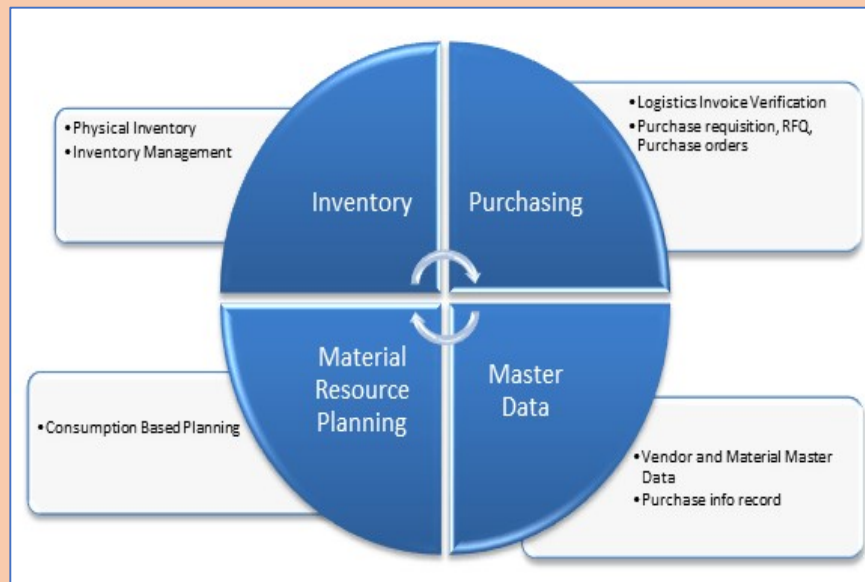# FIT5101   Enterprise Systems

Lecture 04

❖ **Materials Management (Store)**
❖ **Inventory**
❖ **Procurement (Buy)**

Lecturer: Stephen Paull
stephen.paull@monash.edu

Unit Topics (Subject to change)

| Week	Date (W/C)	Lecture	Tutorial		Assessment
1	1/3	Introduction	Introduction		
2	8/3	Business Functions & Processes	Business Functions		
3	15/3	ERP Structures	SAP Introduction		Ass 1 Rel
4	22/3	Materials Management & Procurement	Materials Management	**S A P**	
5	29/3	Sales & Distribution	Procurement		
	5/4	BREAK		**W O R K S H O P S**	
6	12/4	Production Planning	Sales & Distribution		
7	19/4	Financials	Production Planning		Ass 1 Due
8	26/4	Process Integration & Modelling	Financials		Ass 2 Rel
9	3/5	ERP Implementation	Process Modelling		
10	10/5	Current Technologies	Work on Assignment		
11	17/5	Future Trends	Sample eExam / Review		Ass 2 Due
12	24/5	Review	??		

Organisational Units used in Materials Management

Client –
  Highest element.

Company Code –
  Needed for the
  balance sheet
  Financial accounting.

Plant –
  Central org. unit
  where a product is
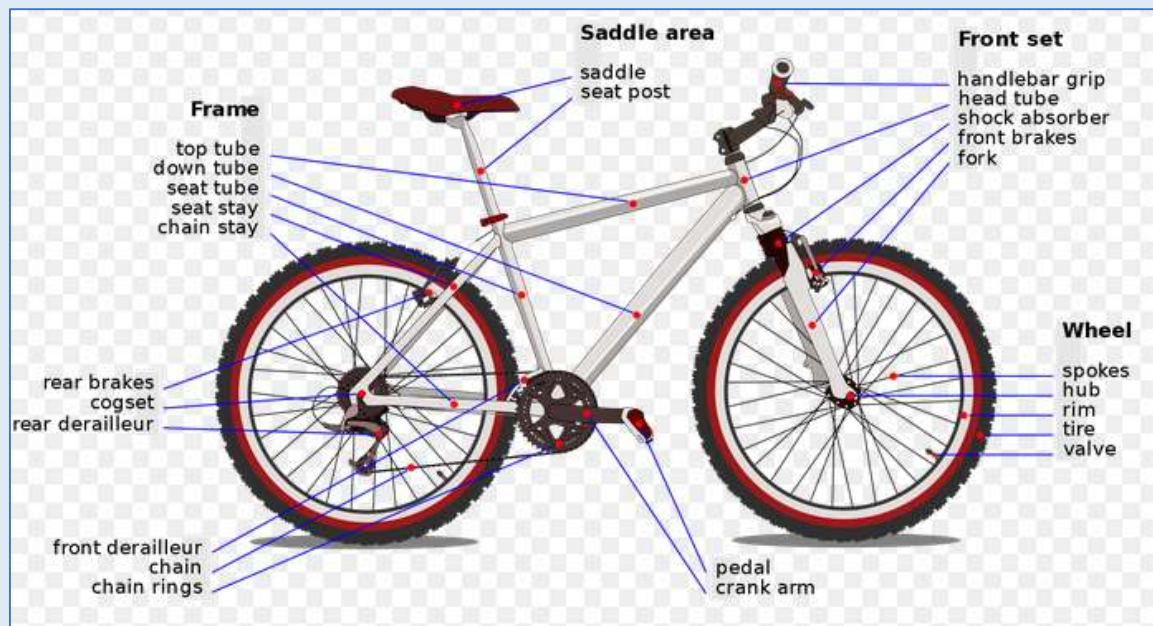 manufactured or
  distributed.

Storage Location –
  Stock is located in different
  parts of the plant – general
  area in the plant where
  materials are stored.
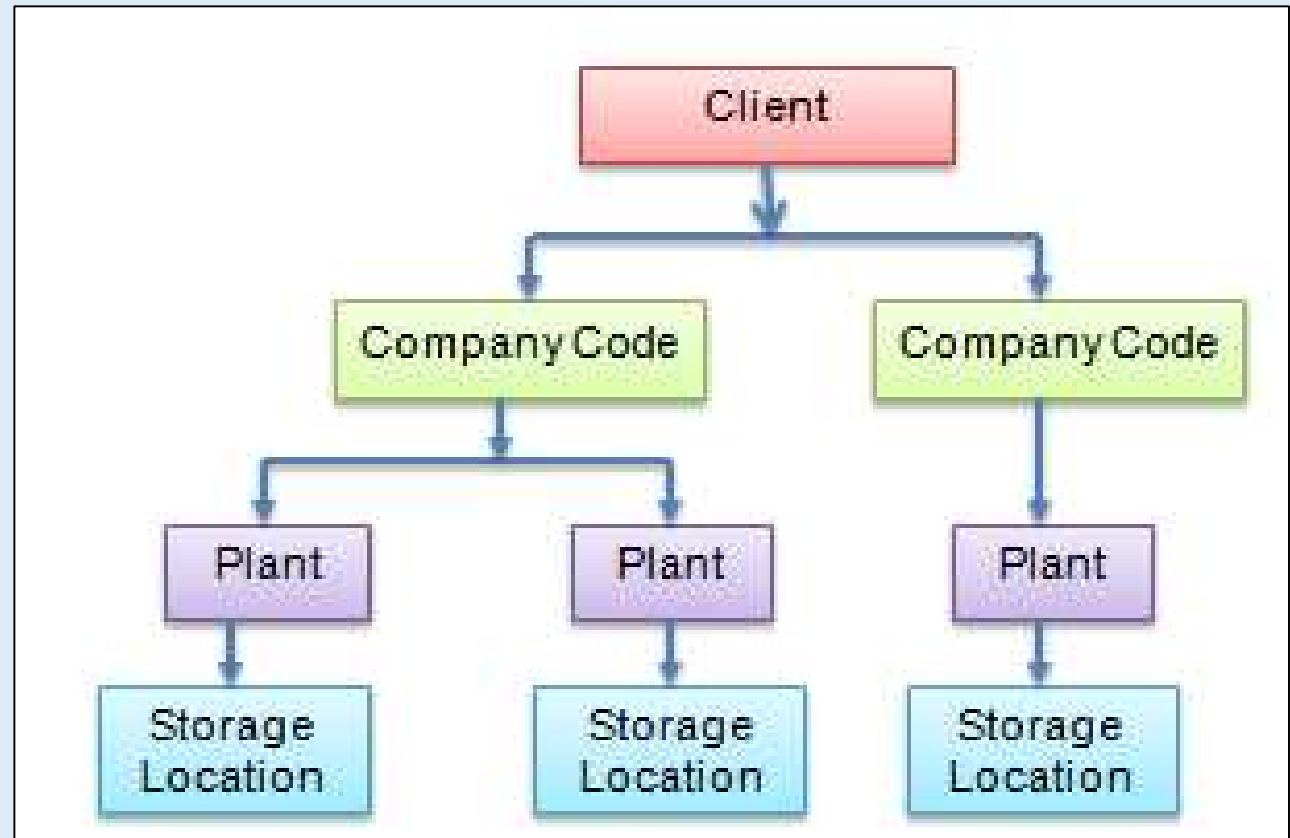
Materials Management Master Data

