

# PROJECT MANAGEMENT

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Pages

Chapter 1.	<b>Definition of a project</b>	3
Chapter 2.	<b>Life cycle of a project</b>	15
Chapter 3.	<b>Scope of a project</b>	21
Chapter 4.	<b>Project planning</b>	30
Chapter 5.	<b>Time management tools</b>	38
Chapter 6.	<b>Scheduling and smoothing</b>	59
Chapter 7.	<b>Project monitoring</b>	63
Chapter 8.	<b>Project planning and monitoring : a summary</b>	89
Chapter 9.	<b>False ideas about projects</b>	97
Chapter 10.	<b>Conclusion</b>	102

# ***Introduction***

## **Course objectives**

Knowledge and understanding of the tools and methods which will enable you to :

- define a clear and precise objective
- plan and monitor a project.

## **Course structure**

Lectures :

- Definition of a project and defining scope (6 hours)
- Tools and methods for project planning and management (6 hours)

Practicals :

- Planning a project with MS Project (4 hours)
- Monitoring a project with MS Project (4 hours)



**The objective is to teach you how to plan and run a project.**

## **2. Definition of a project**

# 1. Definition of a project

Definition : a project is :

« a collection of specific actions which **methodically** and **progressively** bring about a future reality which has no **exact equivalent**, enabling the achievement of **technical and economic objectives put in place** for a **precise task** and including a **start** and a **finish** ».

Concept with an innovative aspect in terms of content, participants or method of execution : **no one project is the same** (it is unique).

A project is not :

- a proposal or a draft,
- a more or less long-term forecast,
- a production activity,
- abstract or applied research.

## Examples

- designing a new vehicle is a project,
- building a new manufacturing plant is a project,
- mass production is not a project,
- exploring potential new fuels is not a project.



# 1. Definition of a project

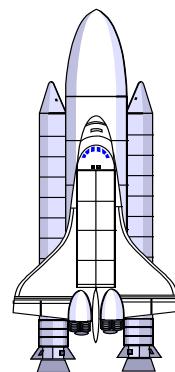
## Project : a generic concept

Not everything is a project, but there is no business sector or industry to which the theory cannot be applied!

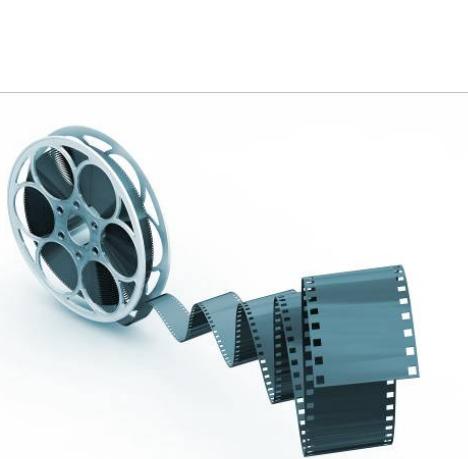
A project is a unique and non-repetitive activity which:

- works towards a clearly defined objective,
- is carried out in a limited time,
- requires the participation of many departments and specialists,
- has precise requirements in terms of time, cost and return.

project : an ancient concept (e.g. building a pyramid) that progressively became a standard for all industrial products !



# 1. Where are projects used?



« The art and science of project management will soon become the very essence of management training, operational excellence and added value. »

Tom Peters  
slide 6

# 1. The importance of project management

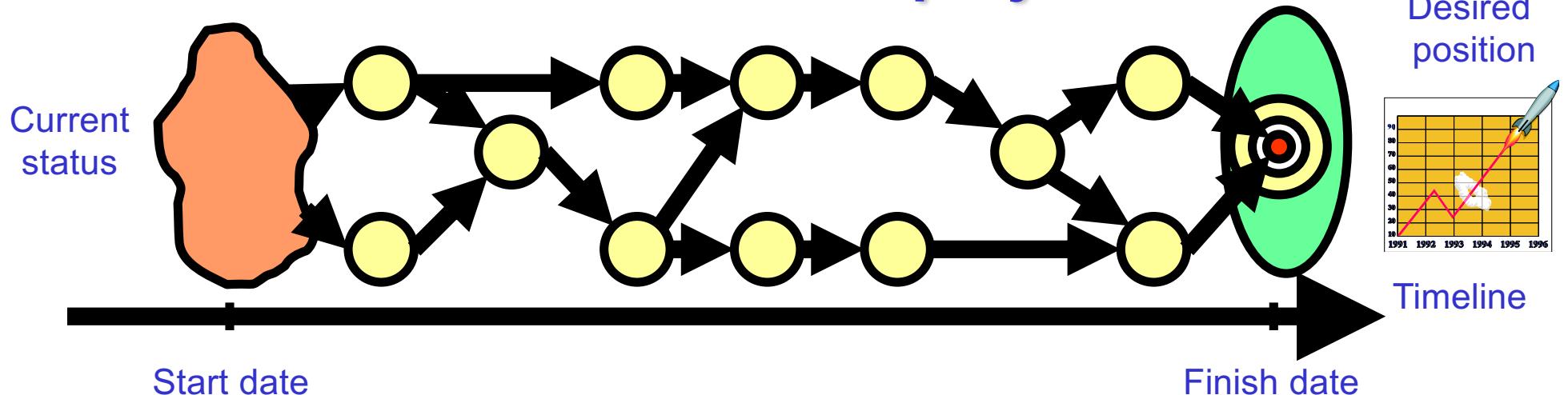
## Strategic direction of companies:

- Shortening product life cycle
- International competition
- Huge increase in knowledge
- Company restructuring
- Increased customer focus
- Rapid development of under-developed countries
- Small projects often synonymous with major problems

## Project Management Institute :

- Over 200,000 members
- Chapters in 125 countries
- PMP certification since 1984
- First training organisation to obtain ISO 9001 certification in 1999
- Publisher with more than 1,000 titles to its name
- 3 publications

# 1. Definition of a project



**What is the current status ?**

- quantified using indicators,
- analysis of efficiency in relation to market demand,
- identification of strengths and weaknesses.

**What needs to be done :**

- identify all tasks enabling progress from current status to desired position,
- draw up action plan.

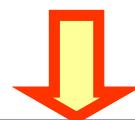
**For each task, define :**

- objectives (target),
- start and finish dates,
- expected results,
- stakeholders (skills),
- necessary resources
- responsibilities,
- risks of failure and if necessary alternative solutions,
- performance indicators.

**What are the objectives ?**

Considered future position which is :

- consciously chosen and desired,
- quantified by measurable indicators,
- achieved through a positive approach.



**Establish core target**

# 1. Objectives to be achieved

Successful project : 2 objectives

- client satisfaction,
- project team satisfaction

} consider these two objectives simultaneously

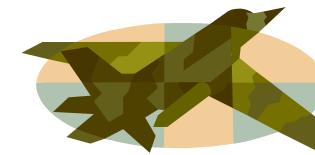
## Client satisfaction



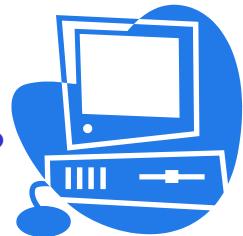
« Cost »

What is the allocated budget ?  
How much can the project cost ?

« Quality »  
What are the expected uses?  
What level of performance must be achieved ?



Magic triangle



« Time »

When must the project start?  
When must it finish?

## Current indicators

The triangle is ineffective with poorly achieved objectives and exceeding:

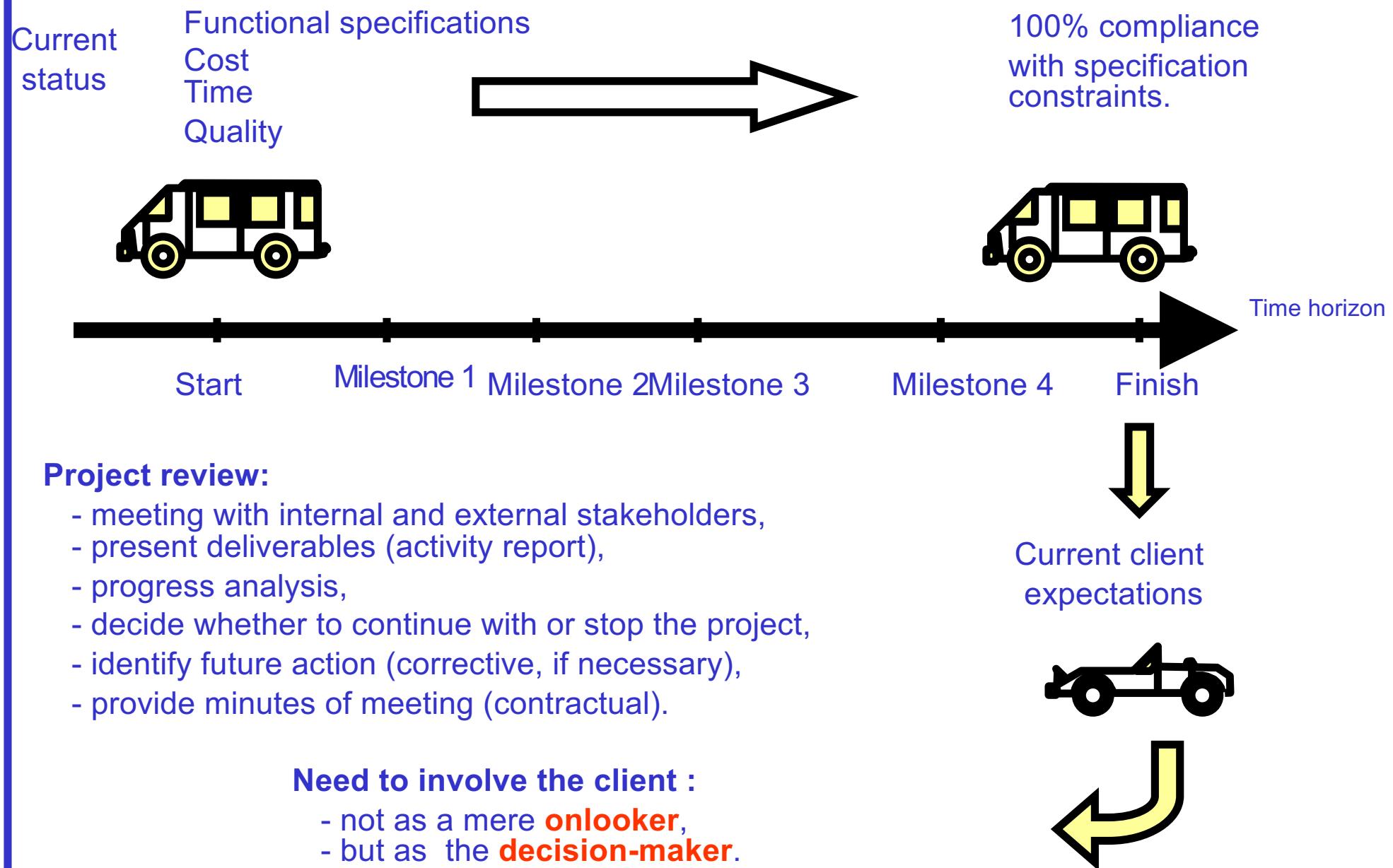
- time limits (100%),
- costs (40% on average),
- commercial failure of new products (80%).

