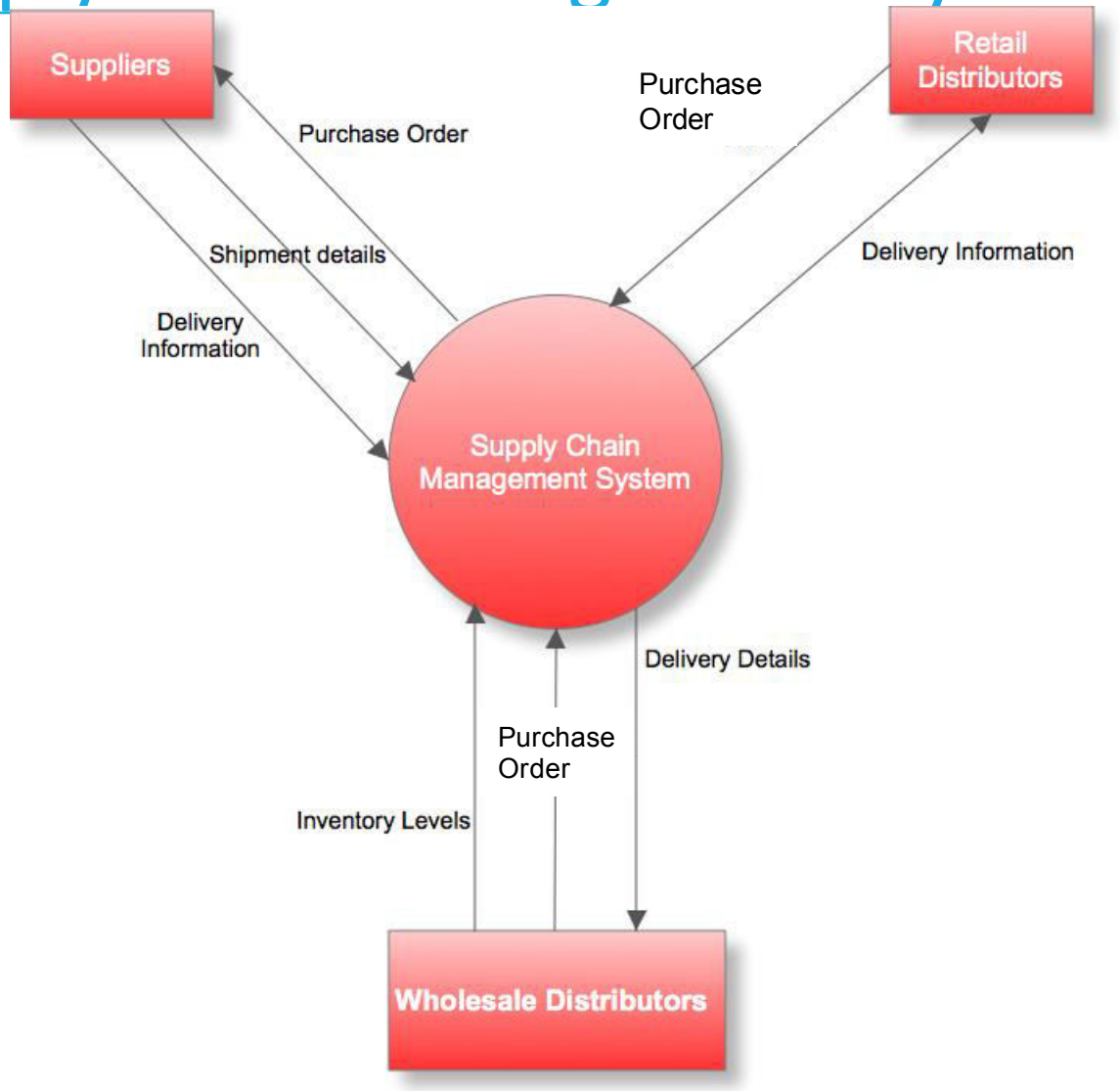
- help define and agree the **scope or boundary of the system** of interest
- provide a simple **high-level picture or birds eye view of the system** of interest.
- **Help identify the elements in the environment of the system** of interest that it interacts with. All systems operate in an environment; failure to pay attention to that environment will lead to failure.
- Identify and define the external interfaces the System of Interest logically has to have with the outside world.
  Source: http://www.burgehugheswalsh.co.uk/uploaded/documents/CD-Tool-Box-V1.0.pdf
- The interfaces between the system and the external entities are shown with labeled arrows. The context diagram **depicts the project scope at a high level of abstraction** but reveals nothing about the system functionality, architecture, or look-and-feel. Nor does it explicitly identify the features or functionality that are in or out of scope. The functional behavior of the system is merely implied by the labeled flows that connect the system to the external entities.

