Operation Management (OM) Introduction

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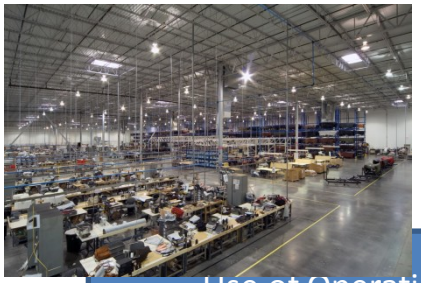
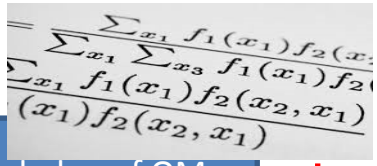
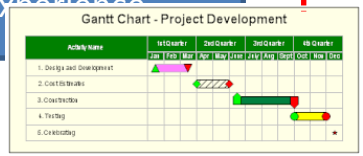
What is going on ?

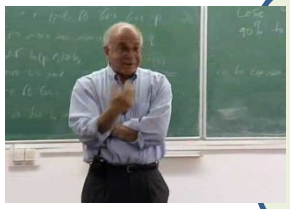


Use of Operations Management (OM) in external environment **(main target)**

General knowledge of OM methods acquired at university and long-standing experience

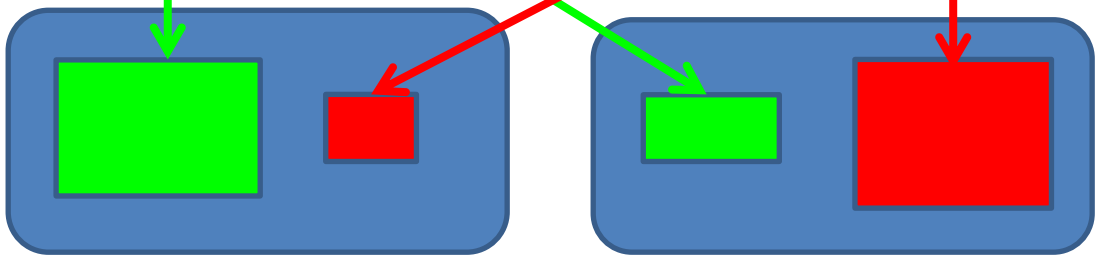






Knowledge of methods and experience from research and literature - **teachers**

Knowledge of methods and experience from outside world – **consultants, managers**, …



Extent of knowledge

Extent of knowledge

Synergy and put OM into practice

OM all around us

OM is the management of all processes used to design, supply, produce, and deliver valuable goods and services to customers








IN

Processing-transformation

Out

TQM = Total Quality Management

ERP: Logistics, Transportation

MRP, JIT, APS, Lean Manufacturing, Little´s law

ERP: Marketing, Selling, Invoicing, Payment,….

Some OM methods

- Theory of Constraints
- Balanced Scorecard
- Project Management methods (Critical Chain, SCRUM,…)
- Material Requirement Planning (MRP) and Just-in-Time
- Advanced Planning and Scheduling (APS)
- Six Sigma – quality management
- Boston, SWOT and Magic Quadrant Matrices
- Little´s Law (relations between WIP, Throughput and Cycle time)
- Linear programming - optimisation
- Yield Management
- Kepner-Tregoe (support of decision making)
- Decision trees

Some tools which have to be used

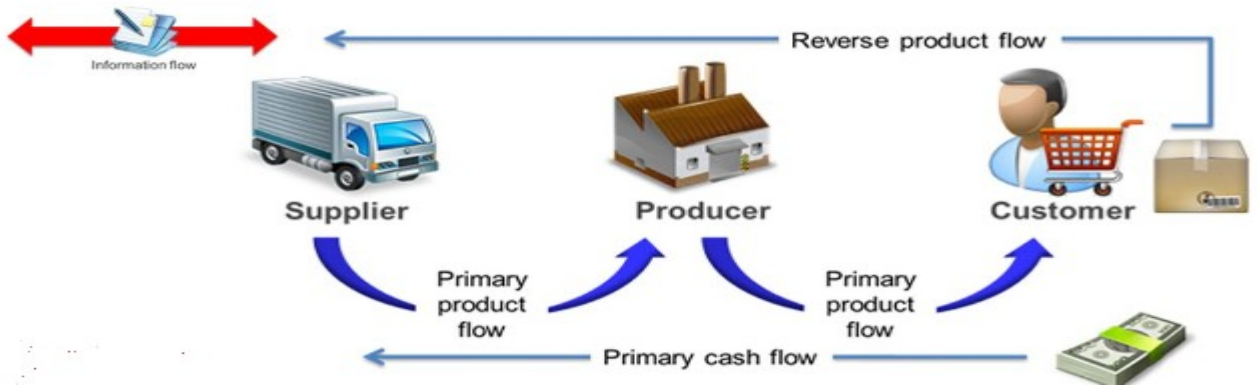
- **ERP**-Enterprise Resource Planning (MS Dynamics NAV)
  - Basic installation, handling and setup
  - Inventory – Items – Transports –Availability of components
  - Purchase –dealing with Suppliers (**SCM**)
  - Selling – dealing with Customers
  - Payment – bank operations
  - Accounting basics
  - **CRM**- **C**ustomer **R**elationship **M**anagement
  - Manufacturing – Planning and Shop Floor Control
  - Cost management

Controlling processes in Supply Chain Management (SCM)

Planning levels

	Supply	Production	Orders
Strategic	←	Operation Strategies and Innovations , R&D	→
Tactical	Forecasts, Blank Orders	Long term planning	Marketing
Operational	Logistic operations	Routing control, TQM	Packaging , Transportation
Operational	MRP, Replenishment	MRP_II ; JIT, Capacities	Cash flow

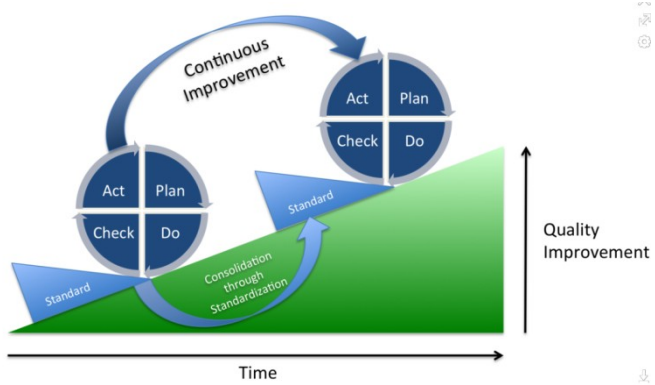
Demand Planning



Used abbreviations : **R&D** –Research and Development; **TQM**-Total Quality Management; **JIT**- Just –In-Time; **MRP_II**-Manufacturing and Resource Planning

Used abbreviations (slide number 3): : **ERP** - Enterprise Resource Planning **; APS –** Advanced Planning and Scheduling

Deming cycle (based on periodicity)



Plan*:* Define the problem to be addressed, collect relevant data, and ascertain the **problem's root cause** (e.g. by use of TOC)

Do: Develop and implement a solution; decide upon a measurement to gauge its effectiveness.

Check: Confirm the results through before-and-after data comparison.

Act: Document the results, inform others about process changes, and make recommendations for the problem to be addressed in the next PDCA cycle.