} New criteria :

- accuracy / needs,
- customisation,
- «meaning» (useful and necessary),
- respect for the environment.



# 1. Client satisfaction



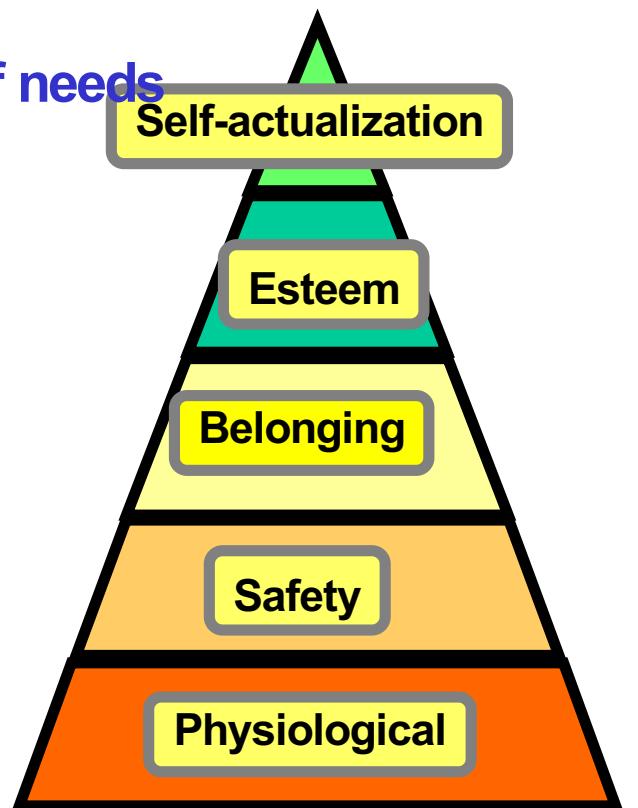
# 1. Team member satisfaction

## An observation

The success of a project depends entirely on the commitment and motivation of the stakeholders !

→ They need looking after !

## Maslow's hierarchy of needs



## Motivation and commitment of stakeholders

- difficult to secure,
- easy to lose.

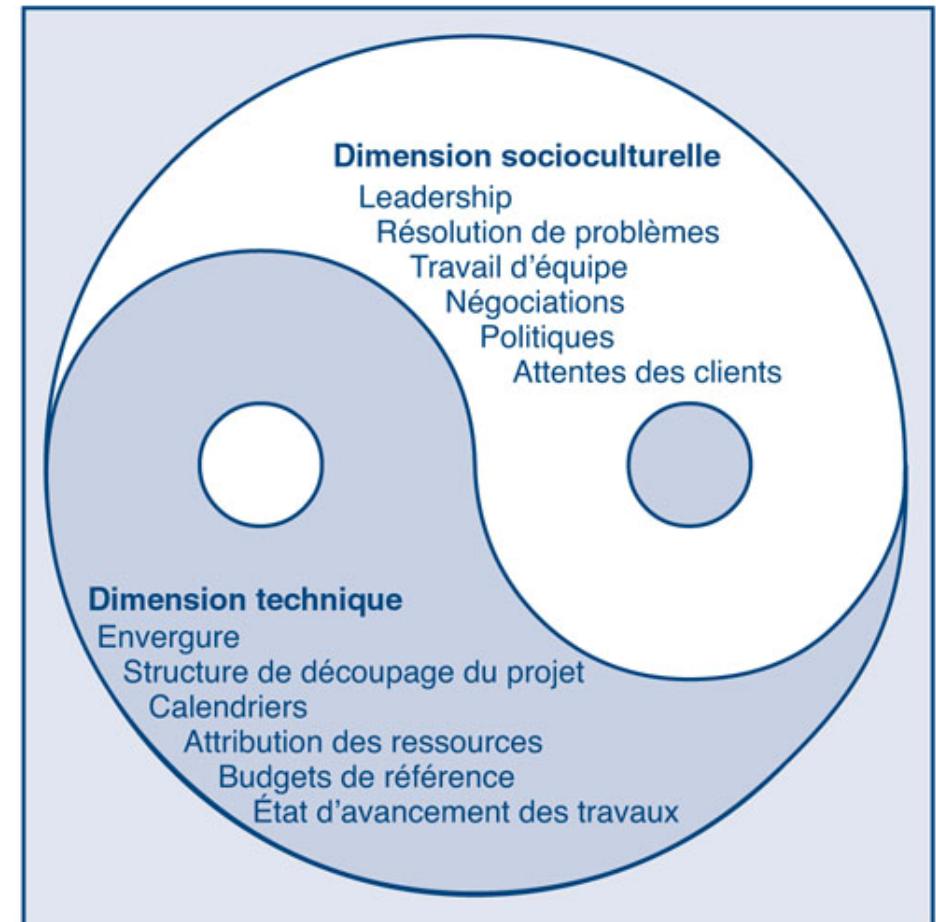
HERZBERG

# 1. Success factors

## The Yin and Yang of a project

Technical dimension, or mechanistic nature.

Socio-cultural dimension combining tools and techniques relating to Social Studies and Social Science .



**Project : The mixture of two opposite but complementary elements**

# 1. Project management

## Changing environments:

- markets transition from « local » production economy to global market economy in a permanent state of crisis.
- techniques product, communication, mentality, means of transport,...



**Increasingly turbulent environment**

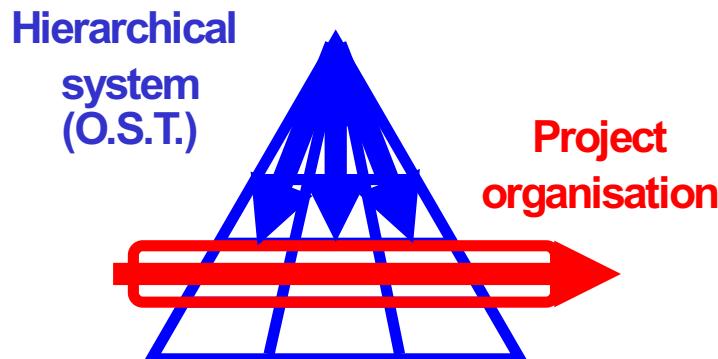


## Always respond to new challenges

technologies and new industries, increasingly complex,  
more and more regulations, legislation and health & safety concerns,  
clients always very demanding,  
decentralisation of responsibility.

## Business needs

- performance based on cost, deadline, quality of **products** and **processes**,
- satisfy clients' explicit and implicit needs,
- get it right from the outset : there's no room for mistakes !



To meet these challenges, we use a new method of organisation: **organisation by project**.

Objective : avoid the mismanagement which results from OST's mechanistic approach !

# 1. Project Management

## What is Project Management?

The application of knowledge, skills, tools and methods to a project with a view to achieving and exceeding the needs and expectations of the project stakeholders, i.e. finding a balance between the competing constraints specific to projects :

- different needs and expectations of stakeholders
- identified requirements (needs) and unidentified requirements (expectations),
- scale, quality, time and cost.