Context Diagram: Example
Fast food restaurant ordering system



Source: http://www.cpanel.stpaulsscience.org/gceict/specifications/aqa/unit3/devsolutions/context/intro.htm

Context Diagram: Another Example – Supply chain management system



Source: http://businessanalystlearnings.com/ba-techniques

Level 1 and 2 Diagrams

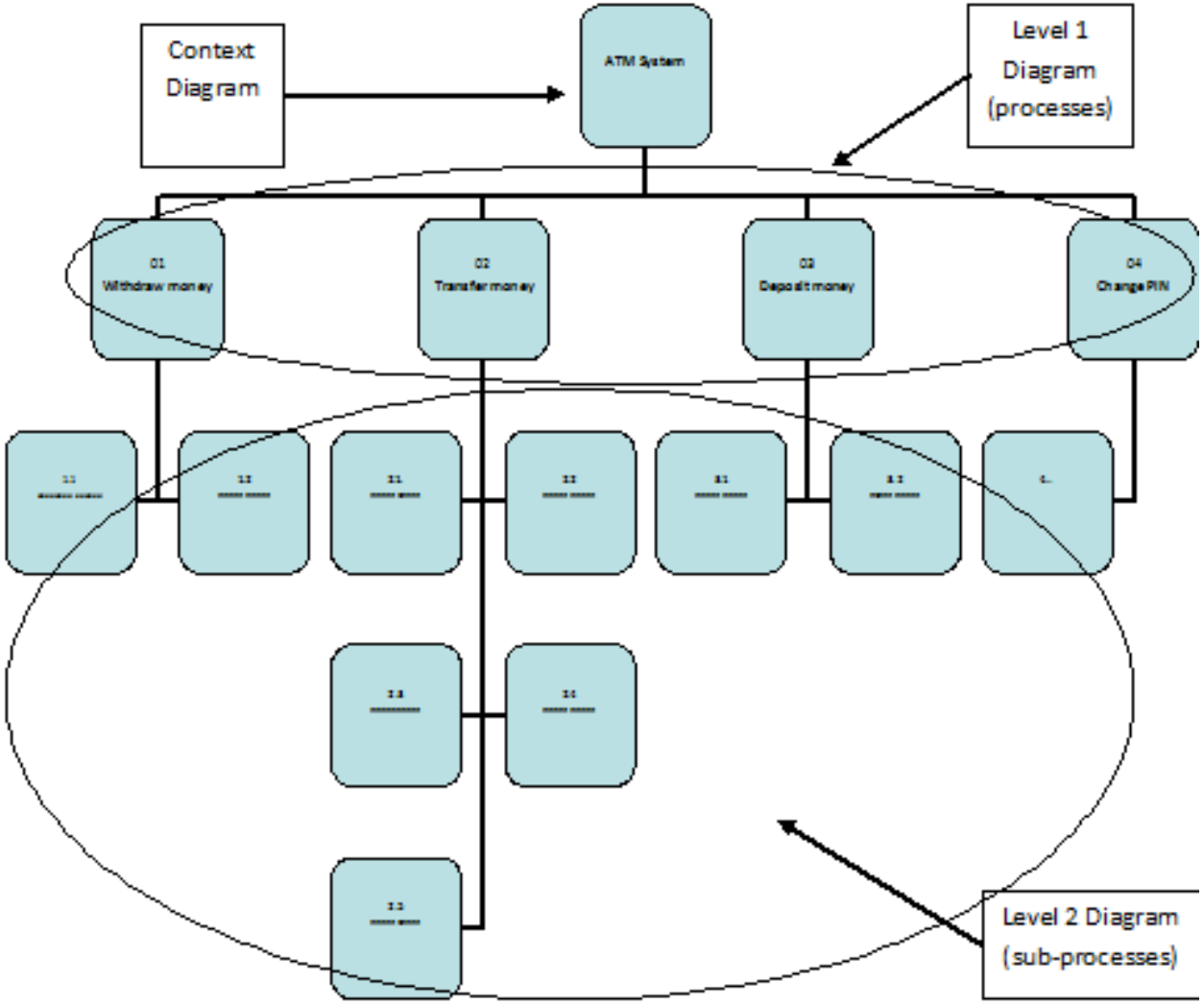
- **Level 1 Diagram:**
  - Identify all the processes (main functionalities/features/work activities) within the System.