Used abbreviations : **TOC** – Theory of Constraints

Another angle of view

This will be modified in following **South African** project show (use of **Balanced Score Card**)

Project management

Theory of constraints

Production

Linear programming

Total quality management

Product postitioning

Business Intelligence

Workflow

Critical chain

Drum –Buffer-Rope

MRP-MRP-II,JIT,APS

Cutting, blending

Pareto, ishikawa

Boston Matrix

Gartner QM

Decision Making -trees

SCRUM

CONWIP

Logistics

Pareto, Ishikawa

Product Life Cycle

Kepner-Tregoe

EOQ

Six Sigma

Yield management

Hurwitz

ABC

Prospect Theory

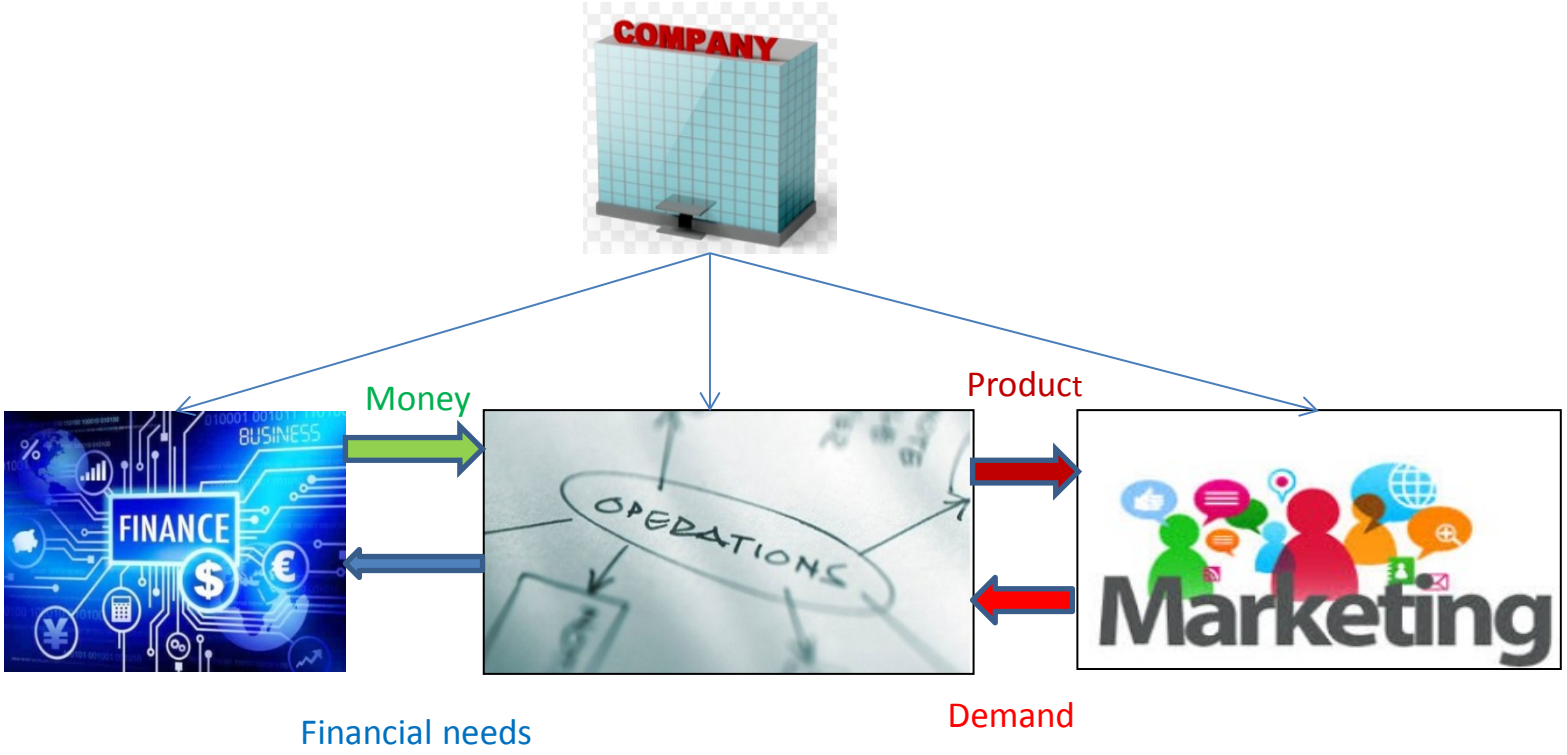
LEAN

Function block Logistic more in detail will be presented later in this show

Little´s law

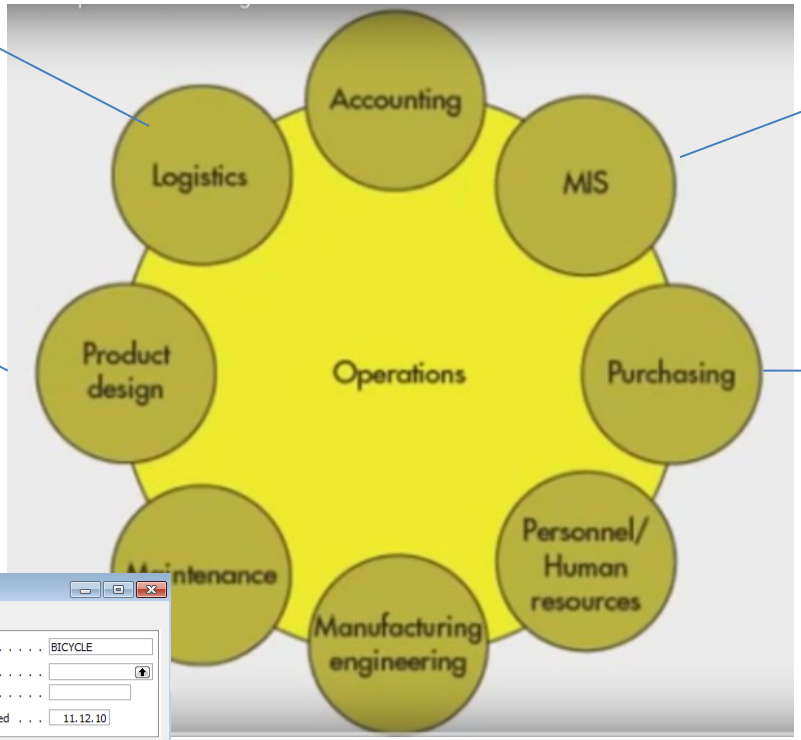
Used abbreviations : QM– Quadrant Matrix; **CONWIP –** Constant Work in Progress; **EOQ** – Economic Order Quantity ; **MRP** - Material Requirement Planning

Another angle of view



Operations

See next slide



Microsoft Dynamics NAV 2009 R2

Version W1 6.0 R2 (6.00.32012)

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Manufacturing

- Product Design
  - Items
  - Production BOM
  - Routings
  - Families
  - Exchange Production BOM Item
  - Delete Expired Components
  - Calculate Low-Level Code
  - Reports
- Capacities
- Planning
- Execution
- Costing

Purchase

- Planning
  - Items
  - Vendors
  - Requisition Worksheets
  - Recurring Req. Worksheet
  - Order Planning
  - Production Forecasts
  - Purchase Orders
  - Sales Orders
  - Blanket Sales Orders
  - Planned Production Orders
  - Firm Planned Prod. Orders
  - Transfer Orders
  - Reports
  - Documents
  - Setup
- Order Processing
- Inventory & Costing
- Analysis & Reporting
- History
- Setup

1000 Bicycle - Production BOM

General

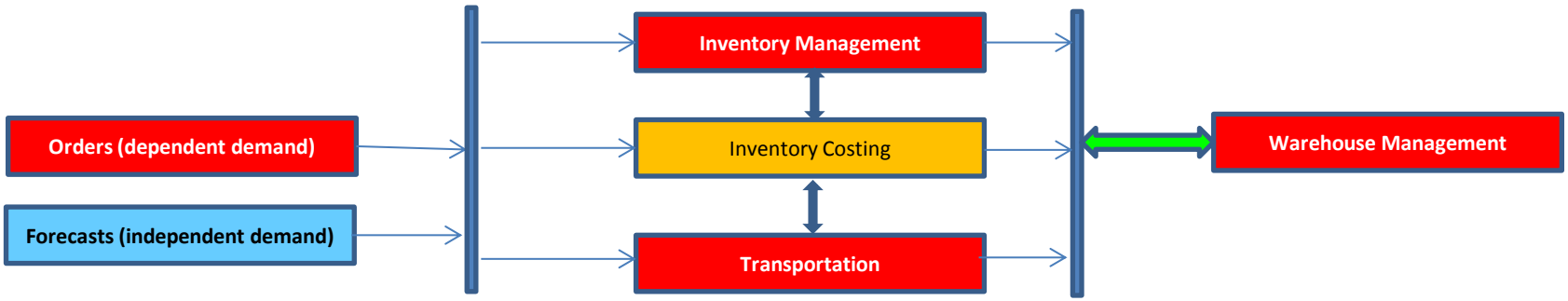
No. 1000 | Search Name BICYCLE
Description Bicycle | Version Nos.
Unit of Measure Code PCS | Active Version.
Status Certified | Last Date Modified 11.12.10