## Objectives

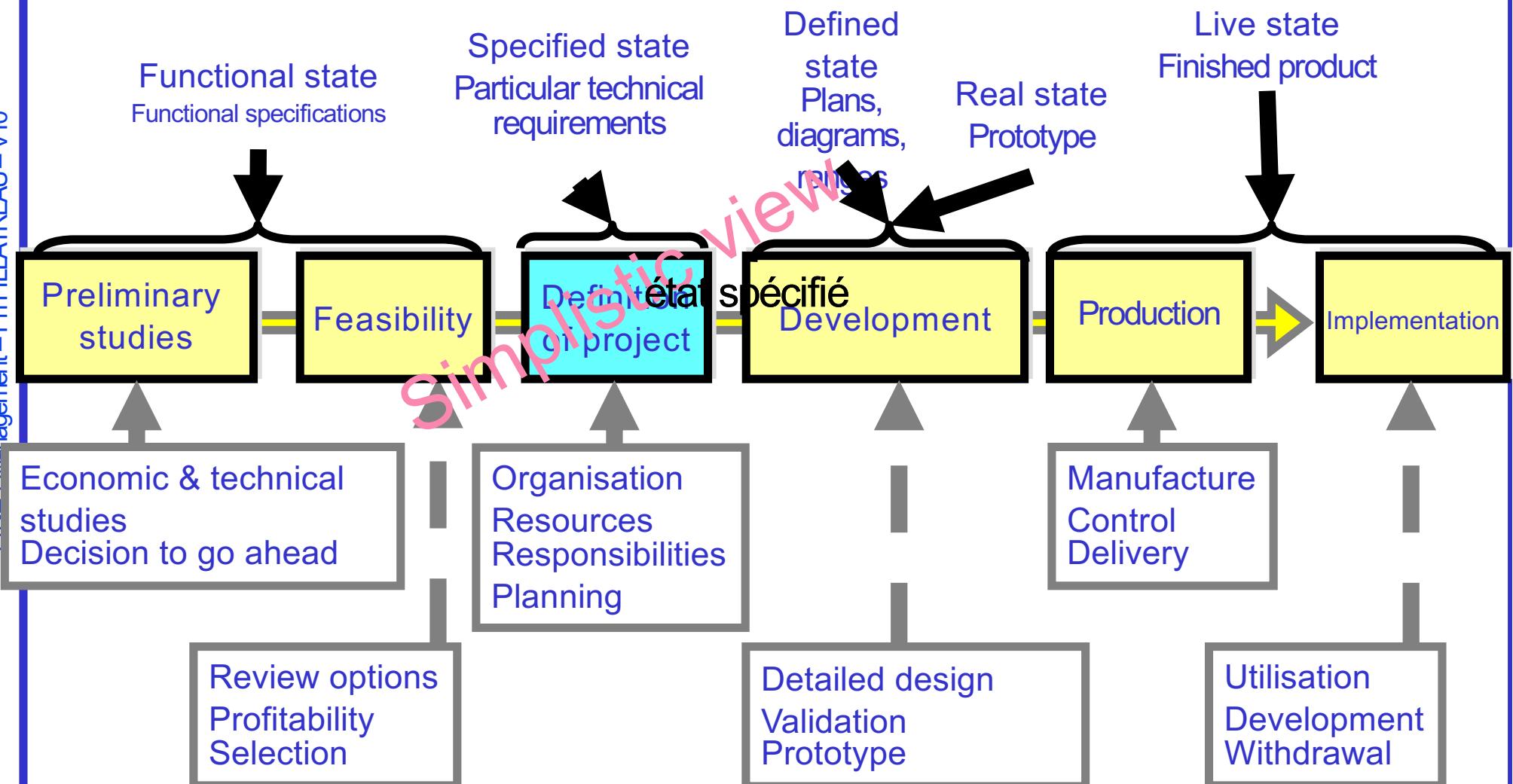
- exceed client needs and expectations,
- satisfy the project team's hopes and expectations,
- provide the project management team with the information needed to make the decisions which will enable them to honour the terms of the client contract (scope, quality, time, cost),
- put together statistical data, incidents plus reliable and reusable results to improve preparation and execution of future projects.

## **2. Life cycle of a project**

## 2. Life cycle of a project

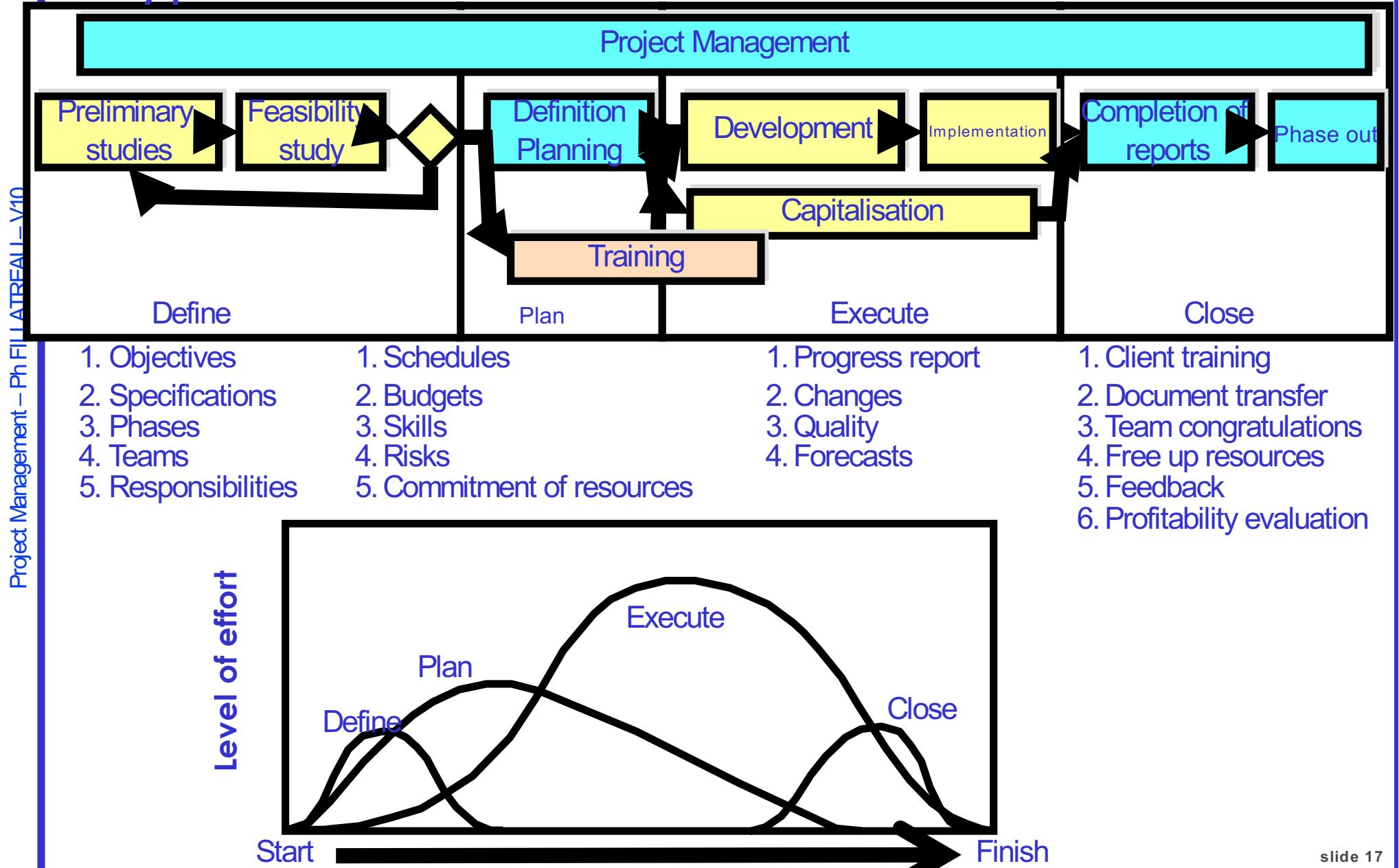
### Definition :

The life cycle of a project describes the development of a project from the initial idea to its completion.



## 2. Phases of a project

4 key phases



## 2. Types of process

### Process :

A series of actions taken in order to achieve a given objective and which requires resources, a budget and a deadline.

### Two types of process :

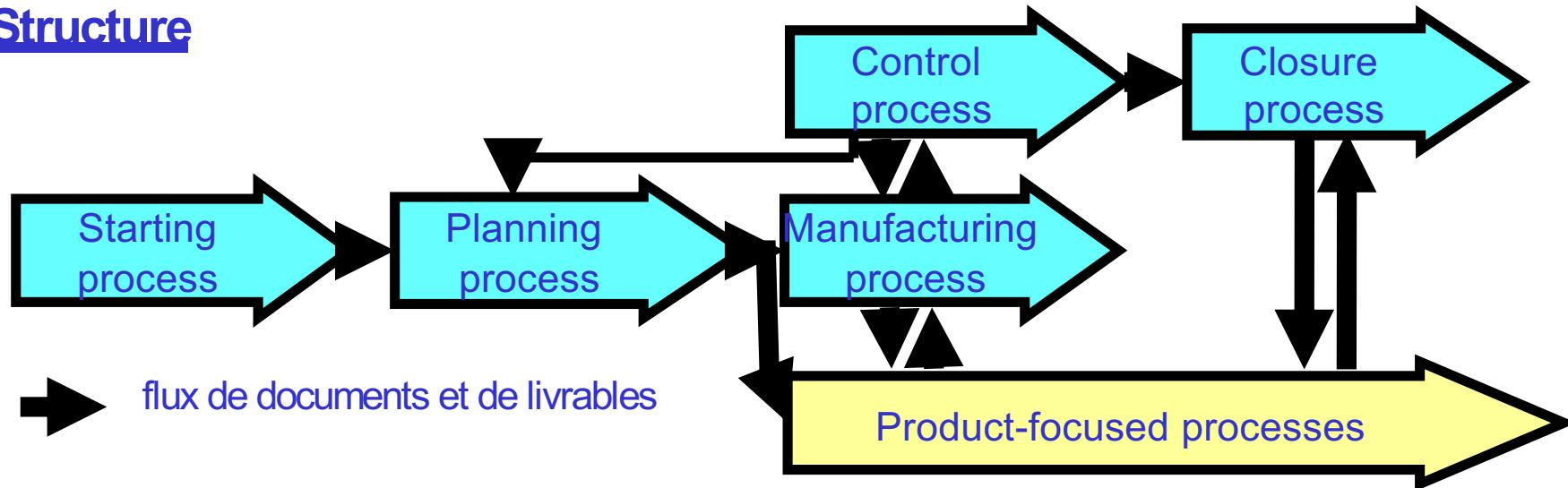
- Project management processes :
  - relate to the description and organisation of work (how the project is run),
  - are applied to most projects, most of the time.
- Product-focused processes :
  - relate to the specification and development of the product resulting from the project,
  - are part of the project life cycle, vary dependent on fields of application.