- **Level 2 Diagram:**
  - Detail/model all sub-processes and tasks within each process identified at Level 1.
  - Identify all the tasks from the start to end required to complete each Level 1 process and draw one separate diagram for each Level 1 process.

ATM Process Model (from last week's workshop case study)

- **Context**
  - Identify all the External Entities + information that flows between the ATM System and Entities
- **Level 1:** Identify all processes within the ATM System
  - 01 Withdraw money
  - 02 Transfer money
  - 03 Deposit money
  - 04 Change PIN
- **Level 2**
  - Detail/model all sub-processes and tasks within each process identified at Level 1. Identify all the tasks from the start to end required to complete each Level 1 process and draw one separate diagram for each Level 1 process.

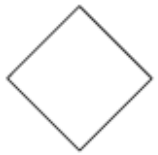
ATM Process Model
(from last week's workshop case study)



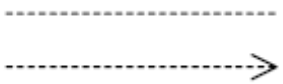
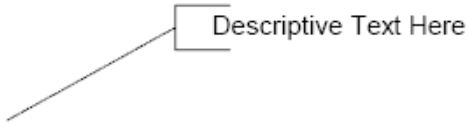
BPMN – A Process Modelling Technique

- Business Process Modelling Notation (BPMN) is the standard notation used for business process modeling.
- The primary objective of developing BPMN is to provide a **notation that is readily understandable by all** business users, from the analysts that create the initial drafts of the processes, to the technical developers responsible for implementing the technology that will perform those processes, and finally, to the business people who will manage and monitor those processes.
- BPMN defines a Business Process Diagram (BPD), which is based on a flowcharting technique tailored for creating **graphical models of business process operations.**
- A Business Process Model, is therefore, a network of graphical objects, which are activities (i.e., work) and the flow controls that define their order of performance.

BPMN – Notations

Element	Description	Notation
Event	An event is something that "happens" during the course of a business process. These events affect the flow of the process and usually have a cause (trigger) or an impact (result). Events are circles with open centers to allow internal markers to differentiate different triggers or results. There are three types of Events, based on when they affect the flow: Start, Intermediate, and End.	
Activity	An activity is a generic term for work that company performs. An activity can be atomic or non-atomic (compound). The types of activities that are a part of a Process Model are: Process, Sub-Process, and Task. Tasks and Sub-Processes are rounded rectangles. Processes are either unbounded or a contained within a Pool.	
Gateway	A Gateway is used to control the divergence and convergence of Sequence Flow. Thus, it will determine branching, forking, merging, and joining of paths. Internal Markers will indicate the type of behavior control.	
Sequence Flow	A Sequence Flow is used to show the order that activities will be performed in a Process.	
Message Flow	A Message Flow is used to show the flow of messages between two participants that are prepared to send and receive them. In BPMN, two separate Pools in the Diagram will represent the two participants (e.g., business entities or business roles).	