Type	No.	Description	Quantity ...	Unit of Measu...	Scrap...	Routing Li...
Item	1100	Front Wheel	1	PCS	0	
Item	1200	Back Wheel	1	PCS	0	
Item	1300	Chain Assy	1	PCS	0	
Item	1400	Mudguard front	1	PCS	0	
Item	1450	Mudguard back	1	PCS	0	
Item	1500	Lamp	1	PCS	0	
Item	1600	Bell	1	PCS	0	
Item	1700	Brake	1	PCS	0	
Item	1800	Handlebars	1	PCS	0	
Item	1850	Saddle	1	PCS	0	
Item	1900	Frame	1	PCS	0	

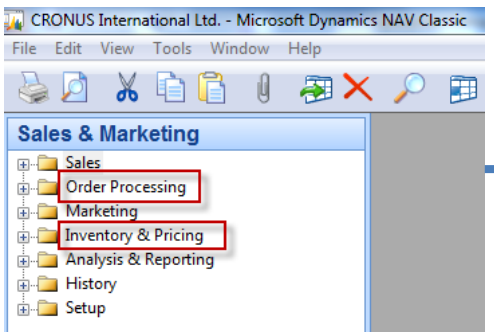
Prod. BOM | Component | Functions | Help

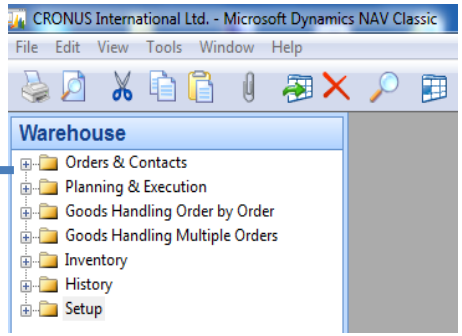
Bill of material

Function block Logistic-simplified

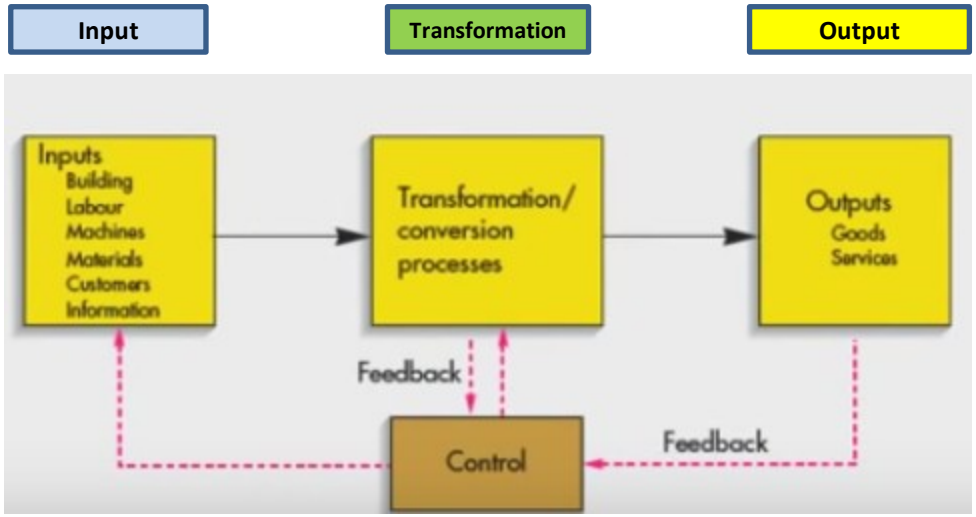