### Interaction :

- Project management and product-focused processes overlap and interact throughout the project..
- For example, project objectives cannot be defined without a minimum knowledge of how to manufacture the product.

## 2. Project management process

### Structure



### Process components :

- input data : documents or deliverables which will be produced in order to begin the process,
- tools and methods : processes applied to input data to produce output data,
- output data :collected documents or deliverables resultant from the process.

### Characteristics :

- a macro and micro vision of the project with repeated links enabling ongoing planning (as progress is made),
- major interaction between the processes : output data from one constitutes input data of one or several others ,
- overlapping of processes in each phase or sub-project.

## 2. Project management processes

Composed of 5 process types :

- Initiating:

- ensure that input data is available,
- get the company to commit to starting the next process.

- Planning:

- draw up and put into use a workable plan of execution,
- allocate budgets, responsibilities, deadlines, etc.

- Executing:

- co-ordinate staff and resources necessary for the execution of the project.

- Controlling/monitoring:

- monitor and measure progress,
- define and employ corrective actions.

- Closing:

- formalise completion of the project (prepare administrative documents),
- build on information acquired during the project,
- assign stakeholders to their new roles.

### **3. Scope of a project**

**Select a dream**

**Use your dream to set yourself a goal**

**Create a plan**

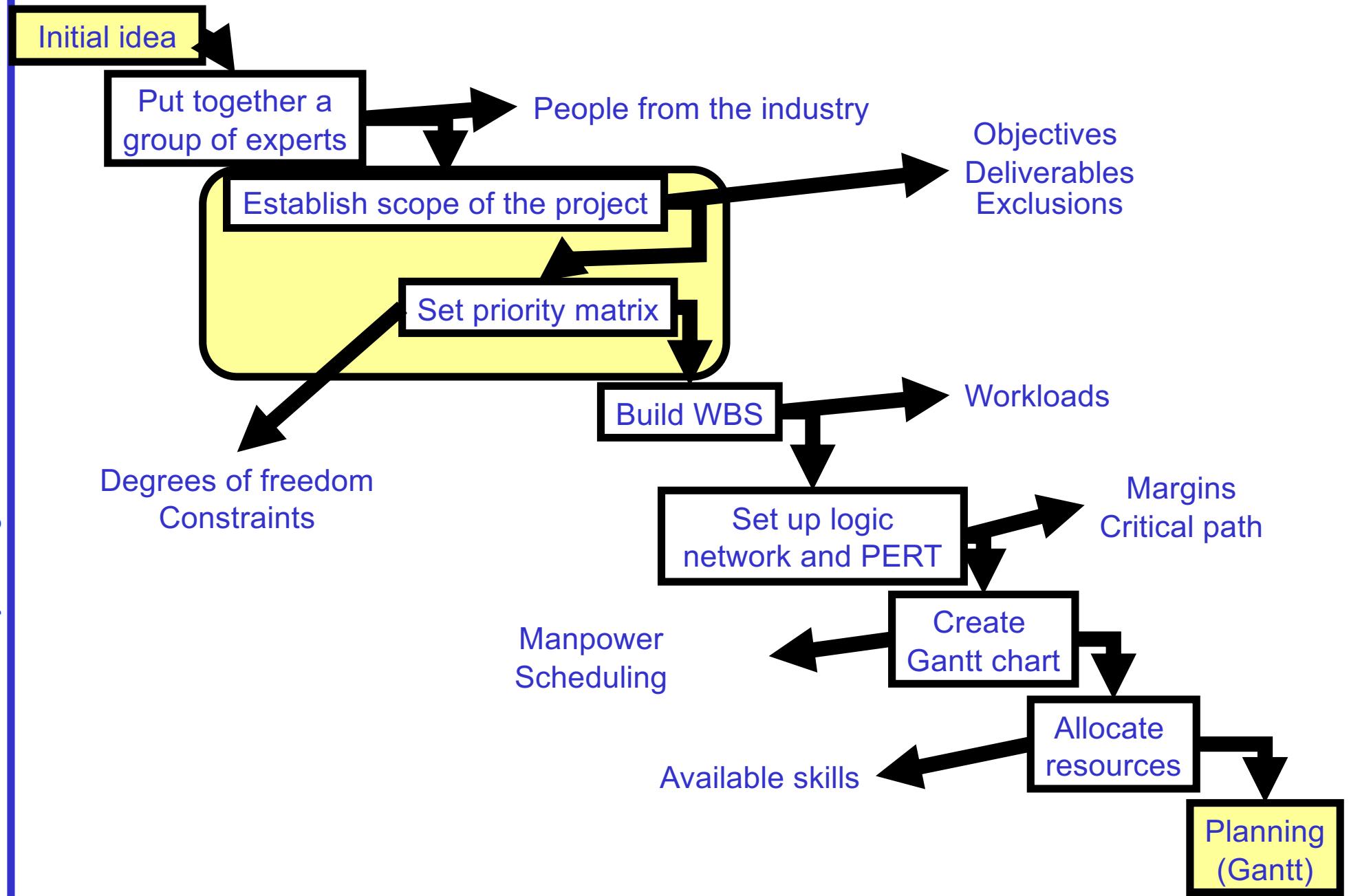
**Consider (assess) your resources**

**Exploit (use) and develop skills and abilities**

**So Go For It !**

**Success will surely follow**

### 3. Process overview



# 3. Scope of a project

Key questions to ask yourself to get your project off to a good start



Requires a global view of the project

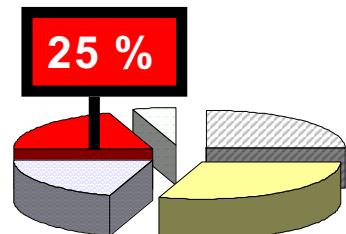
## 1 - Define objectives

Considered future situation which is :

- consciously chosen and desired,
- quantified by measurable indicators.

Establish the core target for all elements of the project.

An objective must be S.M.A.R.T.



Increase market share



Increase shareholder margin



Grow stronger in market segment



Penetrate discount store network



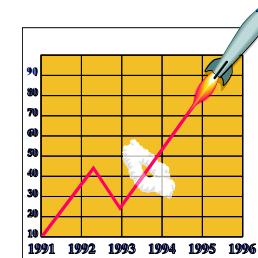
None of these suggestions is a SMART objective !

# 3. Scope of a project

## 1 - Define objectives

Ask yourself the following questions :

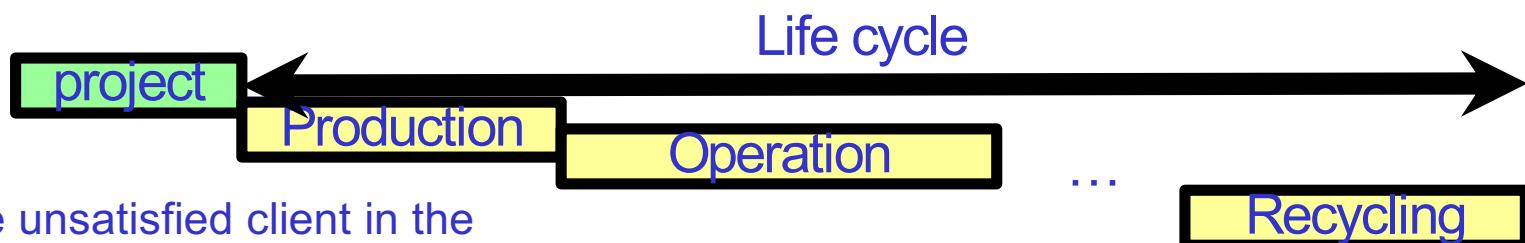
- **What for?** : goal to be achieved,
- **Why?** : what has created the need for a project?
- **What?** : key performance indicators
- **When?** : finish date
- **How much?** : what is the budget?



## 2 - Define clients and stakeholders involved in the project

Ask yourself the following questions :

- **Who is the end client?**
- **Whose collaboration is required ?**
- **Whose approval is required ?**
- **Who can oppose or stop the project ?**
- **Who needs progress reports on the project ?**



Just one unsatisfied client in the cycle can ruin the project !

# 3. Scope of a project

## 3 - Define the main deliverables

For each **client** ask yourself :

- What are their **criteria for satisfaction**?
- What **result** will be necessary to satisfy them and in what form?
- Will the hoped-for result be acceptable to the client ?

## 4 - Define milestones and their schedule

Milestone : important and precise moment of the project which acts as a performance control point.

A milestone often equates to the achievement of an important deliverable.

The definition of milestones helps provide :

- an initial estimate of duration, costs and resources,
- a basis for determining the major stakeholders in the project.

The milestone schedule is set according to the required deliverables.

# 3. Scope of a project

## 5 – Define technical requirements

Technical requirements: constraints which will ensure a performance in line with client expectations.

Technical requirements can be :

- compatibility of electronic or computer formats,
- ability to function in the particular work environment (220V, 110Hz)
- current regulations (e.g. swimming records approved by FINA).



**Key element to success often forgotten in definition of the project !**

## 6 – Define limits and exclusions of the project

Limits and exclusions of content: things that will not be done during the project.

To be clearly specified from the start in order to avoid :

- waste of resources and time due to poor problem analysis,
- client disappointment.