Master data used in Materials Management and Production Planning includes:

- Material Master
- Bill of Material (BOM)
- Work Centre
- Routings
- Cost Centers
- Vendors

Material Master Example : Mongoose Mountain Bike

Material Master is the most important central data object in a manufacturing system. It is used to store information on :

- Raw materials
- Semi-finished products
- Finished products
- Tools spare parts etc.

You will be creating a material master for the Mongoose Mountain Bike

Material List

Item Code	Material Description	Material Type
ORWA1###	Wheel Assembly	Semi-Finished Product
OFFR1###	Frame	Semi-Finished Product
DGAM1###	Gear Assembly	Semi Finished Product
ORTR1###	Tire	Raw Material
ORTB1###	Tube	Raw Material
ORWH1###	Aluminium Wheel	Raw Material
HXNT1###	Hex Nut	Raw Material
LWSH1###	Lock Washer	Raw Material
BOLT1###	Socket Head Bolt	Raw Material

Material Master - Material Types

Materials purchased from external suppliers – metal, bolts, etc
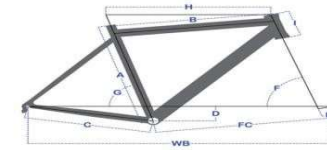
1. Raw materials

Components assembled from raw materials – electric motor

2. Operating supplies

3. Semi-finished products

Examples of material types

1. raw materials
2. operating supplies
3. semi-finished products
4. finished products

4. Finished products

The finished product that is sold to the customer

Material Master : Views

Basic Data	Purchasing
MRP	Sales
Stocks in plant/ storage location	Work scheduling
Accounting	Quality management
Storage	Forecasting
Warehouse management	Classification

Each user department has its own view of a material master record. For example, data that relates to the accounting department is stored in the accounting view and data that relates to material planning is stored in the MRP view.

Material Master : Views

Different Views

Material Master

Data held in the material master includes:

- Material code $\quad$ AABC45000
- Description $\quad$ Bicycle Frame
- Units of measure $\quad$ Kg
- Material group $\quad$ Bike
- Weight etc. $\quad$ 22 Kg
- Standard price $\quad$ $980
- Lot size $\quad$ 100

Master Data : BOM

- The Bill of Material is a *structured* list of the components which make up the product or assembly.

- The list contains the *material code* of each component as well as the *quantity per* and *unit of measure*.

BOM (also referred to as a Kit)

- BOM contains the assemblies or components/sub assemblies that are included in the production of a product (material)

- BOMs are used in MRP*, production, and procurement and for product costing

- May include documents to aid in developing the finished product

   *Note: MRP (Material Requirements Planning) is covered in more detail in Week 6

Exploded BOM

Mongoose Mountain Bike
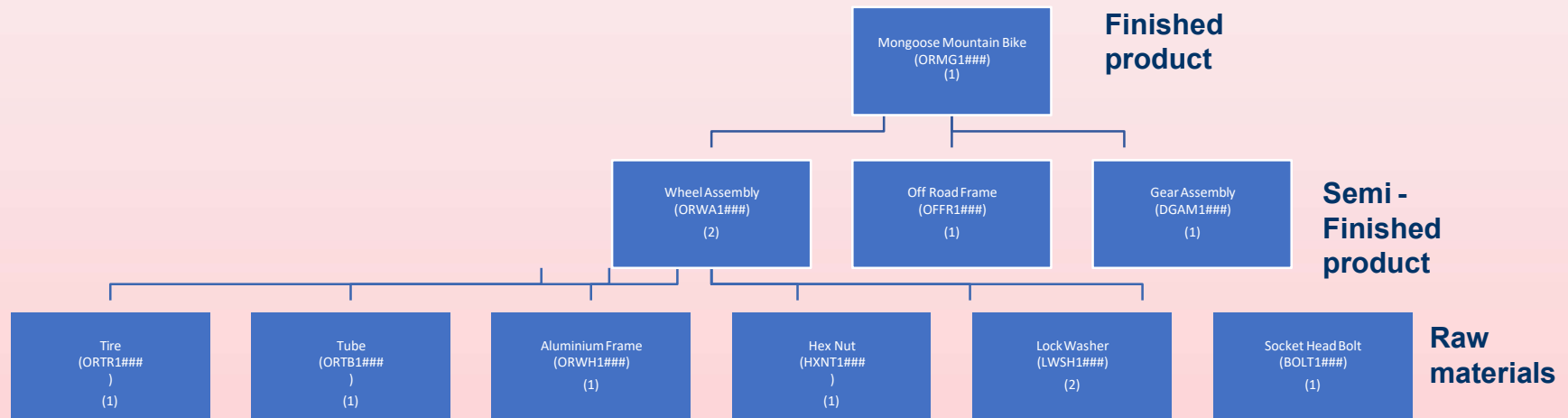
A bill of materials **explosion** displays an assembly at the highest level broken down into its individual components and parts at the lowest level.

Master Data : Work Centres

- A work centre is where an operation or activity is carried out within a production plant.

    - Eg: lathe, testing station, drilling machine

- The work centre may be a single machine, a group of machines, or an area where a particular type of work is done.

- Work centres can be structured hierarchically.

- Work centre data may include :
    W/c name and description
    Department
    Capacity
    No. of operators
    Availability

Work Centre data is used in scheduling, capacity planning and product costing.
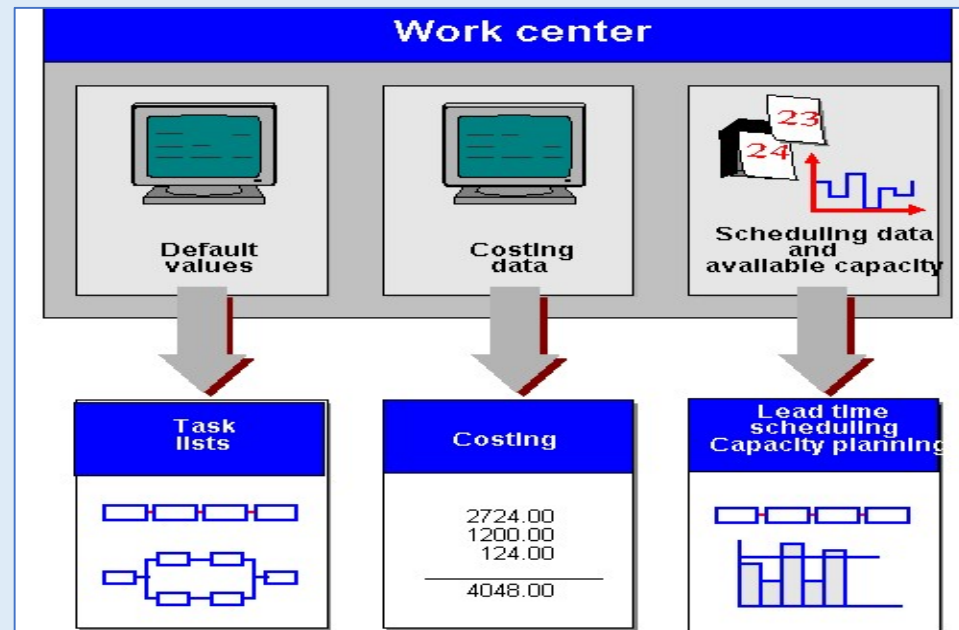
Routings with Work Centres

A routing contains the steps necessary to convert raw materials into components during production.