BPMN – Notations

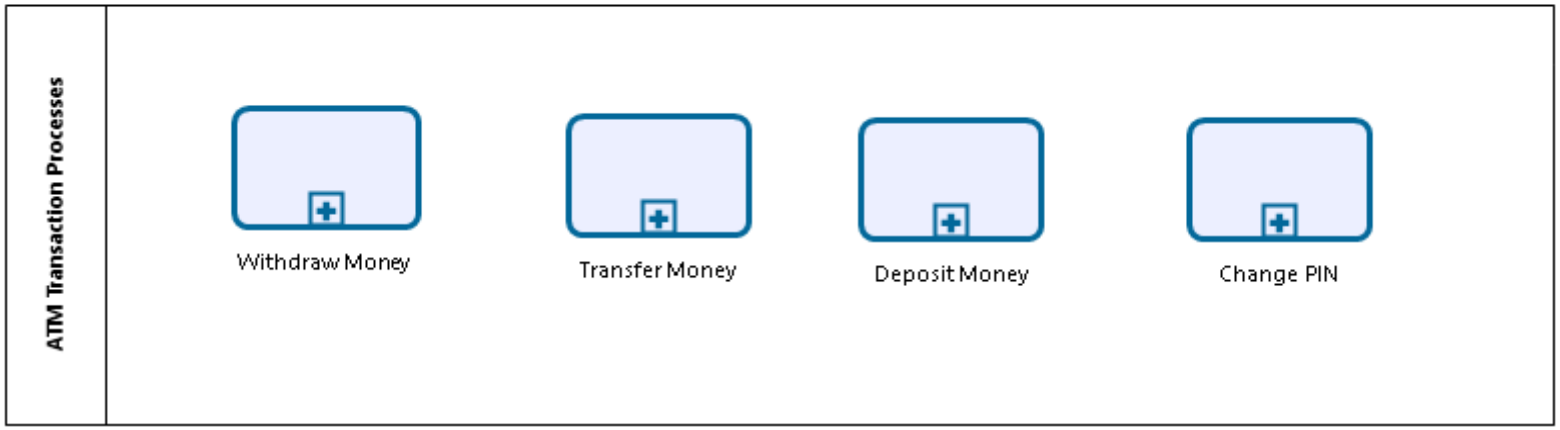
Association	An Association is used to associate information with Flow Objects. Text and graphical non-Flow Objects can be associated with the Flow Objects.	
Pool	A Pool represents a Participant in a Process. It is also acts as a "swimlane" and a graphical container for partitioning a set of activities from other Pools, usually in the context of B2B situations.	
Lane	A Lane is a sub-partition within a Pool and will extend the entire length of the Pool, either vertically or horizontally. Lanes are used to organize and categorize activities.	
Data Object	Data Objects are considered Artifacts because they do not have any direct effect on the Sequence Flow or Message Flow of the Process, but they do provide information about what activities require to be performed and/or what they produce.	
Group (a box around a group of objects for documentation purposes)	A grouping of activities that does not affect the Sequence Flow. The grouping can be used for documentation or analysis purposes. Groups can also be used to identify the activities of a distributed transaction that is shown across Pools.	
Text Annotation (attached with an Association)	Text Annotations are a mechanism for a modeler to provide additional information for the reader of a BPMN Diagram.	

Source: http://www.scribd.com/doc/75548565/Business-Process-Modeling-Template

Examples of a simple process in a BPMN diagram

Often known as a Level 1 BPD: the simplest level.