**Fundamental to client satisfaction**

### 3. Scope of a project

#### 7 – Evaluate risks

Identify possible events which could have a negative impact.

Ask yourself the following questions :

- What are the guarantees of progression and completion ?
- What are the main risks ?
- How formal and structured is the project ?
- How does the project relate to the company's current business ?

Standard tool : 5M

1 – Man : selection, skills / performance, personal factors

2 – Media : external, largely environmental forces

- Climatic
- Operational
- Hygienic / safety
- Etc

# 3. Scope of a project

## 7 – Evaluate risks (follow-up)

3 – Machine : used as intended, limitations, interface with man

- Design : engineering reliability and performance, ergonomics
- Maintenance : availability (time, tools & parts), ease of access
- Logistics : supply, upkeep, repair
- Technical data : clear, accurate, useable, available

4 – Management : drives the interaction between Man, Media, Machine and Mission - standards, procedures, controls

5 – Mission : the desired outcome

- Objectives : complexity understood, well defined, obtainable
- The results of the interactions of the 4 other Ms.

## 8 – Review content with the client

This will ensure that :

- client expectations are agreed and understood,
- contributions and changes are acceptable to the client,
- limits and exclusions are fixed.



**This can reveal 50% of client dissatisfaction**

**Ensure relevance of the project before committing resources !**

# 3. Scope of a project

## Set priorities

The success of a project depends on the ability to adapt to change  
need to have degrees of freedom and priorities

Direct relation between cost and schedule  
varies between cost, schedule and content



## Priority matrix

Overview of the project setting out priorities and degrees of freedom

Three types of behaviour :

- Compliance: performance criteria which must be met or which cannot be modified,
- Improvement: performance criteria needing to be improved to increase client satisfaction,
- Approval: criteria for which a reduced performance is acceptable

Each project has its own priority matrix

	Content	Cost	Schedule
Comply with			
Improve			
Approve			

## 4. Project planning

« If one does not know to which port one is sailing, no wind is favourable. »

Seneca, Greek philosopher (c. 4 - 65 AD)

# 4. Work breakdown structure (WBS)

## Objective :

Convert a list of deliverables into a list of tasks.

**Difficult and key element in project planning**

## Rule :

- break down each deliverable into sub-deliverables and so on until you obtain deliverables which can be managed by one identified person or group of persons,
- identify work packages required to produce the sub-deliverable,
- allocate a manager to each unit,
- allocate a cost centre.

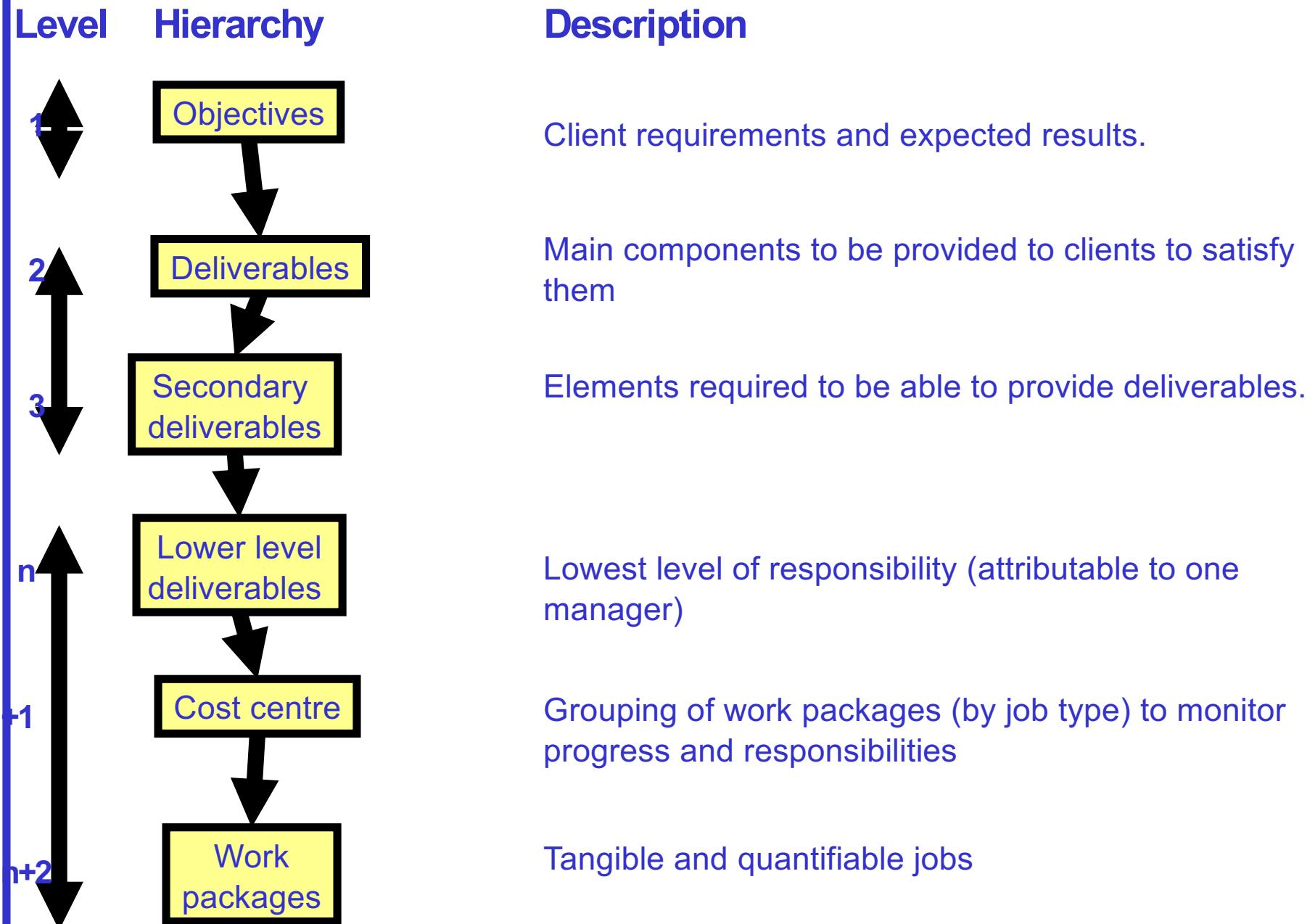
## Benefits :

enables identification of 90 - 95% of tasks to be undertaken,  
breakdown of overall work into smaller elements :

- easier to handle,
- run by one local manager (1 task = 1 boss),
- retains overall coherence .

facilitates progress measurement,  
applicable to more than 90% of projects, whatever their size or field

## 4. Project structure



## 4. Work breakdown structure (WBS)

Level

1

Personal computer prototype

2

Software and applications

Storage units

Mouse,  
keyboard,  
audio system

Microprocessor

other  
components

3

External  
USB

Hard  
disk

Laser  
disk

Internal  
memory

BIOS system

n

Motor

Printed  
circuits

Framing

Read/write  
head.

lowest level  
deliverables

n+2

LTA

LTB

LTE

LT F

LTC

LT J

LT D

LT K

work packages

## 4. Work breakdown structure (WBS)

Each work package enables :

- definition of the work (what?),
- calculation of time required to complete one package (how much time?),
- calculation of resources needed to carry out work package (who?),
- setting of budget (how much money?),
- identification of progress indicators (control)

Make sure you set out the necessary pre-requisites for starting the work.

Preparation of a WBS:

- difficult job,
- result of a team effort (one or more teams)



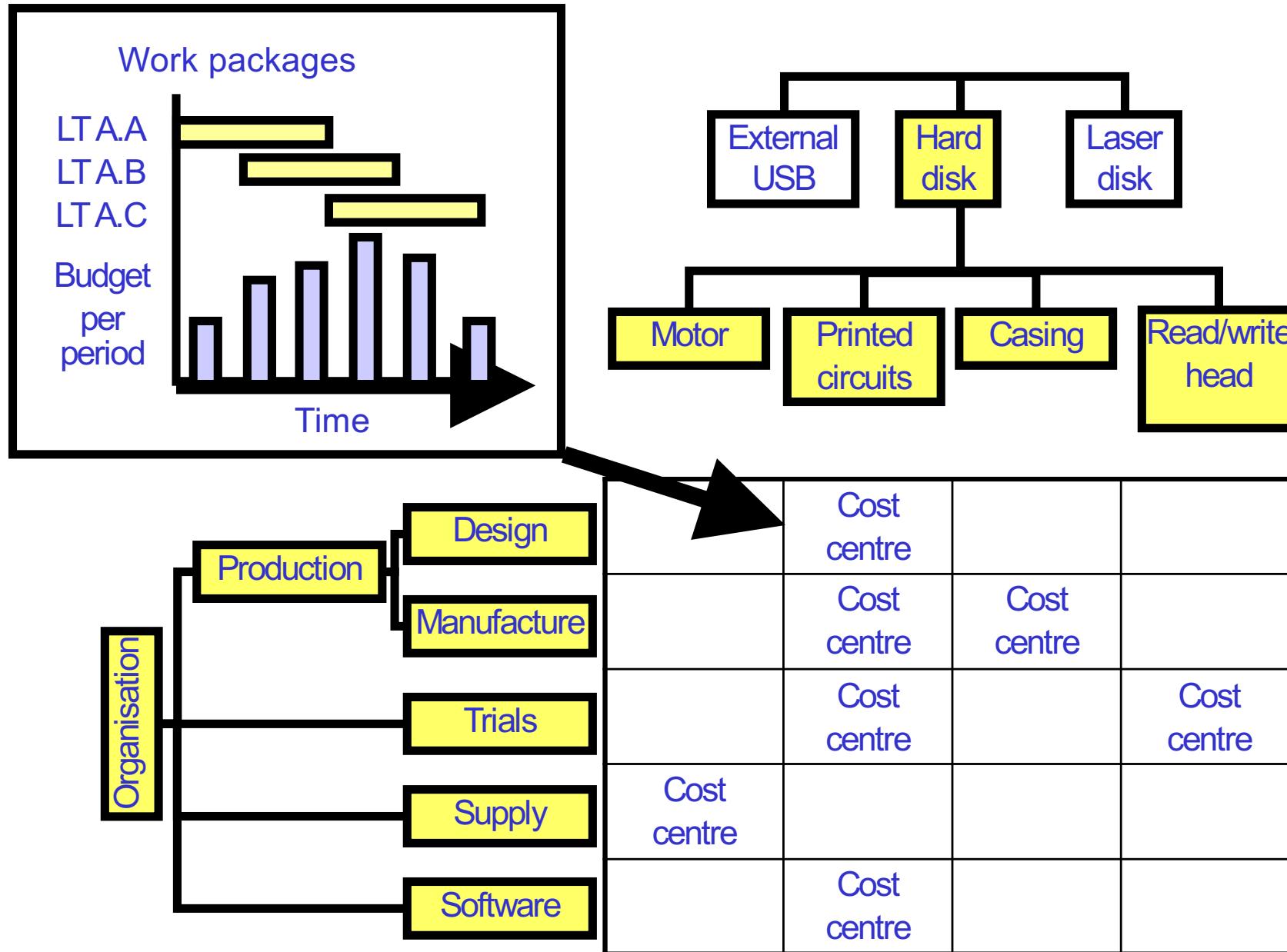
A WBS is used to identify project tasks. It is not :  