This includes the operations, their sequence and the work centres that will do the work.
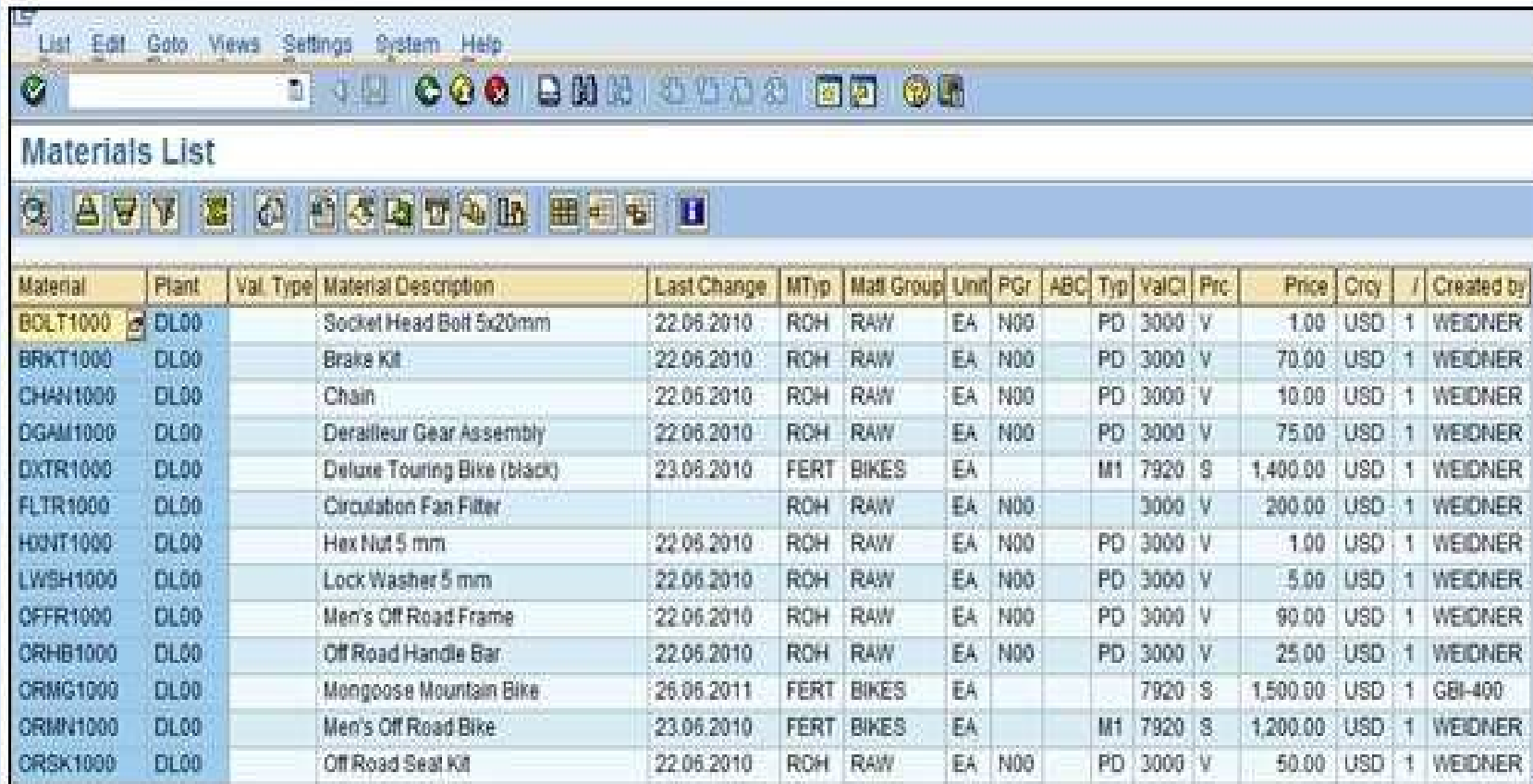
Operation	Work Center	Control	Description
0010	WC1-###	PP01	Assemble Raw Materials
0020	WC2-###	PP01	Final Assembly
0030	WC3-###	PP01	Paint
0040	WC4-###	PP01	Final Test

SAP — Display Routing: Operation Overview

Previous header   Next header   Select all   Deselect all   Check   Long text   Work center   Allocation   Sequences   PRT   XSteps   Inspection Characteristics   More ∨   Exit

Material ORMG1000   Mongoose Mountain BGrp.Count1

Sequence: 0

Operation Overview

Op...	SOp	Work ce...	Plant	Co...	Standar...	Description	Lo...	PRT	Cl...	O...	P...	C...	S...	Base Quantity	U...	Setup	Unit	Activit...	Machine	Unit	Activit...	Labor
0010		WC1-000	DL00	PP01		Assemble Raw Materials								1	EA	0.000		LABOR	0.000			0.000
0020		WC2-000	DL00	PP01		Final Assembly								1	EA	0.000			0.000			0.000
0030		WC3-000	DL00	PP01		Paint								1	EA	0.000			0.000			0.000
0040		WC4-000	DL00	PP01		Final Test								1	EA	0.000			0.000			0.000

Report: Materials list

Material	Plant	Val. Type	Material Description	Last Change	MTyp	Matl Group	Unit	PGr	ABC	Typ	ValCl	Prc	Price	Crcy	/	Created by
BOLT1000	DL00		Socket Head Bolt 5x20mm	22.06.2010	ROH	RAW	EA	N00		PD	3000	V	1.00	USD	1	WEIDNER
BRKT1000	DL00		Brake Kit	22.06.2010	ROH	RAW	EA	N00		PD	3000	V	70.00	USD	1	WEIDNER
CHAN1000	DL00		Chain	22.06.2010	ROH	RAW	EA	N00		PD	3000	V	10.00	USD	1	WEIDNER
DGAM1000	DL00		Derailleur Gear Assembly	22.06.2010	ROH	RAW	EA	N00		PD	3000	V	75.00	USD	1	WEIDNER
DXTR1000	DL00		Deluxe Touring Bike (black)	23.06.2010	FERT	BIKES	EA			M1	7920	S	1,400.00	USD	1	WEIDNER
FLTR1000	DL00		Circulation Fan Filter		ROH	RAW	EA	N00			3000	V	200.00	USD	1	WEIDNER
HXNT1000	DL00		Hex Nut 5 mm	22.06.2010	ROH	RAW	EA	N00		PD	3000	V	1.00	USD	1	WEIDNER
LWSH1000	DL00		Lock Washer 5 mm	22.06.2010	ROH	RAW	EA	N00		PD	3000	V	5.00	USD	1	WEIDNER
OFFR1000	DL00		Men's Off Road Frame	22.06.2010	ROH	RAW	EA	N00		PD	3000	V	90.00	USD	1	WEIDNER
ORHB1000	DL00		Off Road Handle Bar	22.06.2010	ROH	RAW	EA	N00		PD	3000	V	25.00	USD	1	WEIDNER
ORMG1000	DL00		Mongoose Mountain Bike	26.06.2011	FERT	BIKES	EA				7920	S	1,500.00	USD	1	GBI-400
ORMN1000	DL00		Men's Off Road Bike	23.06.2010	FERT	BIKES	EA			M1	7920	S	1,200.00	USD	1	WEIDNER
ORSK1000	DL00		Off Road Seat Kit	22.06.2010	ROH	RAW	EA	N00		PD	3000	V	50.00	USD	1	WEIDNER

The above materials list is a report of all the materials that make up the bicycle, their costs, material number and who created the material.