Will be part of our course regarding ERP system MS Dynamics NAV





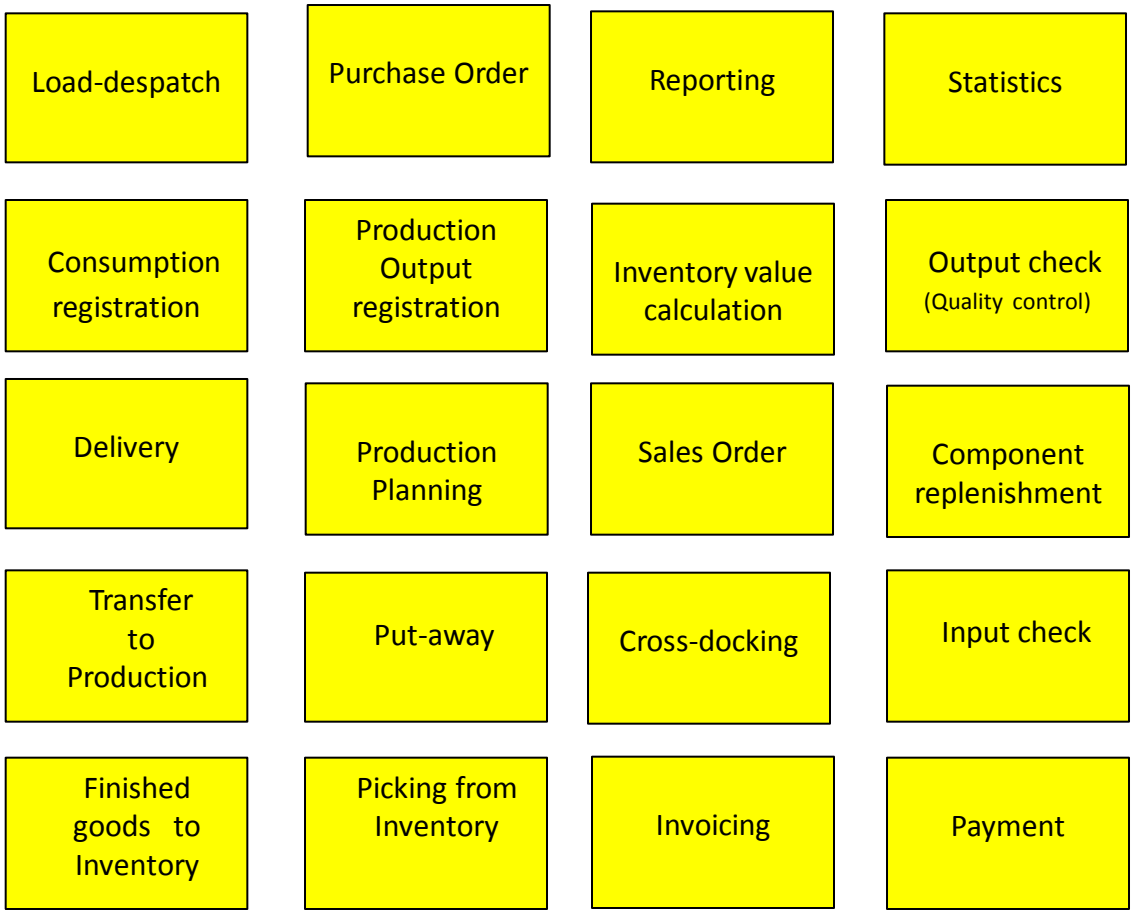
Procedures-simplified



Color agenda used later

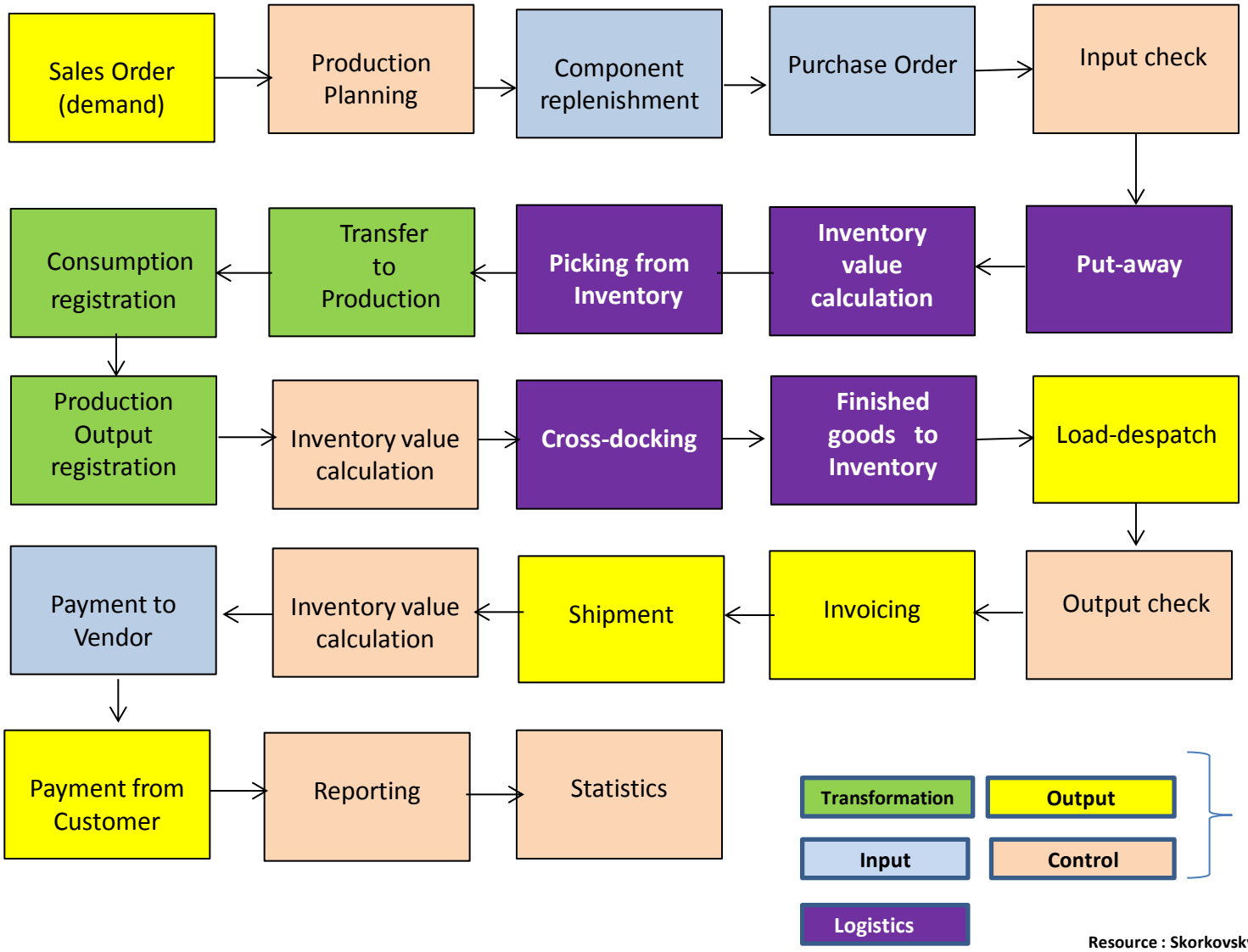
Resource (modified) : dowtsx

Processing (not organised set of processes, will be presented also as a introduction to project management PWP presentation later)



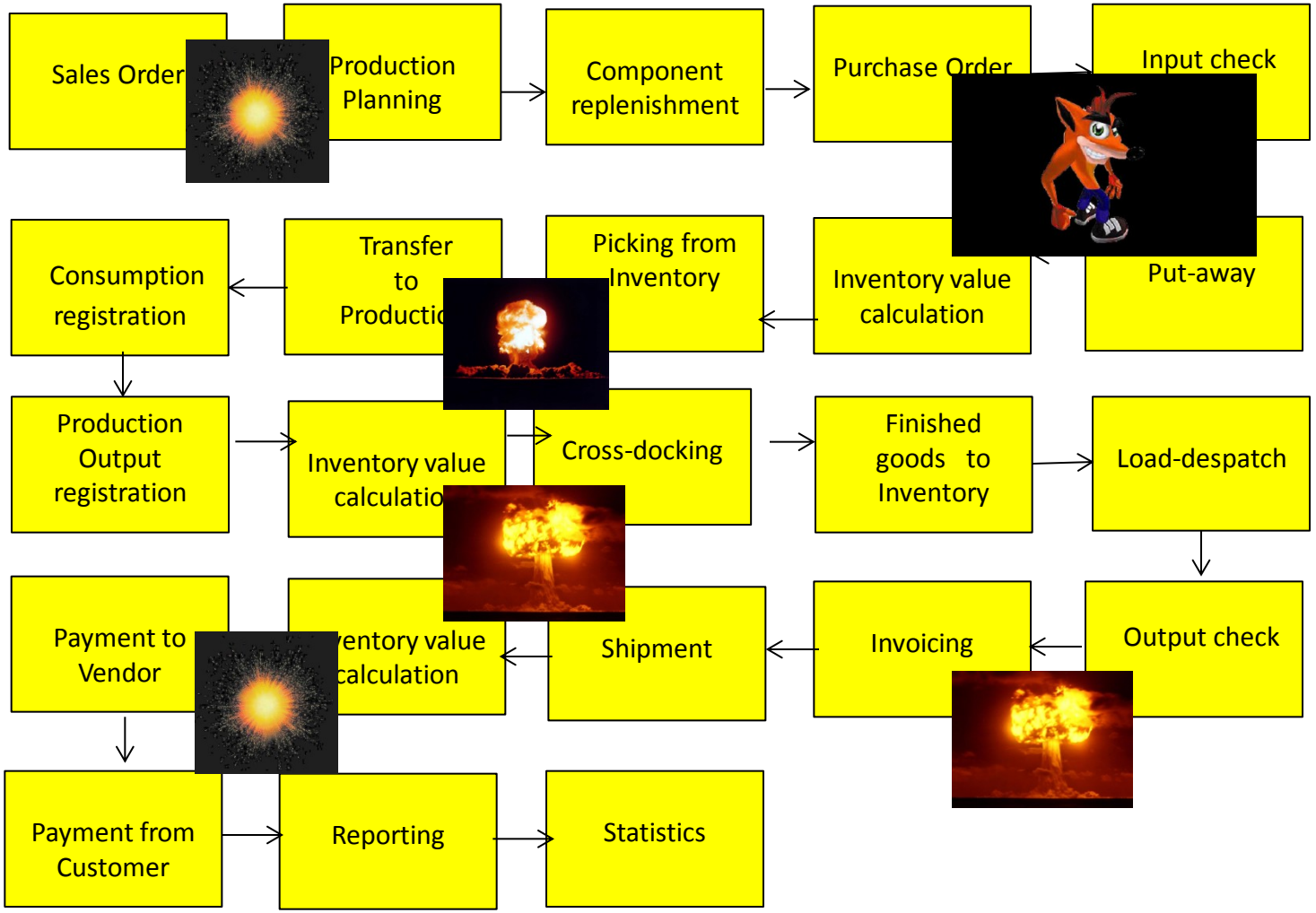
Resource : Skorkovský

Your main task (to organize processes based on business logic)



Resource : Skorkovský

Your main task (possible problems, bottlenecks, undesirable effects..)