- the nomenclature of the final product,
- the process of making the product !

Integrating the WBS into the organisation :

- specify departments responsible for work packages,
- allocate cost centre to be able to monitor production.

## 4. Work breakdown structure (WBS)



RAM: Responsibility Assignment Matrix

## 4. Estimating duration

Estimation :

- involve people of the relevant profession and/or get their approval (best involvement),
- take into account calendar time (weekends, bank holidays, company closing).

Resources required:

- duration depends directly on the number of resources allocated to a task,
- Note! Function is not linear and has thresholds

History: use of past results from :

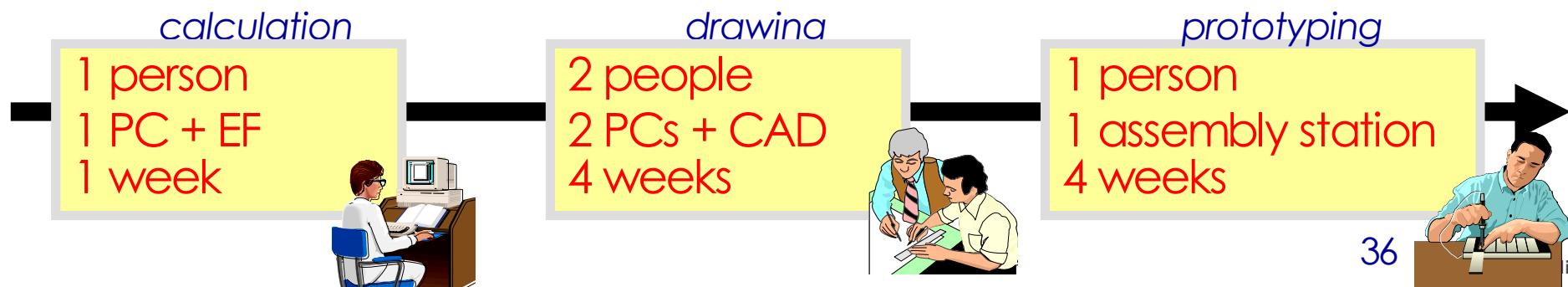
- project files : formalised results often few in number and with little detail
- databases: unambiguous external results and often must be paid for,
- stakeholder experience : tacit results often less reliable but numerous.

Capacity of resources: duration depends on :

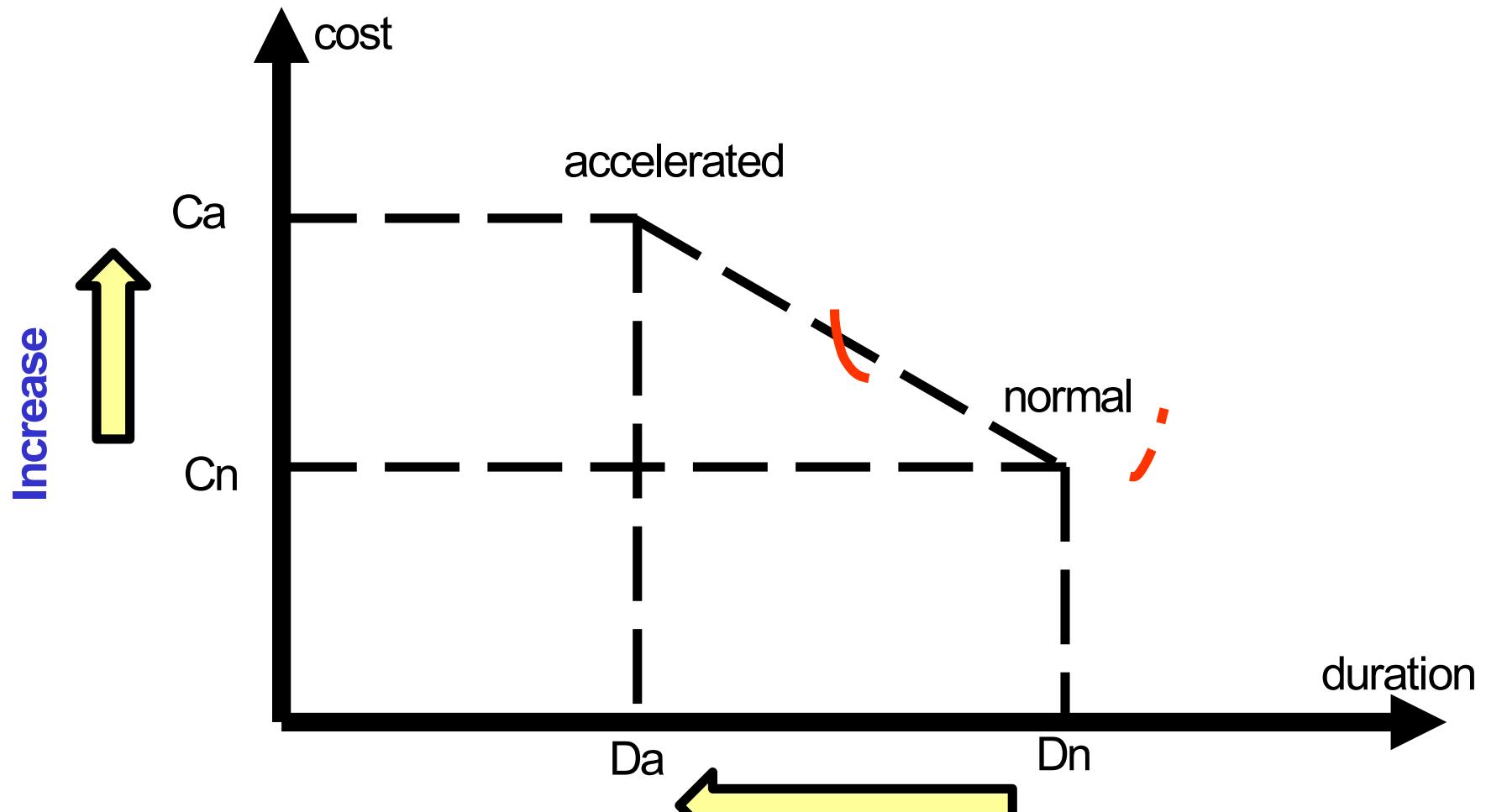
- the experience of the people involved,
- the equipment used.



**Draw a Gantt chart**



## 4. Cost – time relationship



Unrealistic : we can spend more, but we won't go faster

Decrease

Unrealistic : if we go slower, we'll spend more

## 5. Time management tools

## 5. Precedence table

### Objective :

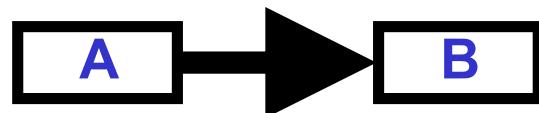
Present all project tasks in a simple and comprehensive way.

This table is the result of industry experts' analysis of resources to be used to keep to specifications. .

Tasks represented by letters	Clear and concise description	Direct or indirect time constraint	Human resources required	Necessary entry points to be able to start
A	Research current practice	1 month	R&D	none
B	Study the market	6 months	Marketing	none
C	Plan project	2 weeks	Project Manager	A and B
D	Monitor project	same finish as N	Project Leader	C
N	Close the project	1 week	All	L and M

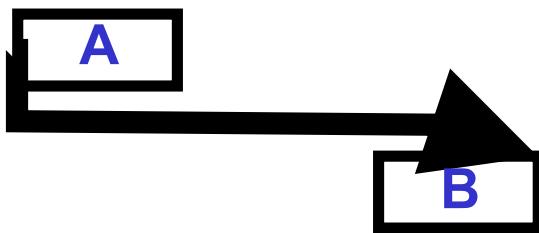
## 5. Types of dependency

To link the beginning and end of two tasks, there are many types of **dependency** :  
**what a task needs to be able to start or finish.**



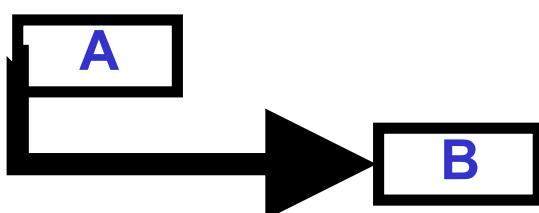
**Finish to start**

The end of one task triggers the start of another.