Master Data : Cost Centres
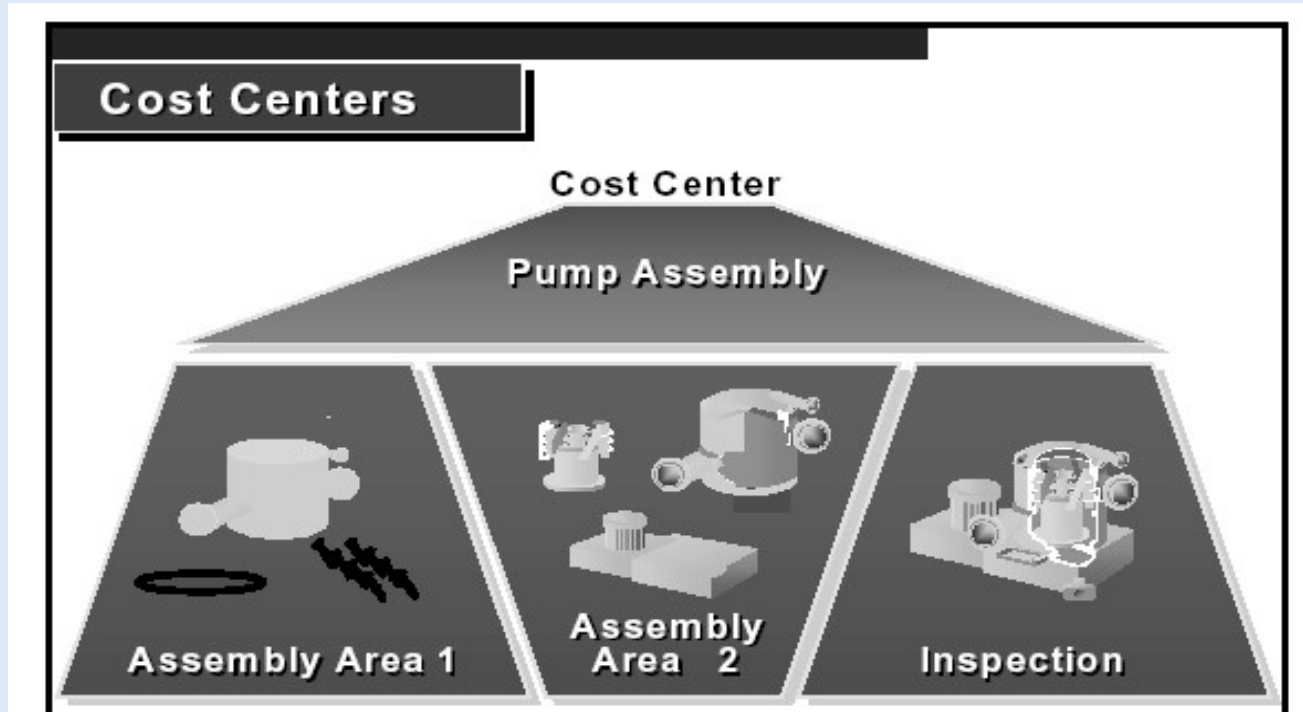
Work Centres linked to a Cost Centre

- Cost Centres are used to collect the actual costs from one or more Work Centres.
- A Cost Centre may be a department.

- Benefits: set budgets, financial visibility, planning, product costing

Definition of Inventory

Inventory is the stock of any item or resource used in an organization.
Can be ordered from suppliers or produced in house.

An *inventory system* is a set of controls that monitors levels of inventory and determines :
- What levels should be maintained
- When stock should be replenished
- How large orders should be

Inventory is typically classified into :
- Raw materials
- Finished products
- Component parts (sub assemblies)
- Supplies (nails, gloves etc.)
- Work in Process (WIP)

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Typical Inventory System

INPUTS AND OUTPUTS OF A TYPICAL INVENTORY SYSTEM

MRP SYSTEM

STOCKTAKE REPORT

Purchase orders delivered from suppliers

Stock issues based on FIFO , LIFO (batch numbers)

Stock transfers from other warehouses

INVENTORY SYSTEM

Stock use reports (MIS)

Inventory valuation systems: FIFO, LIFO (batch numbers)

Supplier performance reports (MIS)

Inventory costings sent to Accounts for updating the General Ledger

Inventory catalogues

Catalogues include full descriptions of inventory items: This is useful to production and design engineers in a large manufacturing company

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Inventory Transactions

Goods Receipt

A **goods receipt** is the physical inbound movement of **goods** or materials into the warehouse. It is a **goods** movement that is used to post **goods received** from external vendors or from in-plant production. All **goods receipts** result in an <u>increase of stock</u> in the warehouse.

Goods Issue

A **goods issue** is defined as a physical outbound movement of **goods** or materials from the warehouse or it is the **issue** of physical **goods** or materials from the warehouse. It results in a <u>decrease in stock</u> from the warehouse.

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Inventory Transactions

Inventory Transfer

This function is used to **move inventory** from one warehouse to another.

Inventory Count

Inventory counting is crucial to any company that manages an **inventory**. By matching the actual **inventory** to the quantities saved in the database, companies can adjust existing **inventory** records, detect unusual or unacceptable discrepancies, and improve **inventory** management.
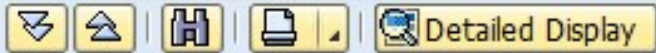
Inventory Transactions

Stock Overview

Shows the current stock quantities at company, plant and location levels.
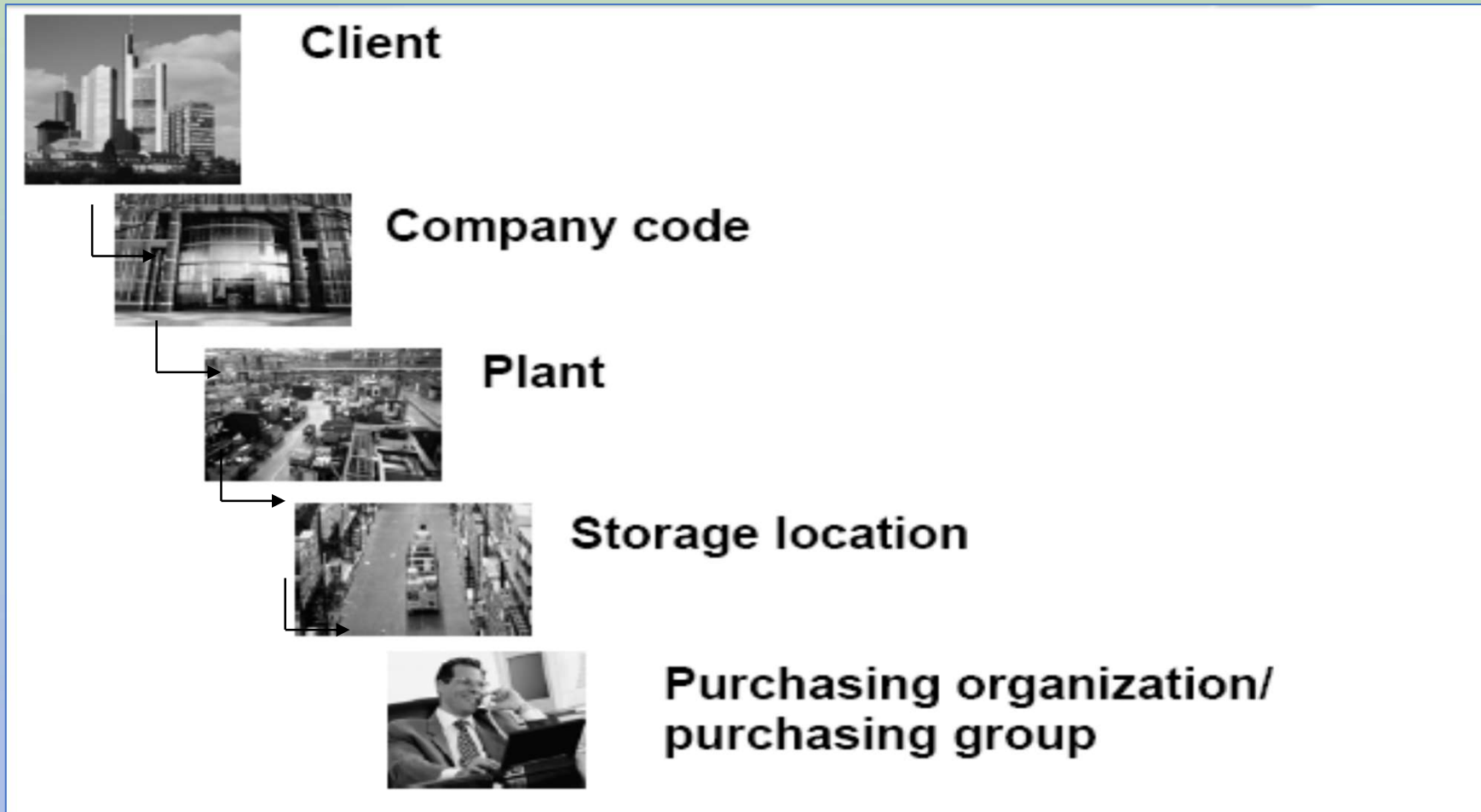
Procurement