Simple Level 1 Business Process Diagram (BPD) for ATM Transaction Processes

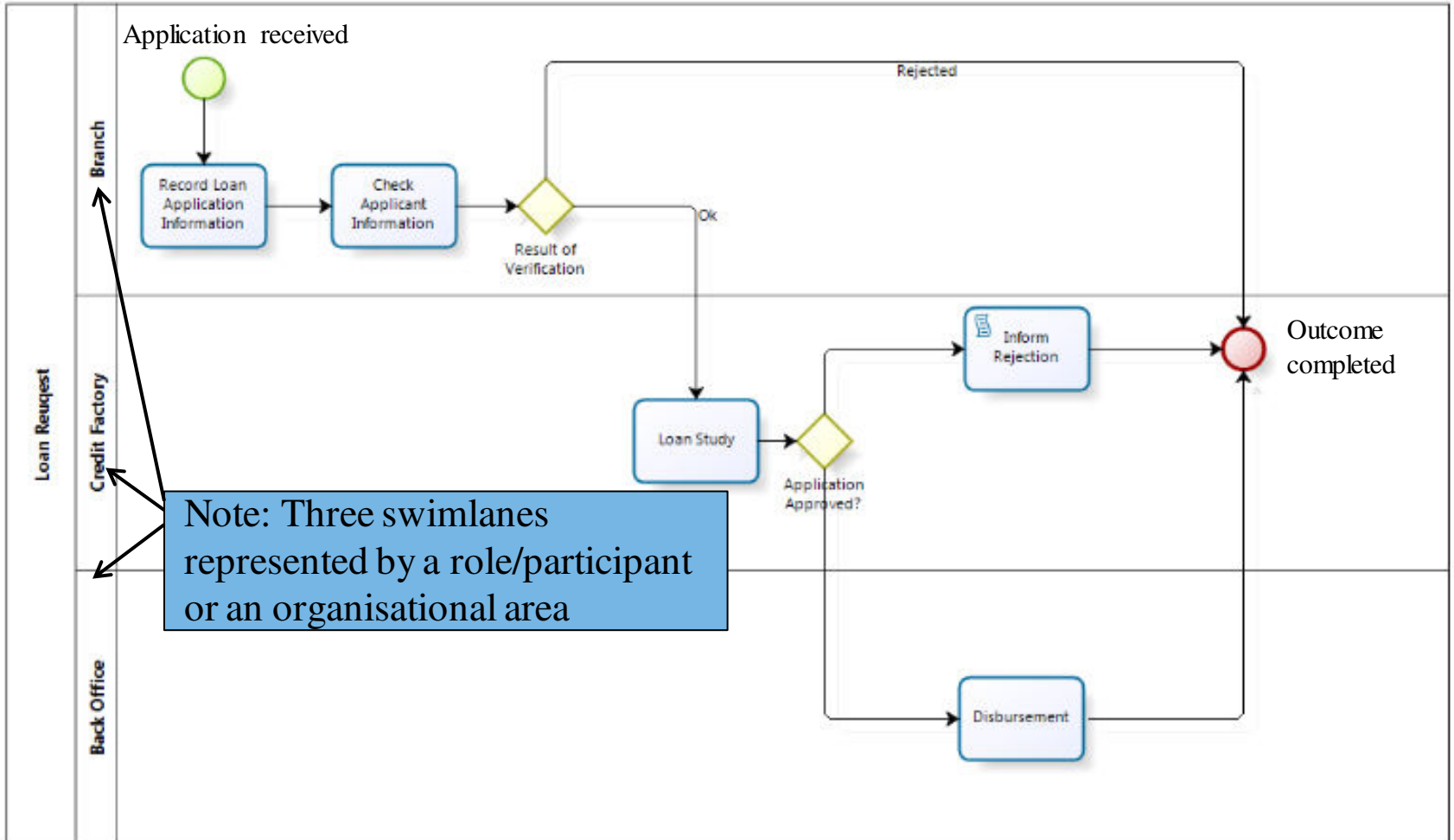


Note: The above diagram contains no Start and End events as it has independent processes and these processes will be detailed in the following Level 2 diagrams which will have the start and end events.