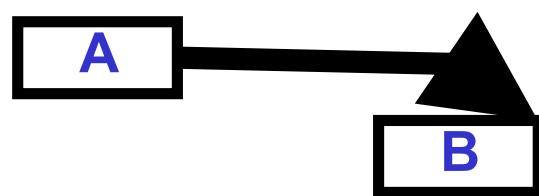
**Start to finish**

The start of one task triggers the end of another.



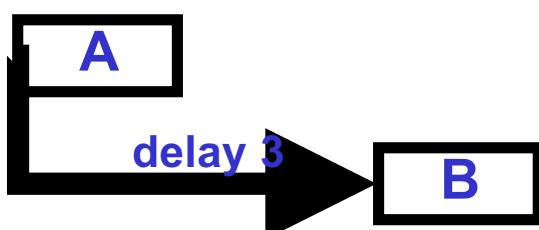
**Start to start**

The start of one task triggers the start of another.



**Finish to finish**

The end of one task triggers the end of another.



**Start to delayed start**

The start of one task triggers the start of another with a 3-period gap.

# 5. Logic network

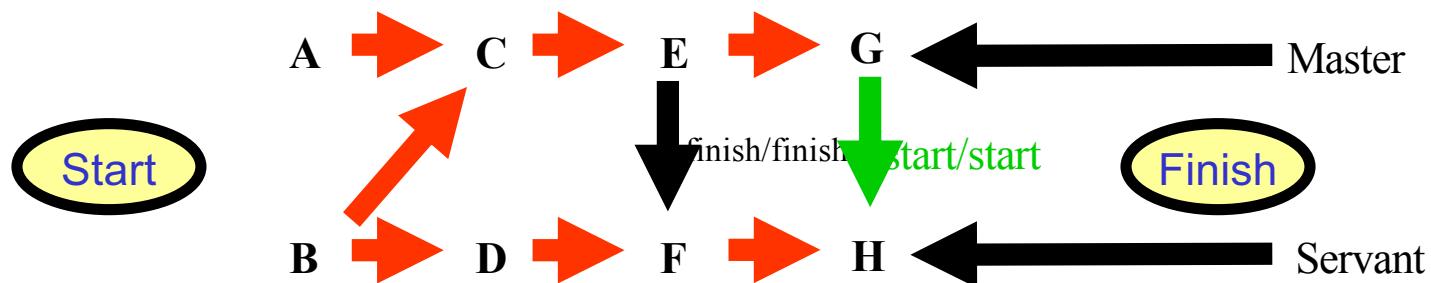
## Objective : check

the consistency and sequence of project tasks

the exhaustiveness of the task list

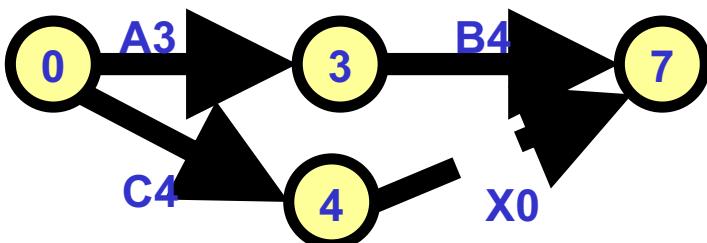
Show the sequence of tasks taking into account the **dependencies**.

Activity	Description	Duration	Personnel	Dependencies
A				None
B				None
C				A and B
D				B
E				C
F		Same finish as E		D
G				E
H				F and start of G

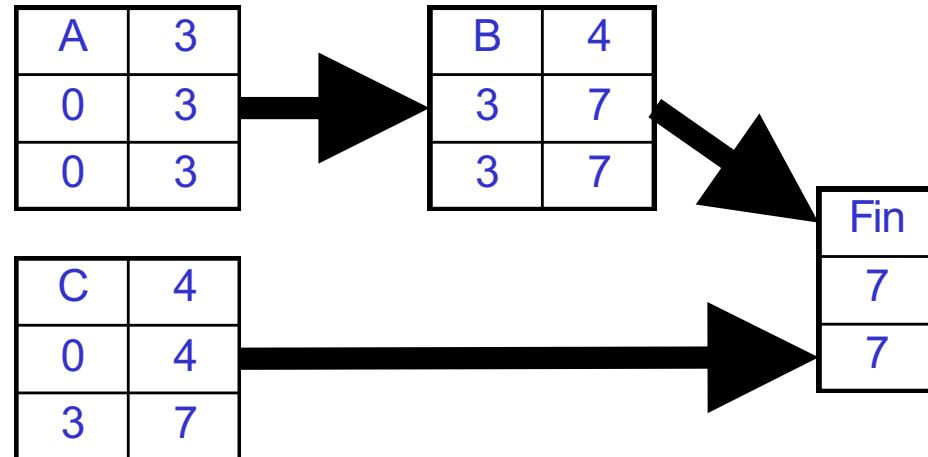


# 5. Temporal networks

Network diagram:  
**PERT chart**



**Potentials method**



## Fundamental rules of construction :

- the arrow runs from **left to right**,
- a task can only start once all the entry points are available,
- each task must have unique and specific numbering
- loops are not allowed (a task is only performed once),
- wording such as « if... then ..., if not ... » is not permitted,
- it is possible to use start and finish nodes to simplify reading,
- avoid crossing arcs (tasks) or dependency constraints as much as possible,
- draw the network and present it in the clearest way possible.

## 5. Critical path and margin

The **critical path** is the **longest** path between the start and finish of a project.



The critical path can change during the project !  
There can also be several critical paths.

**total float (n) = [latest finish task(n)] - [earliest finish task(n)]**

**free float (n) = [earliest start task(n+1)] - [earliest finish task(n)]**

(amount of time a task has to be completed without modifying the earliest start of downstream tasks)

The **critical path** is made up of the tasks that have **the lowest** total float

The **total float** of the critical path can be **negative**.

# 5. Temporal networks

## Method

- devised in 1958 by Bernard ROY (a Frenchman)
- based on two components :
  - **activities** are **positions** and are represented by rectangles,
  - **antecedents** are represented by **arcs**.

## Structuring

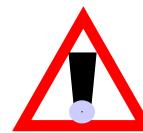
Indicate the following for each activity:

- early start date (départ hâtif) : **DH**
- early finish date (fin hâtive): **FH**
- late start date (début tardif): **DT**
- late finish date (fin tardive): **FT**
- total float (marge totale) : **Ma**,
- description,
- planned duration,
- identifying number.

<b>DH</b>	<b>N°</b>	<b>FH</b>
<b>Ma</b>	<b>Description</b>	
<b>DT</b>	<b>Duration</b>	<b>FT</b>

## Note

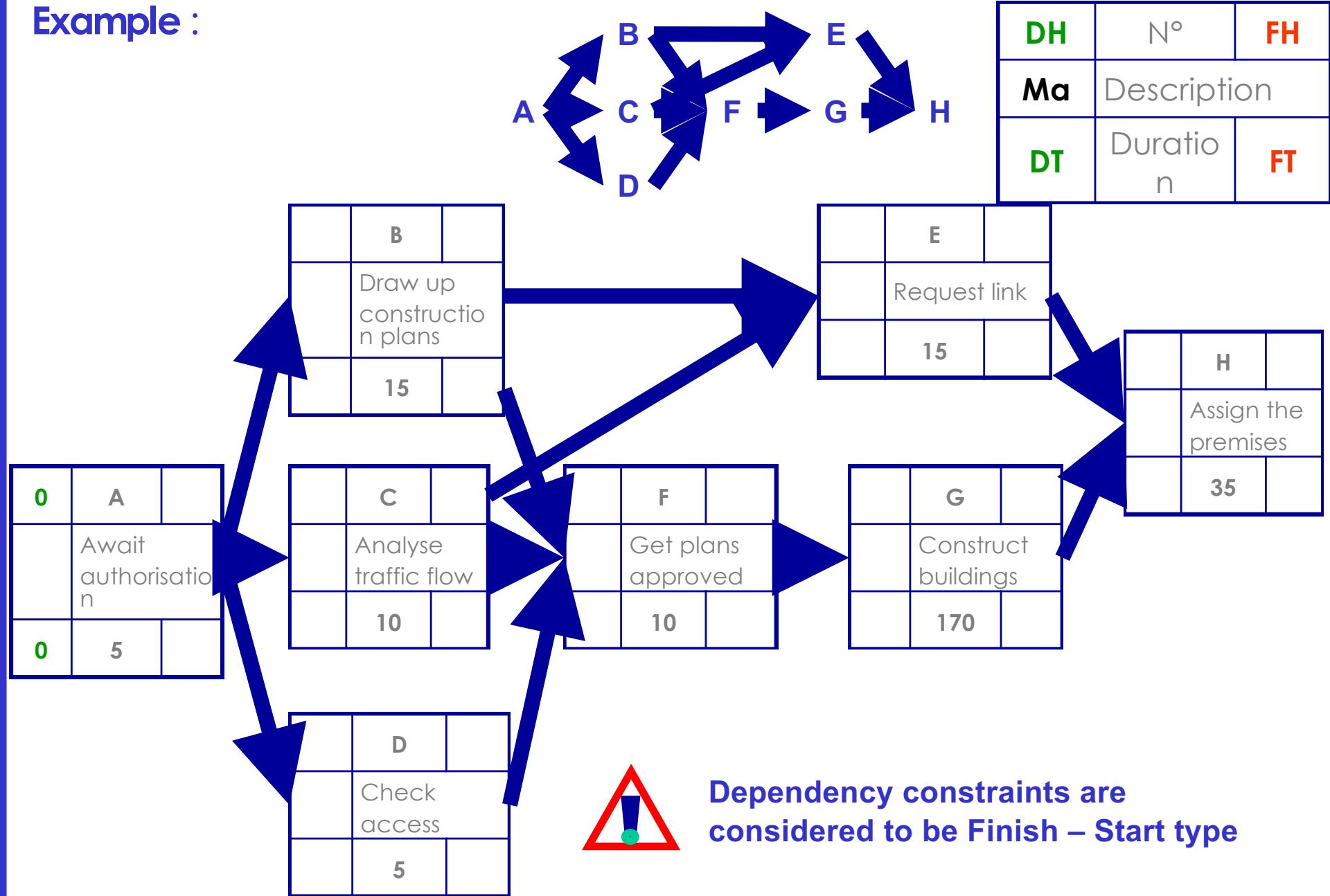
It is possible to create project start and finish elements.