The procurement process includes all of the tasks involved in *acquiring needed materials externally* from a vendor. Procurement is comprised of five steps that are completed in three different functional areas of the organization.

The Procure-to-Pay (P2P) process:
https://youtu.be/GXfPgk6EQOE

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Organisational Levels in Procurement

Client

Company code

Plant

Storage location

Purchasing organization/
purchasing group

Organisational Levels in Procurement

Client

A self contained unit in a SAP system with separate master records – Highest organisational element. Eg IBM.

Company Code

Represents an independent accounting unit. e.g. IBM company in Melbourne.

Plant

In Procurement, Plant is the central organisational element. A plant can manufacture, distribute or provide a service for a product.

Organisational Levels in Procurement

Storage Location

In Inventory Management, material stocks can be differentiated according to their Storage Location within the plant where the item is stored.

Purchasing Organisation/Group

A purchasing organization is the unit that performs activities related to purchasing for one or more plants. It evaluates and identifies vendors, and negotiates contracts, pricing, and other terms. A purchasing group is a buyer or group of buyers responsible for certain purchasing activities.

Procurement Master Data - Material Master

The Material Master record is the main material data source in an enterprise.

Material data is integrated into one single database object:
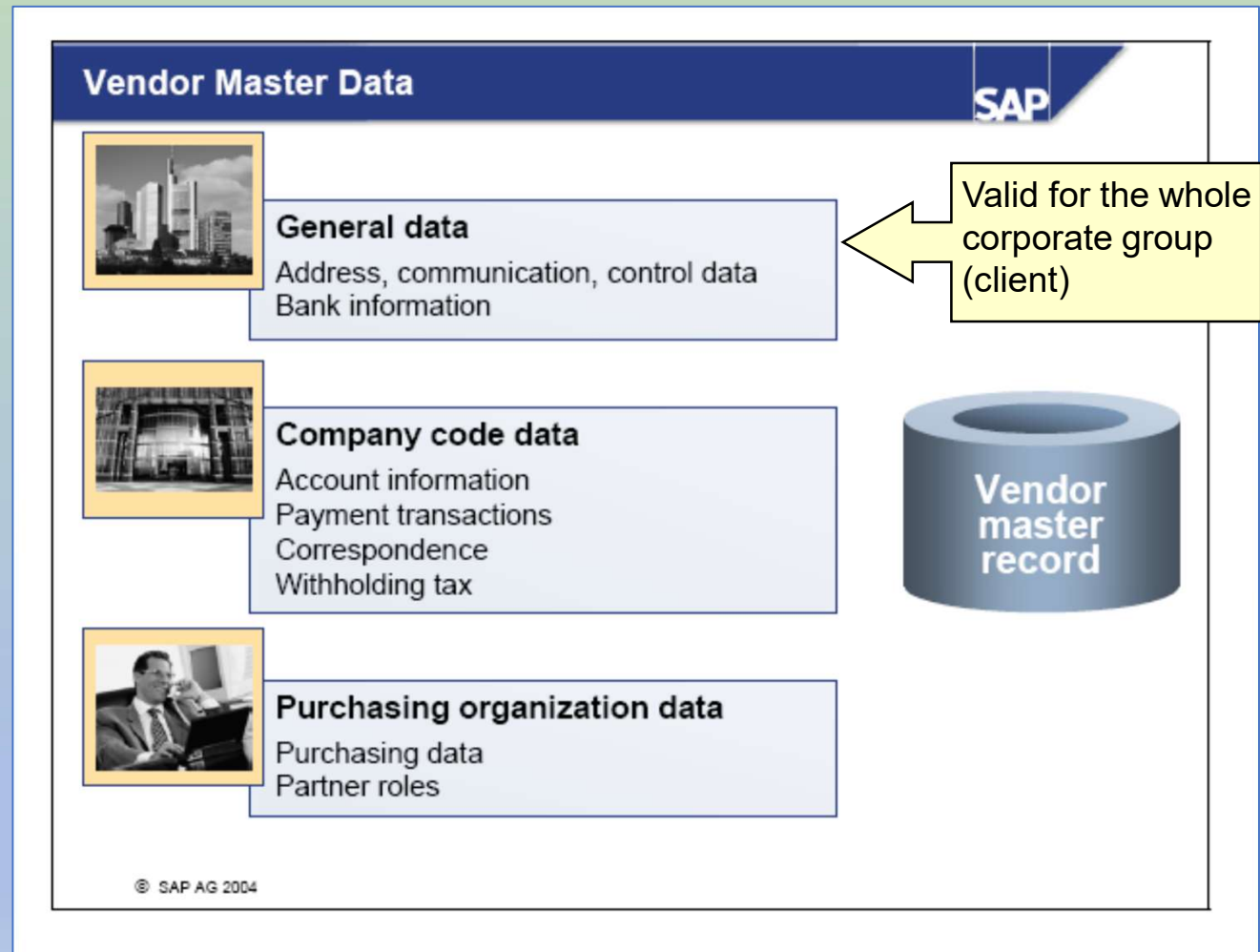
Designed to reduce data redundancy