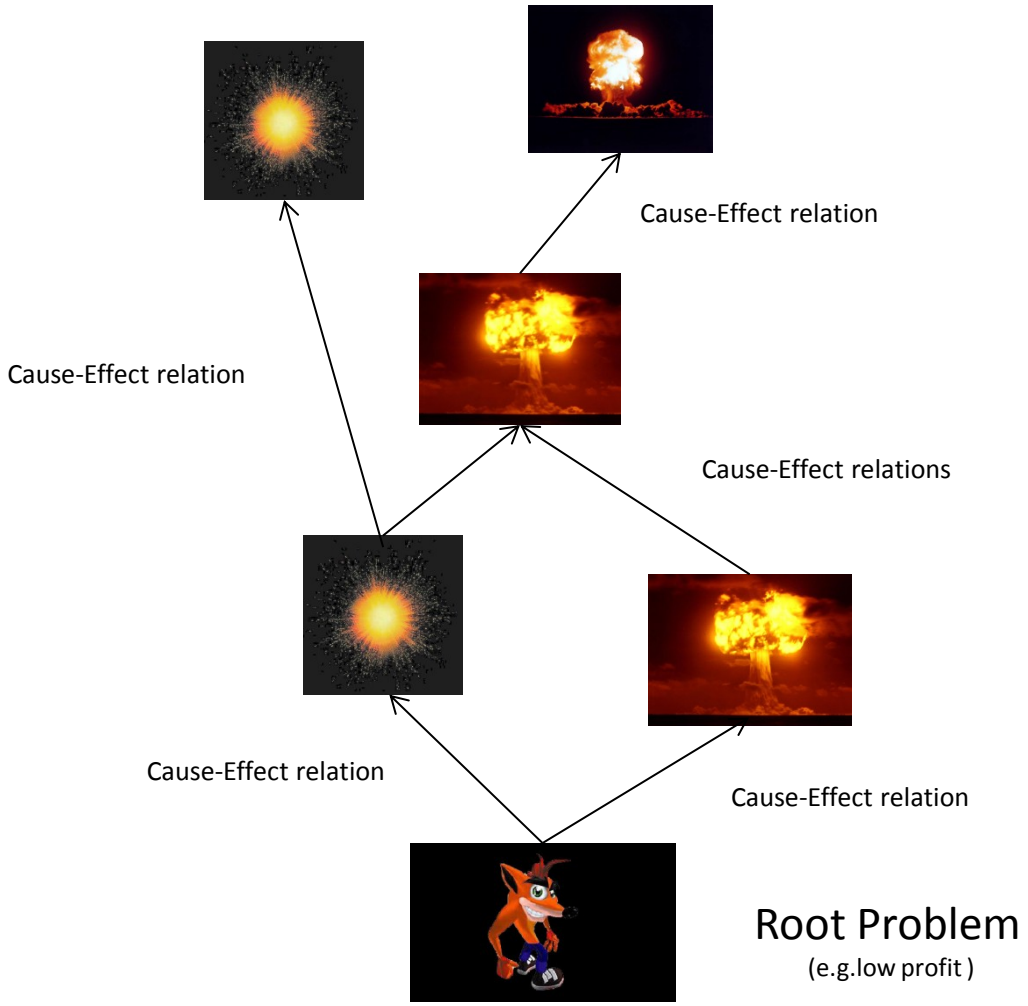


Application of TOC ->thinking tools->Current Reality Tree – first stage

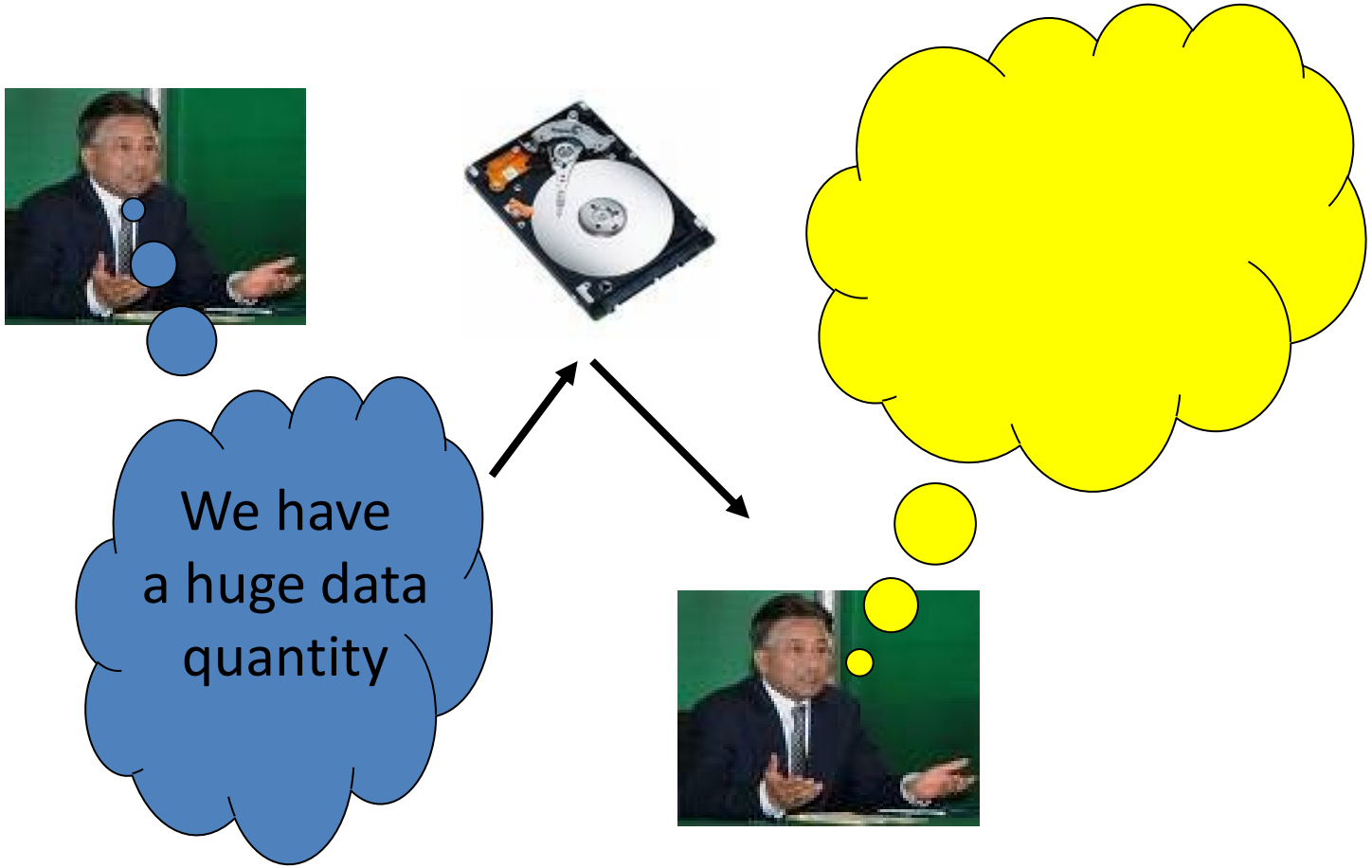
Resource : Skorkovský

Your main task

(Search - **HOW** ??? Measure impacts –**HOW** ??? and Destroy – **HOW** ???)



Basic problem I. (one of many)



Moore's law is the observation that the number of transistors in a dense integrated circuits doubles approximately every two years – so -> capacity of memory is going up

Big data and analysis problem

In test and measurement applications, engineers and scientists can collect vast amounts of data every second of every day.

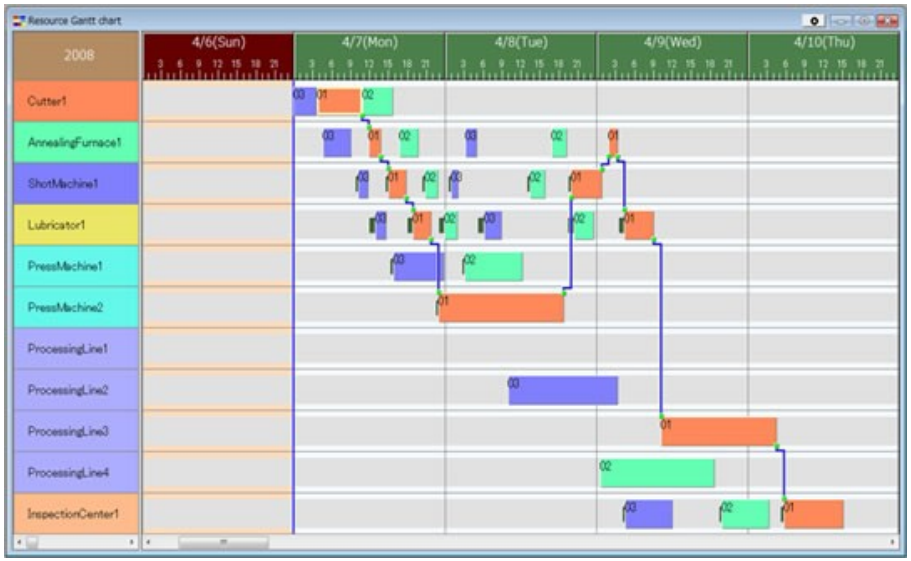
- For **every second** that the Large Hadron Collider at CERN runs an experiment, the instrument can generate 40 terabytes of data.
- For **every 30 minutes** that a Boeing jet engine runs, the system creates 10 terabytes of operations information.
- For a single journey across the Atlantic Ocean, a four-engine jumbo jet can create 640 terabytes of data.
- Multiply that by the more than 25,000 flights flown each day, and you get an understanding of the enormous amount of data that exists (Rogers, 2011). **That's "Big Data."**