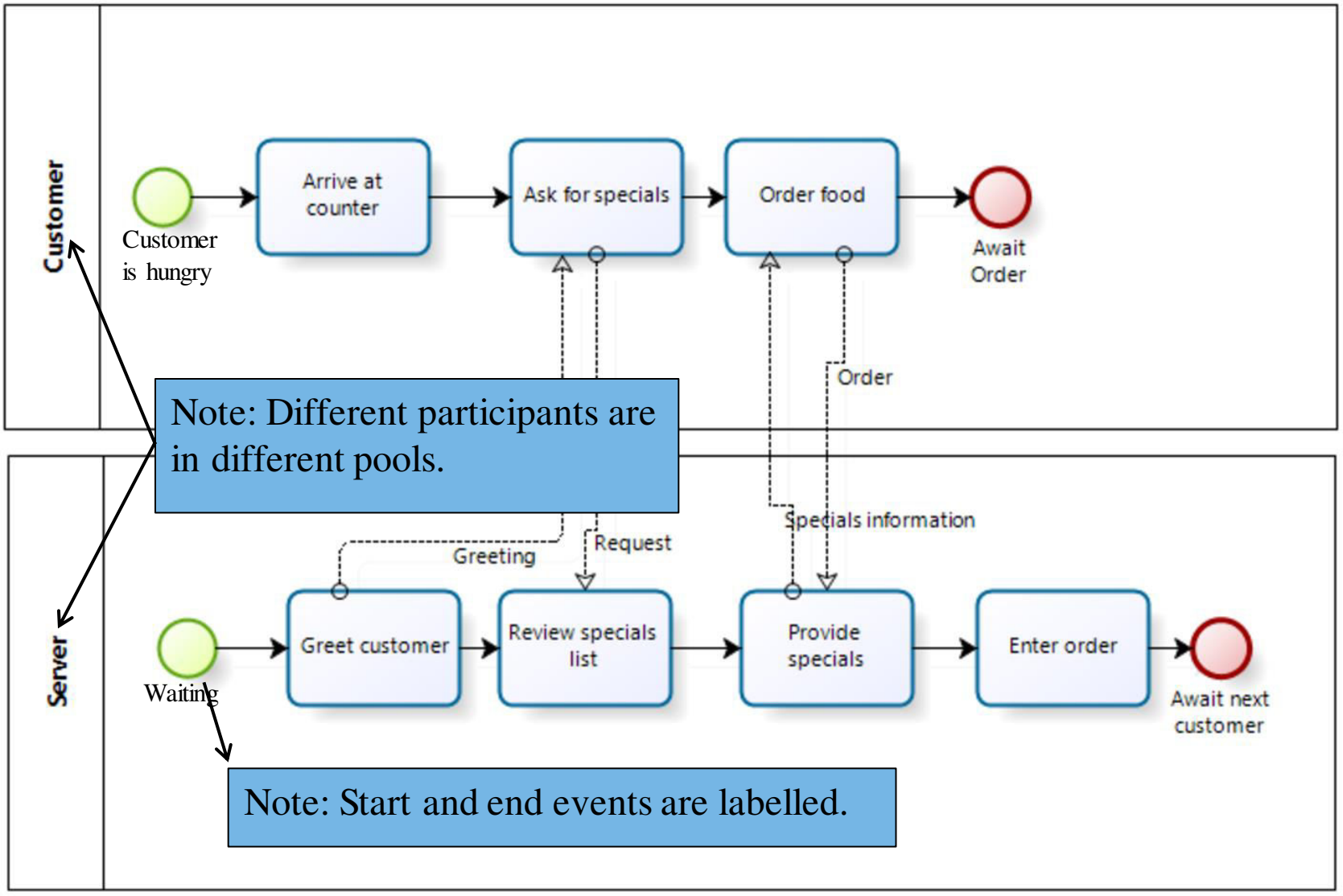
Notice that there are no Sequence/Message Flow arrows between these processes as these processes are independent. A number of Level 1 diagrams, you will see sequence flow arrows as those processed maybe be associated to each other (but not in the above example). Again you will see the sequence flow arrows when we detail/model these processes in the Level 2 diagrams.

An Example of Business Process Diagram with Lanes – *Level 2 Diagram for Loan Request Process*

A Level 2 business process diagram (based on BPMN) breaks down a process like "Apply for Loan" into its sub-processes, as seen below. Level 2 means a greater level of detail than Level 1. It can include lanes, pools, gateways and data objects.