Material Master Data
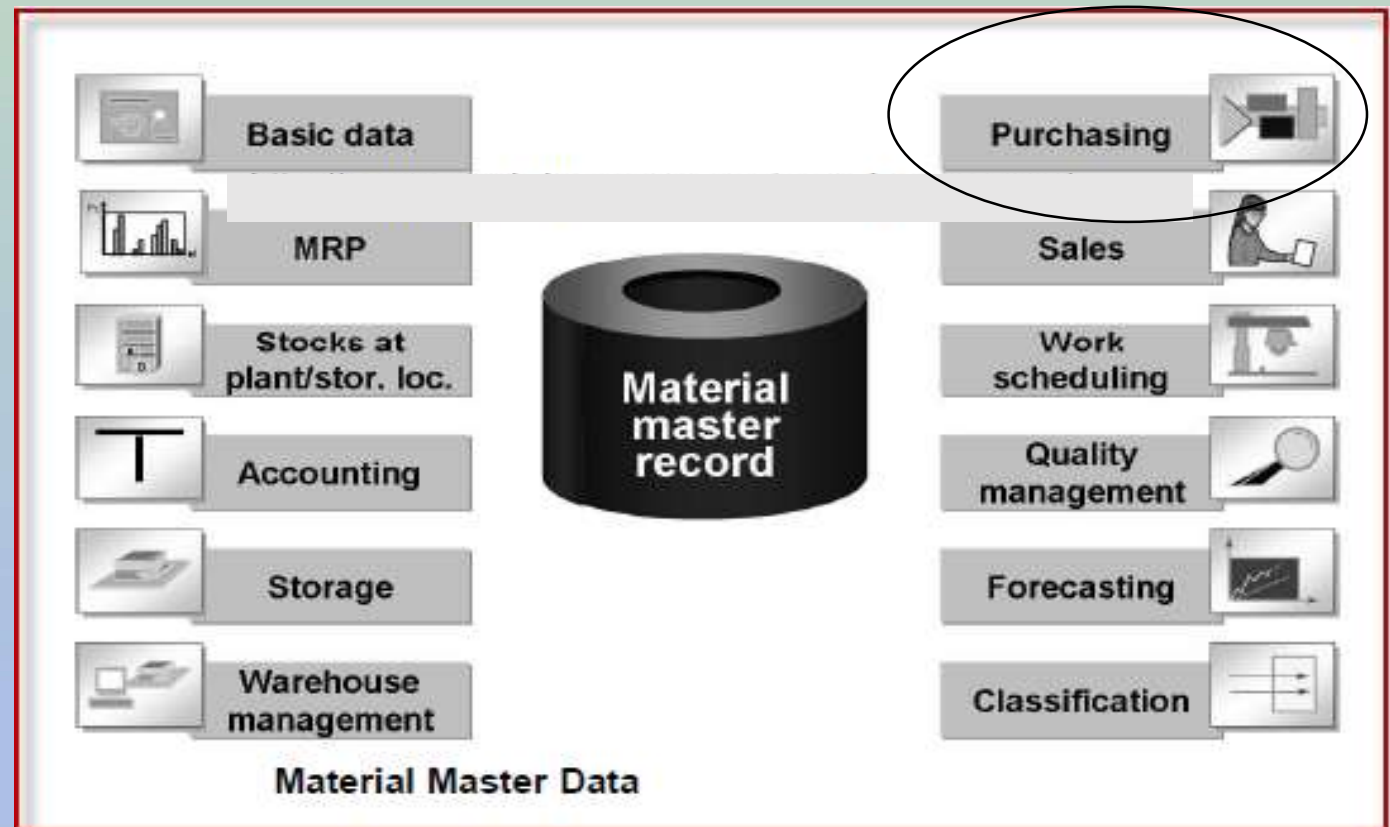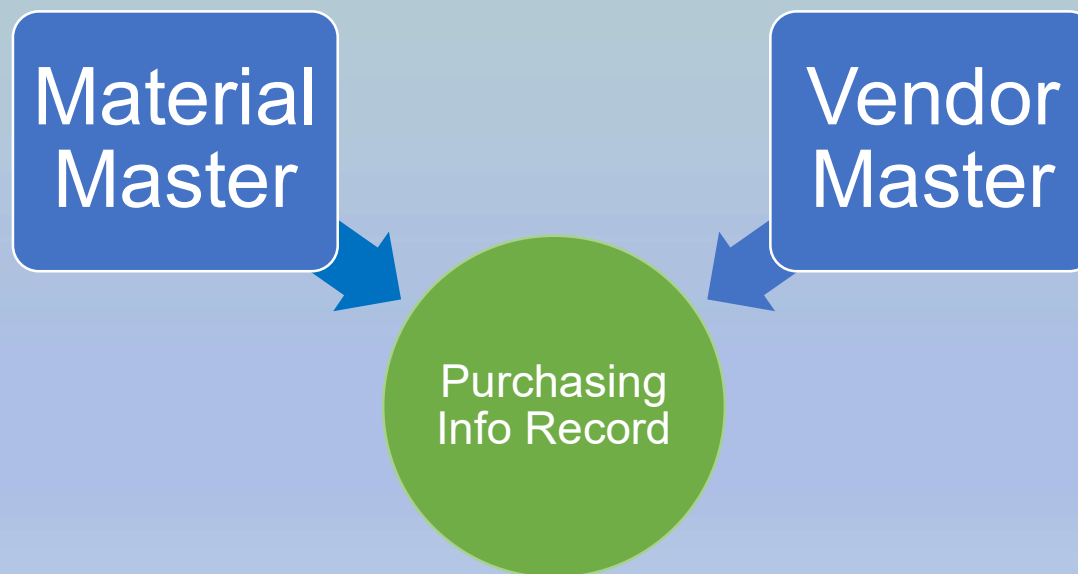
Procurement Master Data - Vendor Master

In Accounting, the vendor is regarded as the *company's crediting business partner.*

The vendor master record is maintained by *Accounting and Purchasing*.

Vendor Master Data

SAP

General data
Address, communication, control data
Bank information

Valid for the whole corporate group (client)

Company code data
Account information
Payment transactions
Correspondence
Withholding tax

Vendor master record

Purchasing organization data
Purchasing data
Partner roles

© SAP AG 2004

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Procurement Master Data – Purchasing Info

A **purchasing info record** is an intersection or a combination of material and vendor data, It contains data specific to *one* vendor and *one* material or material group. Companies use pricing conditions to determine the cost of purchasing the material from that vendor.

Material Master

Vendor Master

Purchasing Info Record

Procurement Master Data - Conditions

Conditions are used to determine the appropriate prices, discounts, taxes, and freight for the materials. Unlike the conditions in the purchasing info records, however, these conditions are not defined for a specific combination of vendor and material, but are based on the overall agreements and contracts in place with vendors. The company uses these conditions to determine pricing when it creates purchase orders.

Key	Description	Control
PB00	Gross price	Condition class: Prices Calculation type: Quantity-dependent Condition cat.: Base price Access sequence: Gross price
FRB1	Freight, absolute	Condition class: Discount/surcharge Calculation type: Fixed amount Condition cat.: Delivery costs
SKTO	Cash discount	Condition class: Discount/surcharge Calculation type: Percentage Condition cat.: Cash discount

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The External Procurement Cycle

Process of purchasing materials from Vendors (suppliers)

Procure to Pay

- **Procurement**
- 1. DETERMINATION OF REQUIREMENTS
- 2. SOURCE DETERMINATION
- 3. VENDOR SELECTION
- 4. PO PROCESSING
- 5. ORDER MONITORING
- 6. GOODS RECEIPT
- 8. INVOICE VERIFICATION
- 9. PAYMENT
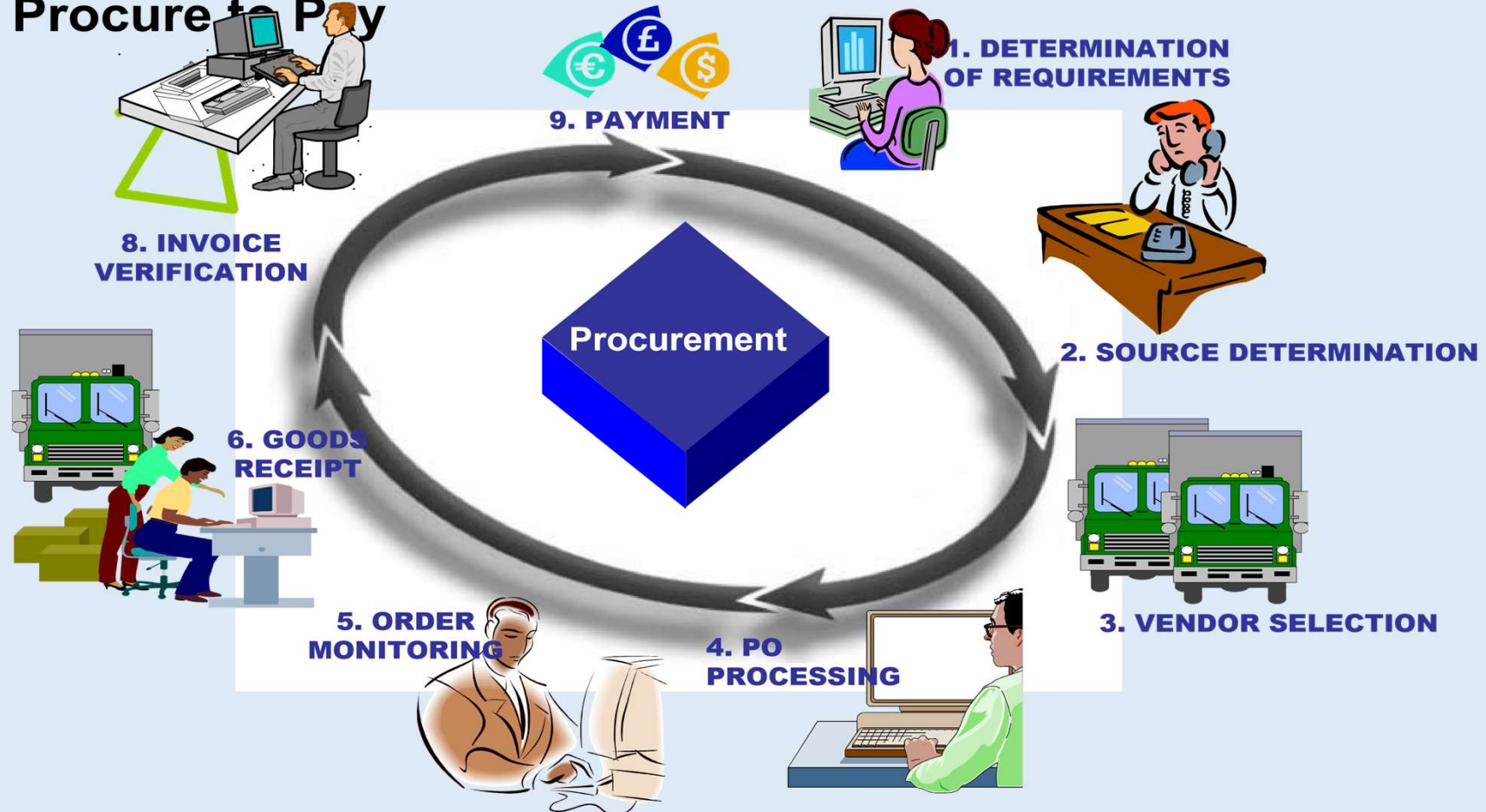
Tasks in the Procurement Cycle