CERN = Conseil Européen pour la Recherche Nucléaire –Resource : https://home.cern/about

Hardon Collider-accelerator

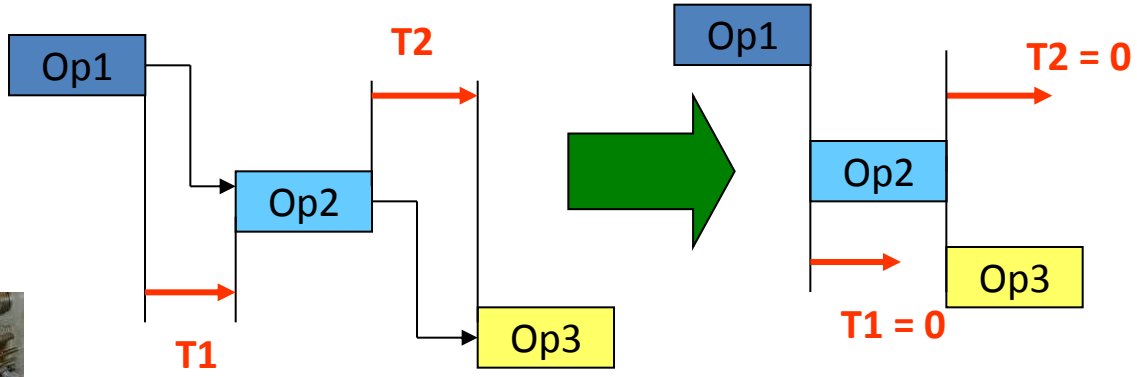
*Basic problem II. (we need reliable data)

To solve it we should use finite capacity scheduling (APS)- will be presented later

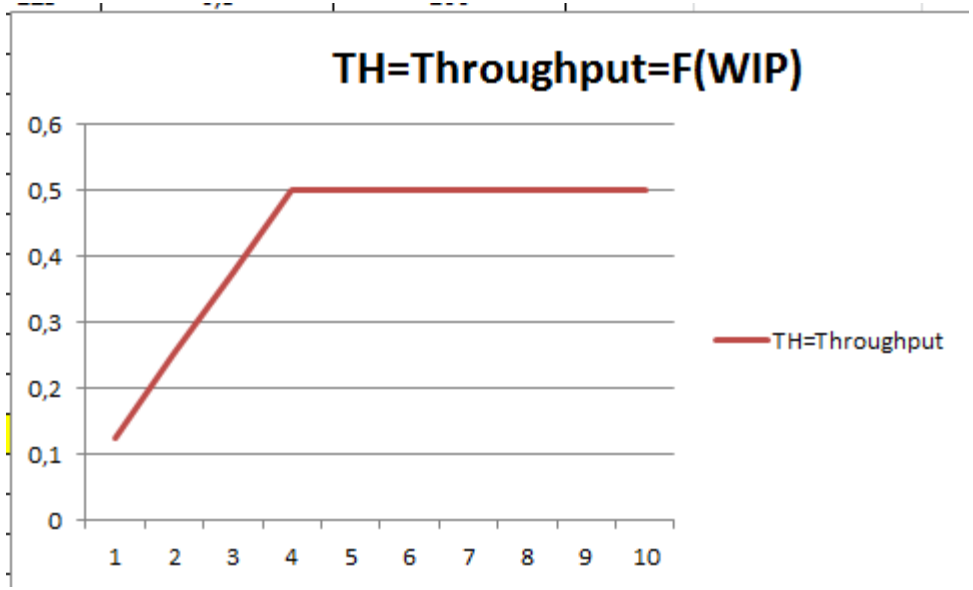


T1+T2=X

Opt=Min(X)



Basic problem III.



Will be explained in Little´s law presentation . WIP= Work In Progress

Basic problem IV.

Black

White

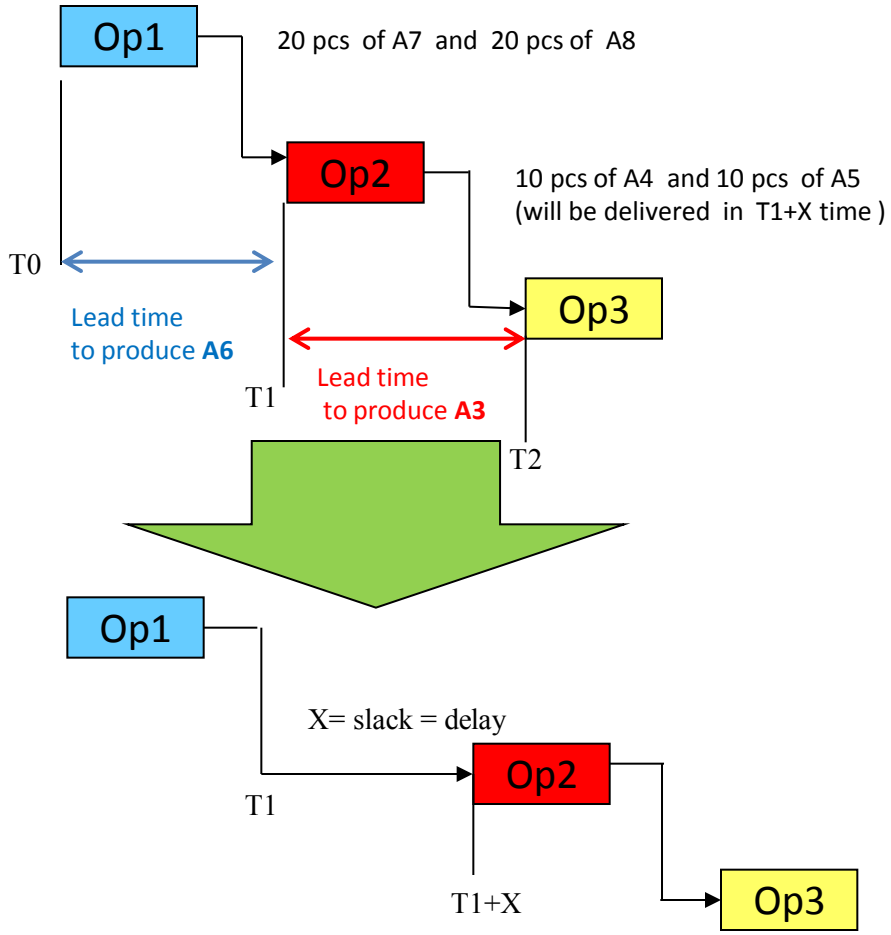
White

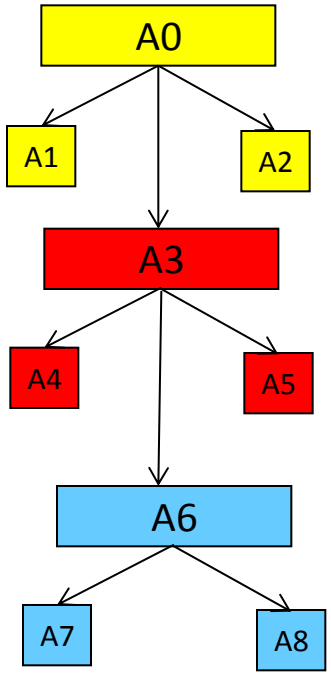
Black

(Black ->White, Setup time=60 minut)