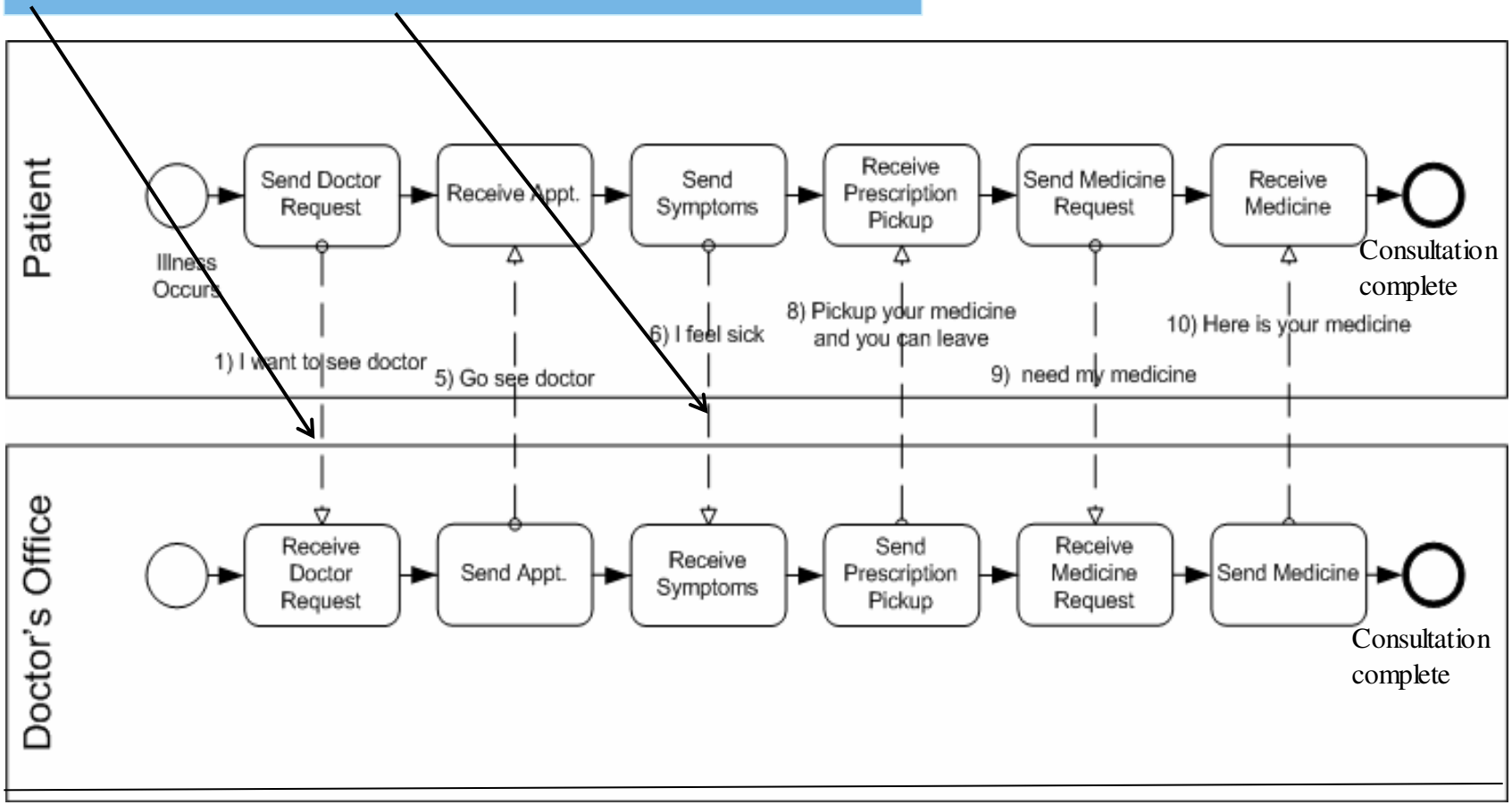
Another example of a Level 2 Business Process Diagram: *Customer ordering food.*