- Internal Purchase Requisition is created by an internal department or by the MRP.

- PR is converted into a Purchase Order by purchasing dept.

- PO is sent to the vendor from the customer (this could be a request for a quote if it is a new vendor).

- Vendor sends stock to customer with Delivery Docket.

- Customer creates a Goods Receipt from PO.
  Verify physical receipt of goods matched against PO.

- Customer receives Invoice from the vendor.
  Invoice details are entered into customer's system and materials and costs are confirmed.

- Customer then posts their Payment to the vendor.
  Vendor is referred to as Accounts Payable

- Payment is received by the vendor from the customer.
  Customer is referred to as Accounts Receivable.
  Vendor processes the payment.

Purchase requisition
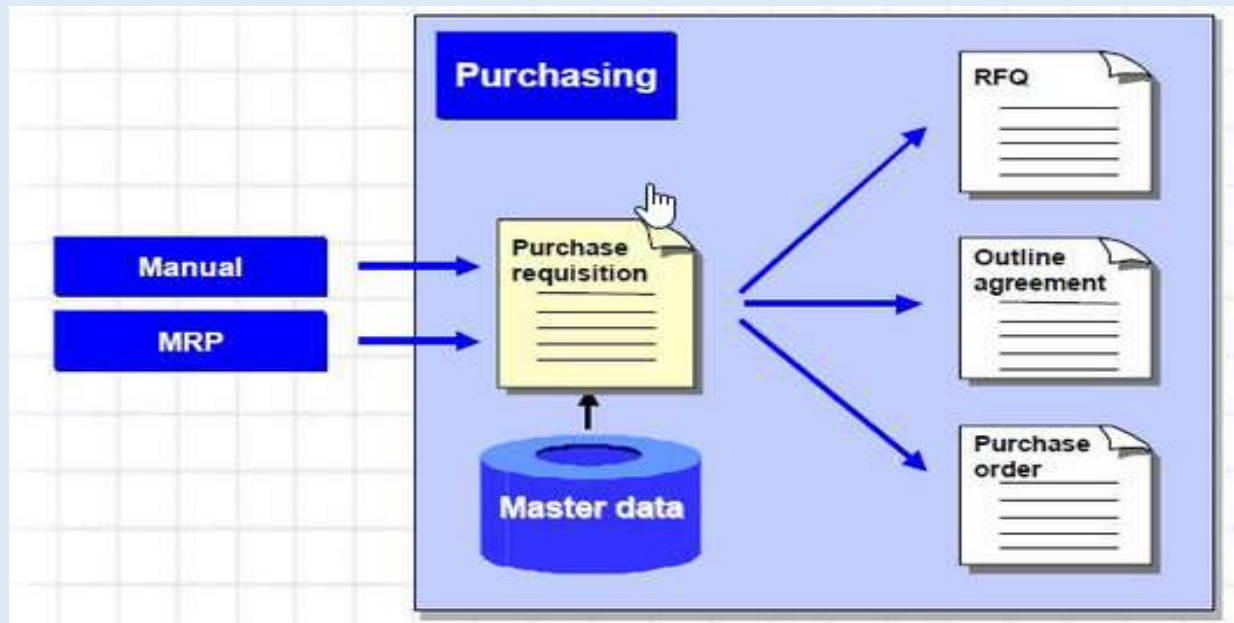
- A purchase requisition is an internal request that is made to the purchasing organization to procure a certain list of materials.
- It may be generated manually or as a result of demand from MRP.
- It may result in a *Request for Quotation, Outline Agreement* or *Purchase Order*

Purchase requisition

Purchase Order

A purchase order is a formal request to a vendor to supply certain goods or services. It is a legally binding document between the supplier and the buyer. It details the items the buyer agrees to purchase at a certain price and also outlines the delivery date and terms of payment for the buyer.

Example of a purchase order in SAP converted from a PR

What do these numbers represent in the SAP system?

A Printable version of a PO Document within the system

```
Mr. Stephen Paull                          Purchase order
101 Ballarat Rd.
MELBOURNE 3000                             PO number/date
AUSTRALIA                                  4500015346 / 06.01.2005
                                           Contact person/Telephone
                                           IDES USA/040/1002


Your vendor number with us
101




Please deliver to:
New York
New York
691 Broadway
NEW YORK NY  10001

Terms of delivery: CIF Sydney
Terms of payment: Payable immediately Due net          Currency AUD

Item    Material            Description
   Order qty.            Unit            Price per unit          Net value


00010 M4E-000                   Pinion, 33mm
                100 Each                 190.00               19,000.00
                                                                  0.00
*** Item completely delivered ***
```