(White->Black, Setup time = 20 minut)

Basic problem V-I. (availability of components)

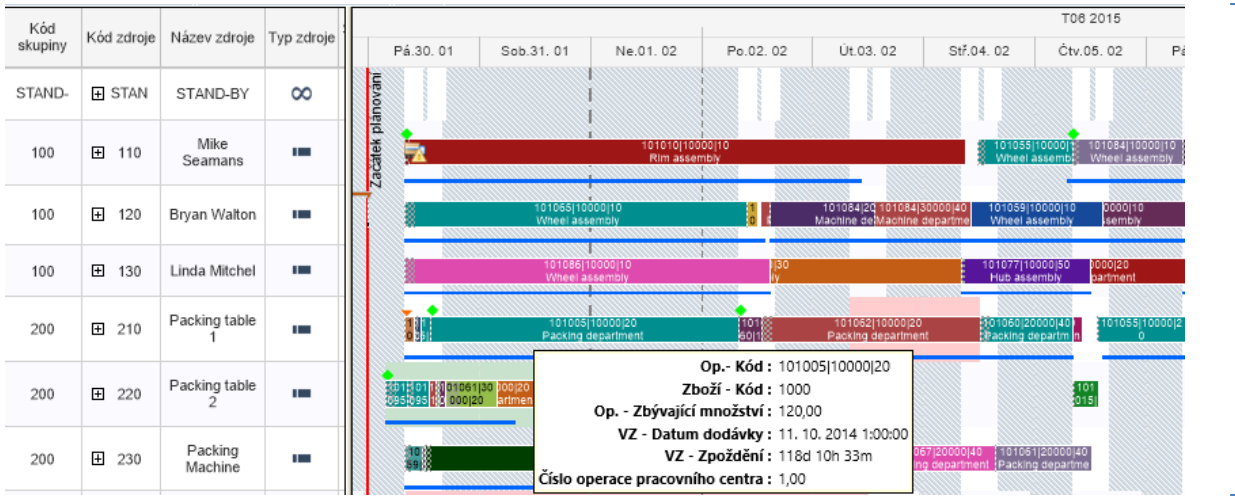




Bill Of Material=BOM

For sake of simplicity we did not mentioned components A1 and A2 and possible delays having cause in delivery times of bad qu ality !!!
Same with capacities of machines allocated to OP1-OP2-OP3 (sudden breakdowns)

Basic problem V-II. (availability of components)



Prod. Order Routing

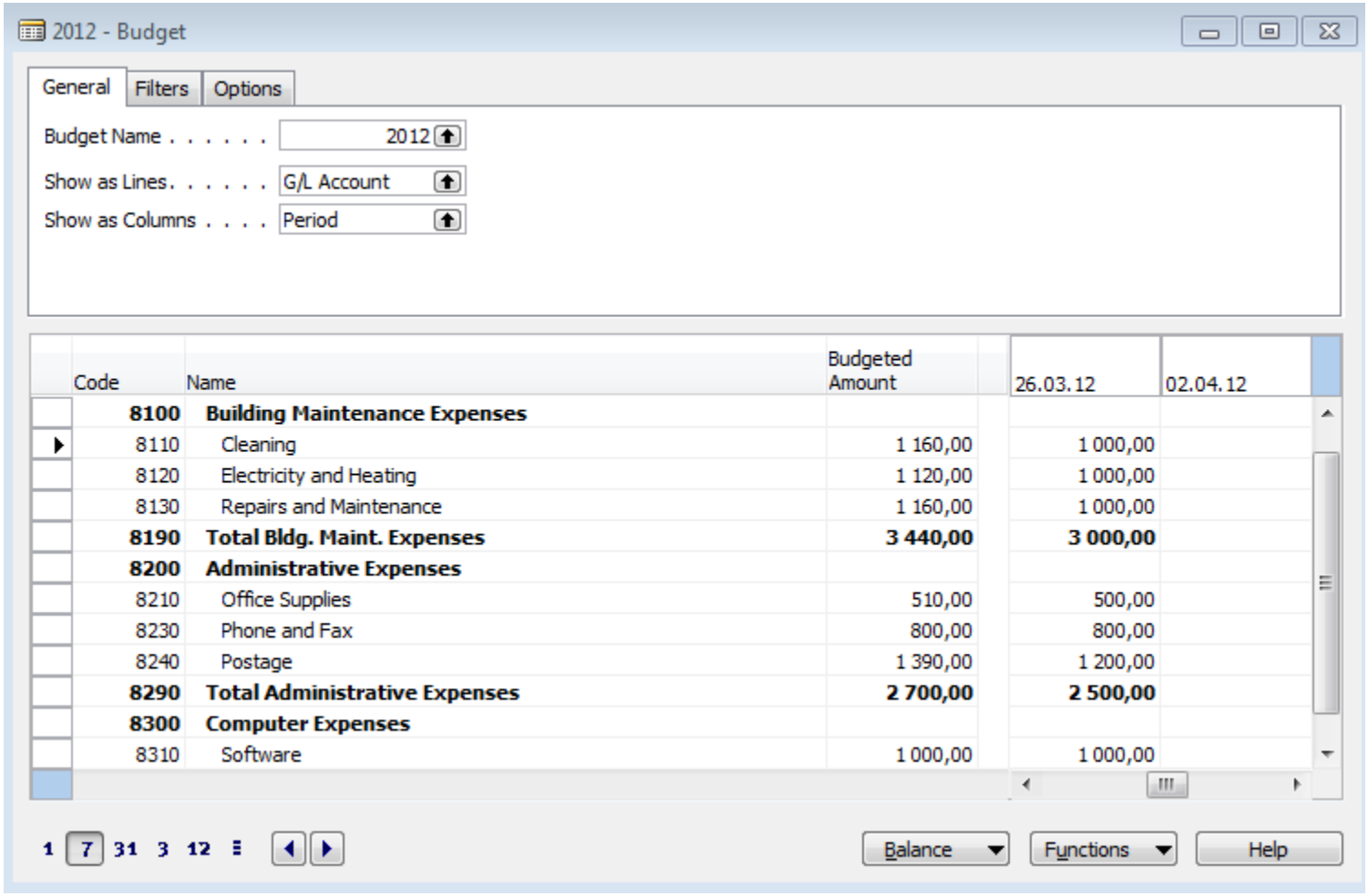
Type to filter (F3) | Prod. Order No.