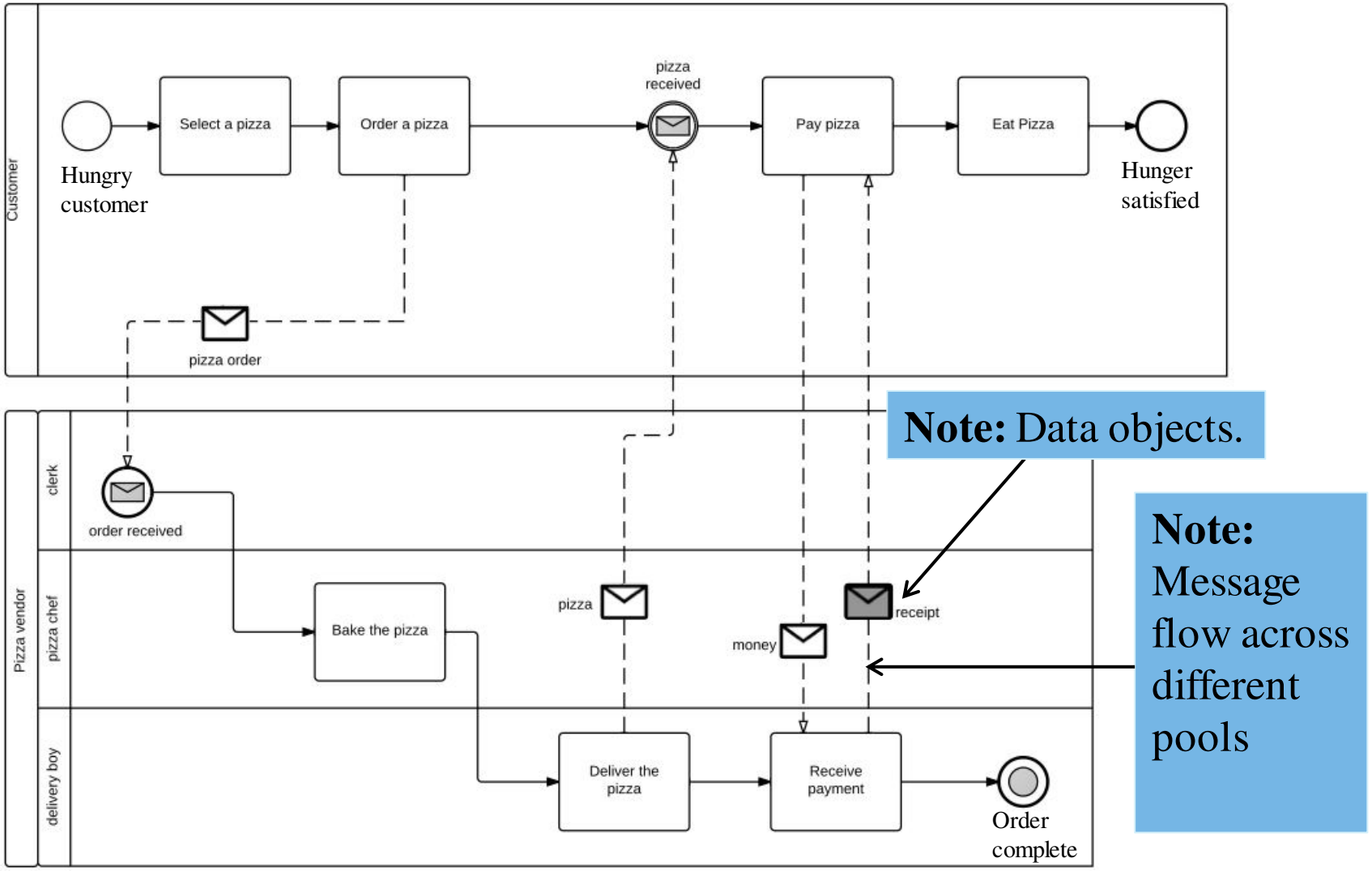
Source: http://www.bizagi.com/docs/BPMNbyExampleENG.pdf

Another Example of BPD with Pools (Level 2 diagram)

Note: Message flow across different pools



Another Example of BPD with Pools (Level 2 diagram)



Source: http://esspa.com.au/blog/the-bpmn-pizza-store-diagram-tutorial/

An Example of BPD with Lanes – Level 2 Diagram for Withdraw Money Process

- **Homework:**
- Draw a Level 2 Diagram for “Withdraw money” process using correct BPMN notations.
- Identify sub-processes and tasks within “withdraw money” process that complete the process of withdrawing the money.
- Make sure these activities/tasks are ordered in a correct sequence and flow logically from start to end.

Objectives of BPM (Why draw a BPD?)

- Understanding the current business processes
- Understanding how the work is done in an organisation
- Clarifying responsibilities
- Identify process inefficiencies
- Support continuous process improvement
- Support process management
- Support process development
- Support process execution

Outcome (Results/benefits) of a BPM

- Improved processes (hence better performance of a business and increased competitiveness)
- New processes
- Value for customer
- Reduced cost
- Increased profit and competitiveness
- Better staff morale
- Customer retention

Resources and Reading

https://online.uts.edu.au/bbcswebdav/pid-1060785-dt-content-rid-5232924_1/courses/31269M01/BPM%20-%20EGD%20%20Ver.%201.pdf

http://www.bizagi.com/docs/BPMN_Quick_Reference_Guide_ENG.pdf

http://www.bizagi.com/docs/Introduction%20to%20BPMN.pdf

Assignment 1 – now released (this week)

- Requirements Analysis Report – 12 Marks
- Case Study: Customer Onboarding for Epic Video
- The marking scheme is as follows:
  - Business Process Model (5.0 Marks)
  - Data Model (3.5 Marks)
  - Data Dictionary (2.0 Marks)
  - Overall Quality of Report Presentation (1.0 Mark)
  - Contribution to Team Work (0.5 Mark)

Conclusion

- This Week's Workshops
  - **Quiz 2 - Requirements Elicitation (3 marks)**
  - Workshop Tasks – Process Modelling

- Next Week's Lecture
  - Data Modelling
- Next Week's Workshops
  - **Quiz 3 - Process Modelling (3 marks)**
  - Workshop Tasks – Data Modelling