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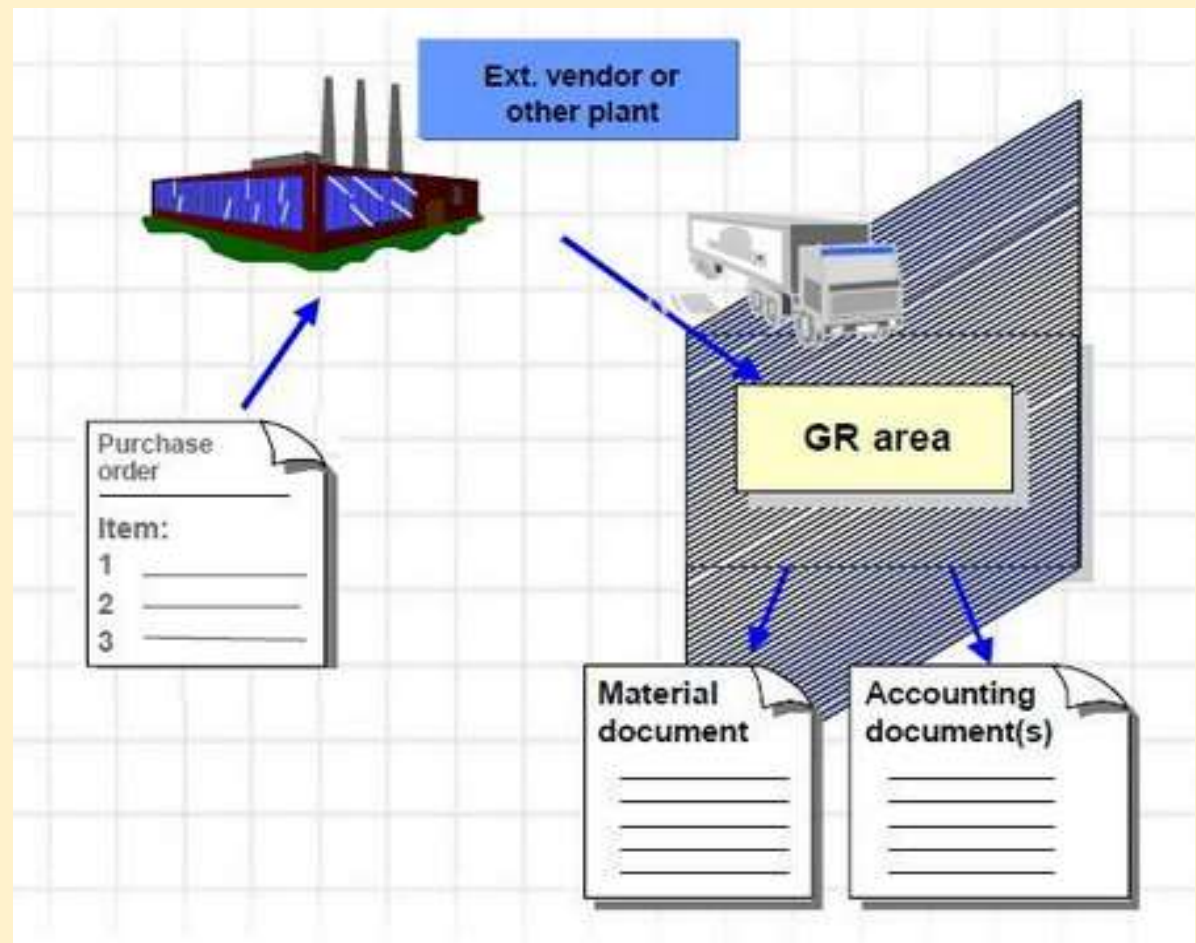
Goods Receipt

When goods are received:

Check over or under deliveries when goods arrive

PO automatically updated with the delivery

Material doc is created; includes storage location in the plant

Accounting doc: records effects material movement has on the value of stock

A GR is posted when the materials have arrived from the vendor.

Post goods receipt

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Stock Inventory types

Blocked stock

Stock that may be damaged and should not be placed in inventory

Stock in quality inspection
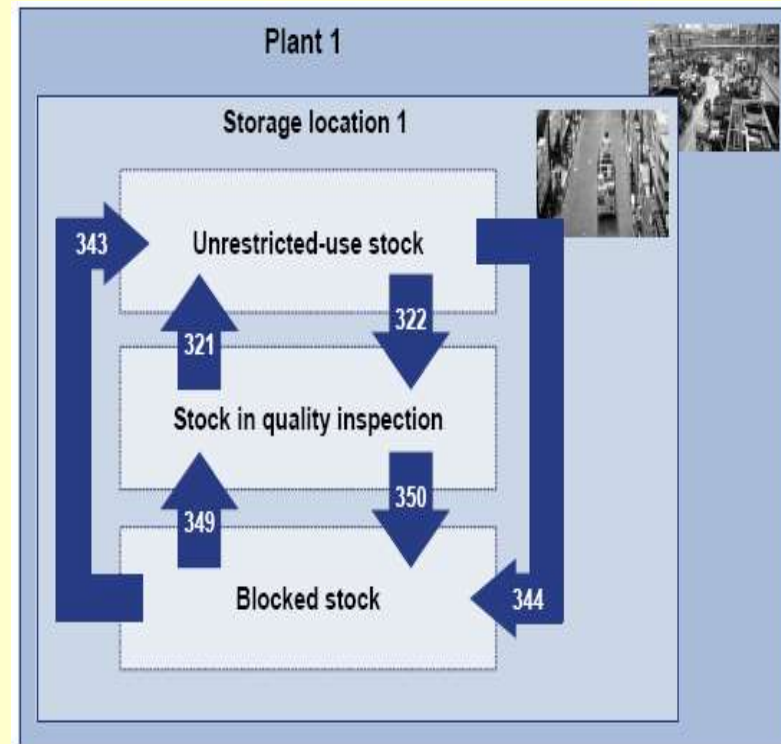
Stock on hold

A new Vendor quality inspection is required

Once completed a stock transfer posting to unrestricted use or to blocked stock is done

Unrestricted use stock

Stock available for use

NB: When you post a goods receipt into the warehouse, the quantity and value of the stock is increased irrespective of the stock type.

SAP Stock Overview

Case Study – Spare Parts Inventory Management

Video :
https://youtu.be/wYb2jrYWmgw?list=TLPQMjkwMjIwMjAPCRYl3bgKng

Sample Exam Questions

A. Identify and describe TWO Master Data items that are used in Materials Management.

B. What is an *Exploded BOM ?*

C. Explain the meaning and use of a *Material Master view.*

D. What effect do Goods Issues and Goods Receipts have on stock inventory levels ?

E. What is a *Purchasing Info Record ?*

F. What is the definition and purpose of a *Purchase Order ?*
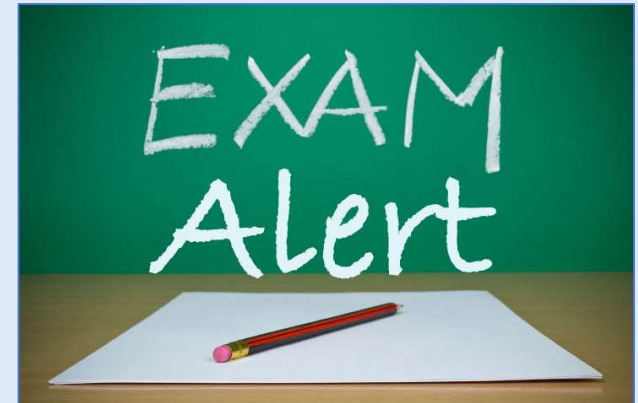
References
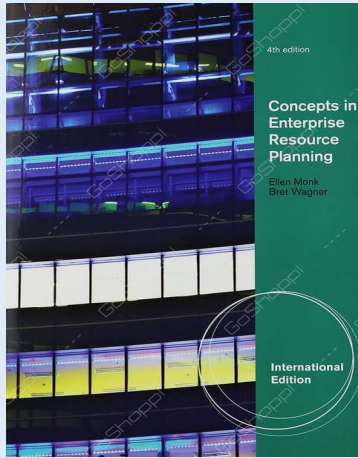
Monk & Wagner   Various

Magal & Word   Chaps 4, 7

TEAM PROJECT PLAN -TEMPLATE

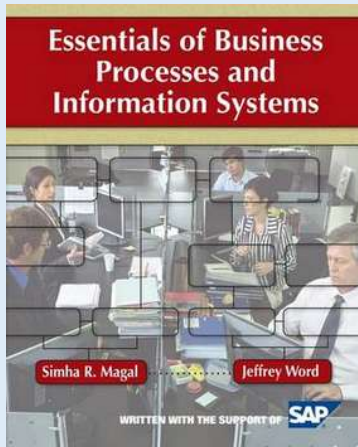| Team Number	Project Team Members					
123	John Smith (JS) Peter Jones (PJ) William Dickson (WD) Harry Foster (HF)					
Task Number	Description	Resources	Duration (days)	Start Date	End Date	Comments
1.0	Program Design					
1.1	Design Program 1	JS, PJ	2.0	19/03/20	20/03/20	
1.2	Design Program 2	JS, PJ	3.5	21/03/20	24/03/20	
1.3	Design Program 3	PJ	4.0	25/03/20	28/03/20	Works part-time
2.0	Program Development					
2.1	Program 1	WD	12.0	29/03/20	9/4/20	Contractor