Filter: Firm Planned • 101005 • 10000 • 1

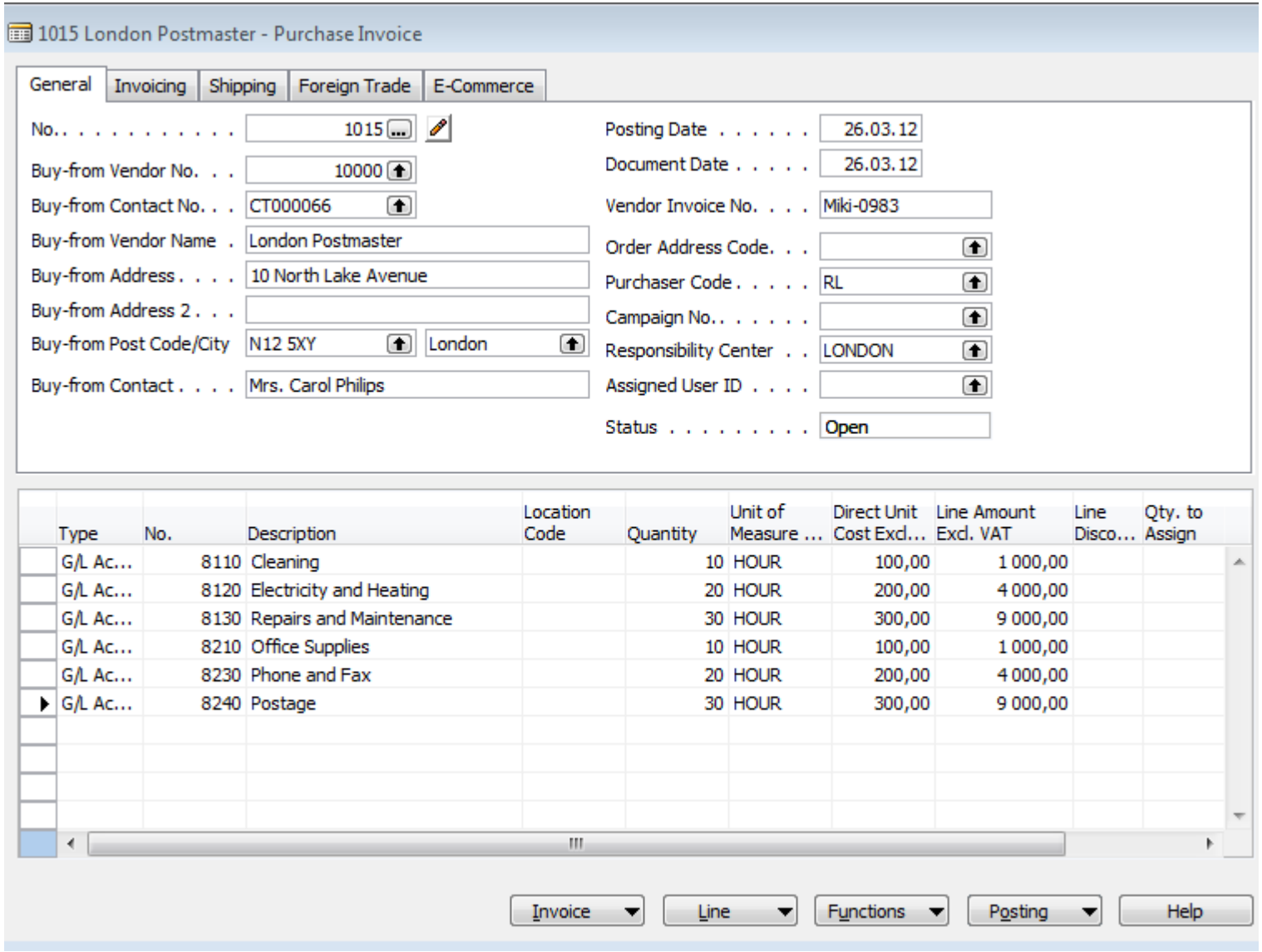
Operati... No.	Type	No.	Description	Starting Date-Time	Ending Date-Time	Setup Time	Run Time	Material Fixed Date
10	Work Center	100	Wheel assembly	18. 8. 2014 14:41	22. 8. 2014 8:31	110	12	23. 8. 2014 0:00
20	Work Center	200	Packing department	27. 8. 2014 8:31	1. 9. 2014 14:46	15	15	10. 9. 2014 0:00
30	Work Center	300	Painting department	1. 9. 2014 14:46	4. 9. 2014 10:46	10	20	
40	Work Center	400	Machine department	4. 9. 2014 11:11	5. 9. 2014 12:21	10	8	

APS result ->18.8.->23.8. a 27.8.->10.9

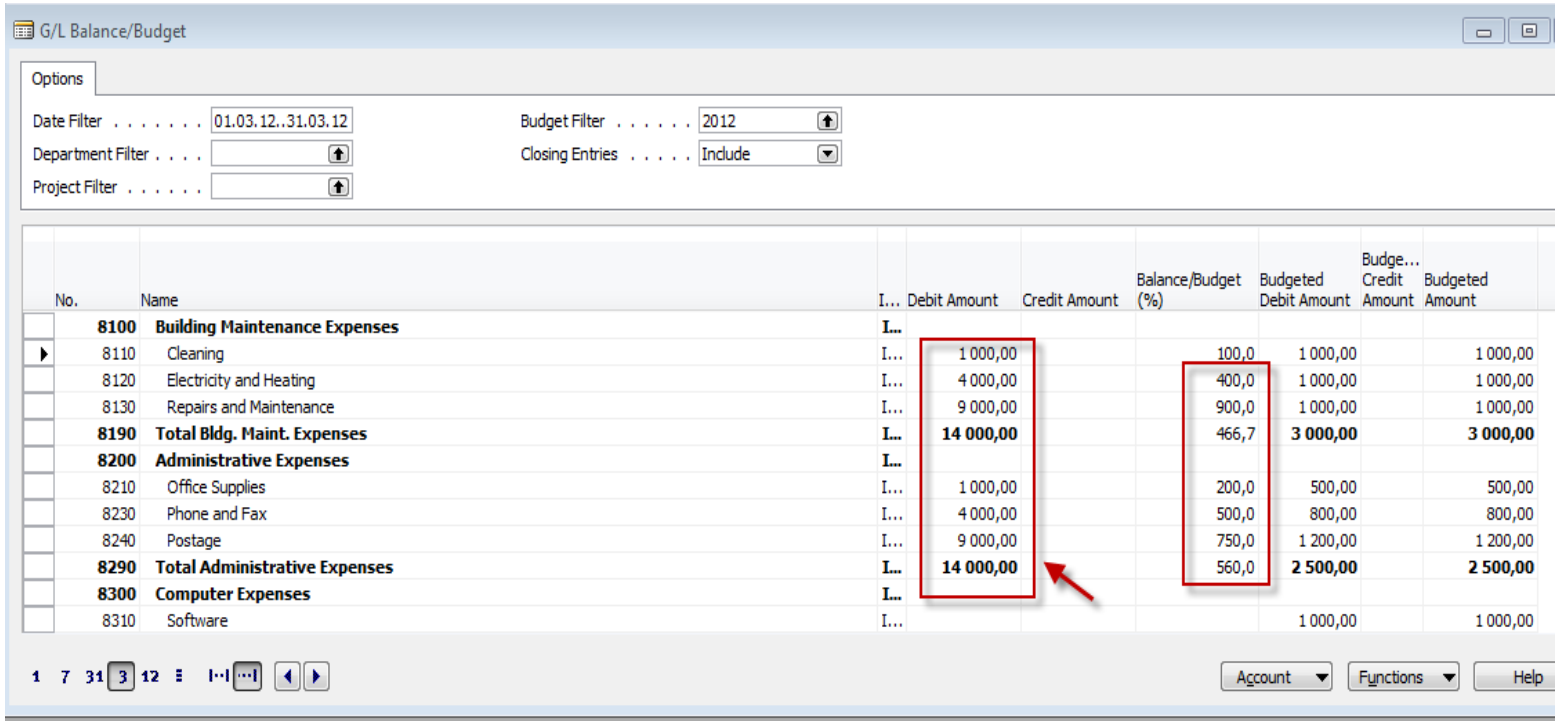
Basic problem VI-I. (over budget)



* Basic problem VI-II. (over budget)



Basic problem VI-III. (over budget)



No.	Name	I...	Debit Amount	Credit Amount	Balance/Budget (%)	Budgeted Debit Amount	Budge... Credit Amount	Budgeted Amount
8100	**Building Maintenance Expenses**	**I...**						
8110	Cleaning	I...	1 000,00		100,0	1 000,00		1 000,00
8120	Electricity and Heating	I...	4 000,00		400,0	1 000,00		1 000,00
8130	Repairs and Maintenance	I...	9 000,00		900,0	1 000,00		1 000,00
8190	**Total Bldg. Maint. Expenses**	**I...**	**14 000,00**		466,7	**3 000,00**		**3 000,00**
8200	**Administrative Expenses**	**I...**						
8210	Office Supplies	I...	1 000,00		200,0	500,00		500,00
8230	Phone and Fax	I...	4 000,00		500,0	800,00		800,00
8240	Postage	I...	9 000,00		750,0	1 200,00		1 200,00
8290	**Total Administrative Expenses**	**I...**	**14 000,00**		560,0	**2 500,00**		**2 500,00**
8300	**Computer Expenses**	**I...**						
8310	Software	I...				1 000,00		1 000,00