Do not confuse this with the PERT method!

## 5. Potentials method

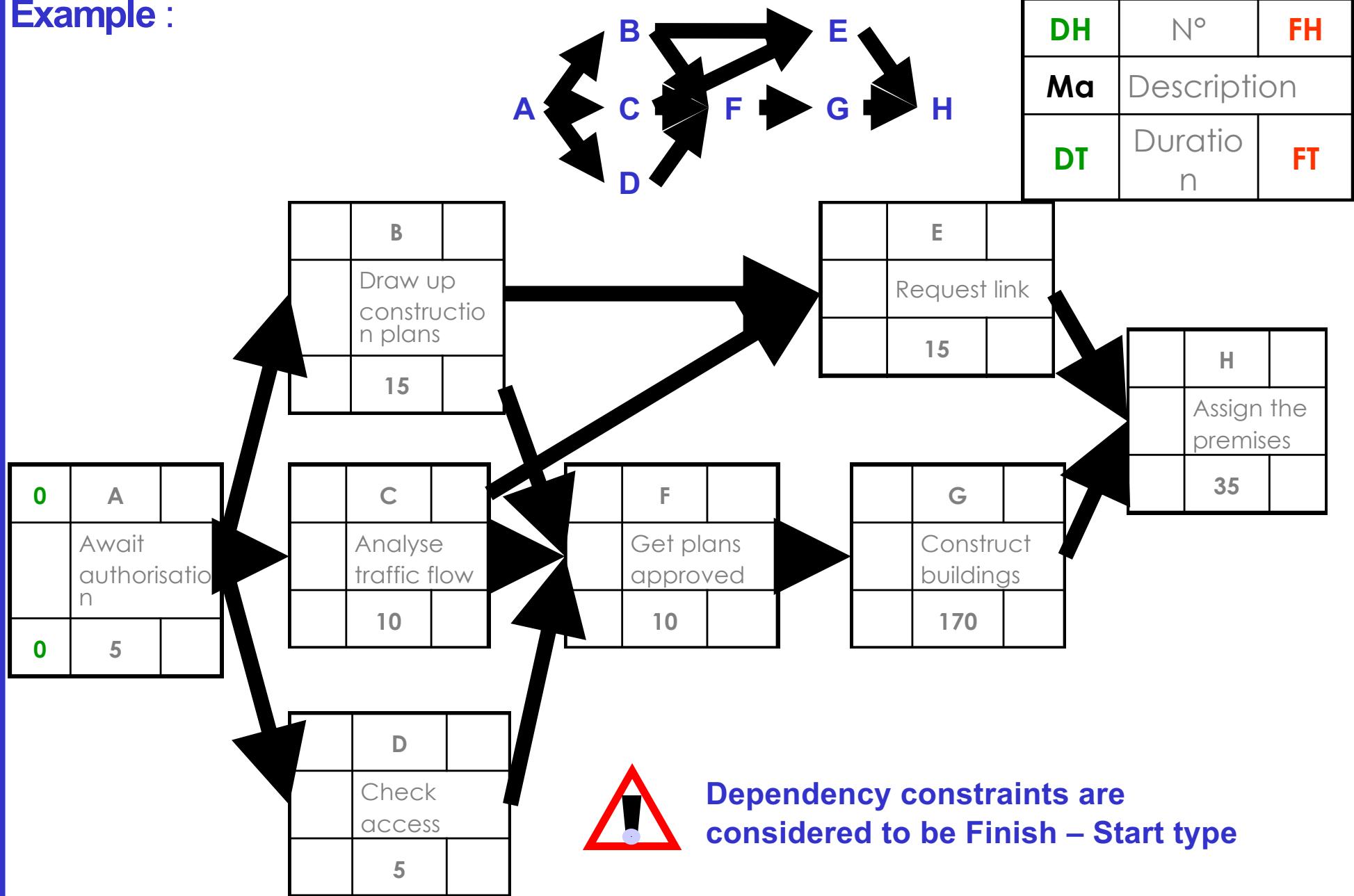
Example :



Dependency constraints are considered to be Finish – Start type

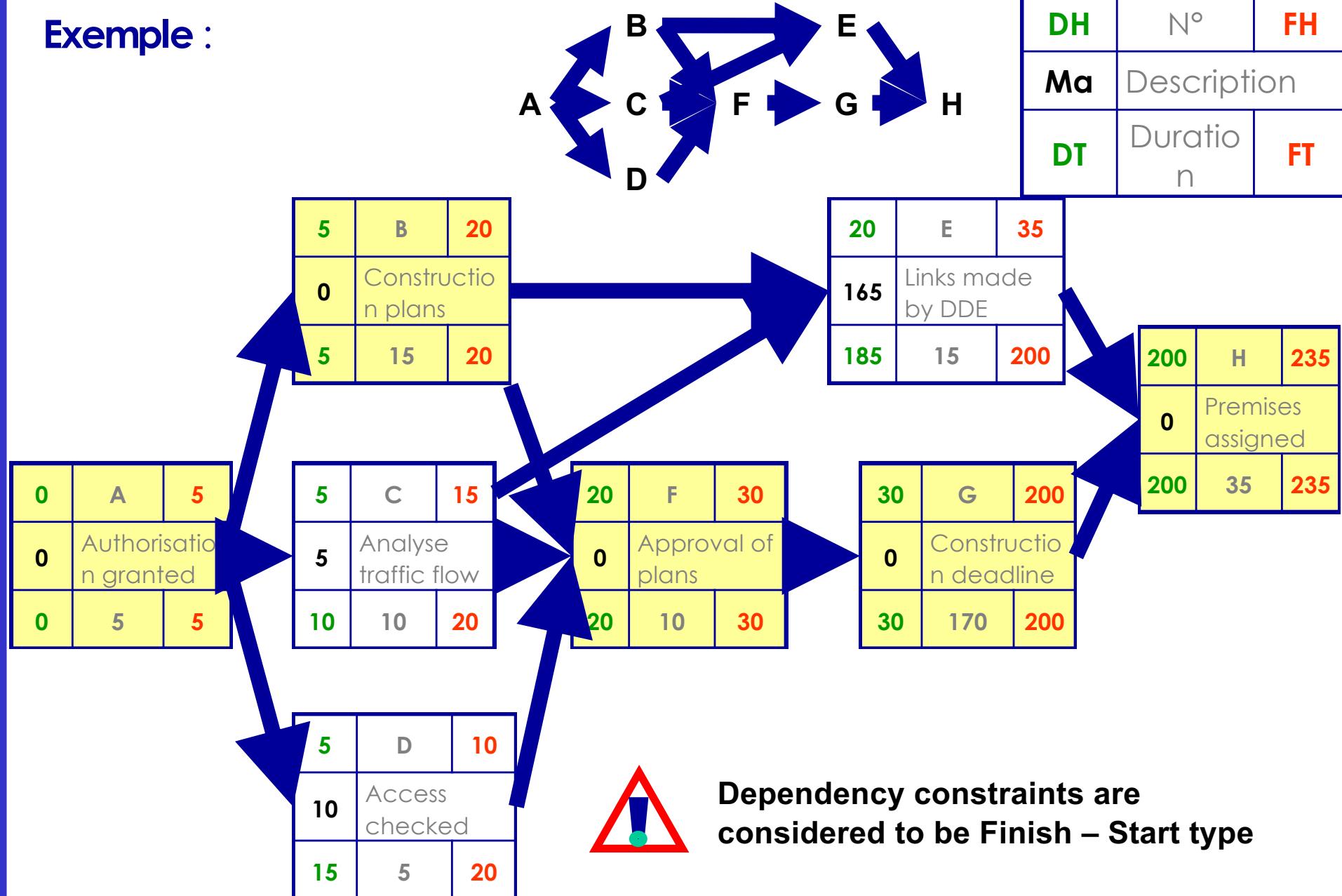
# 5. Potentials method

Example :



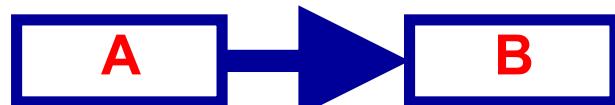
## 5. Potentials method

Exemple :

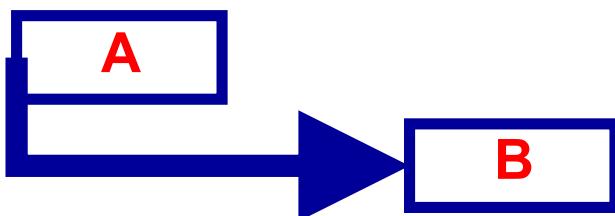


# 5. Time management tools

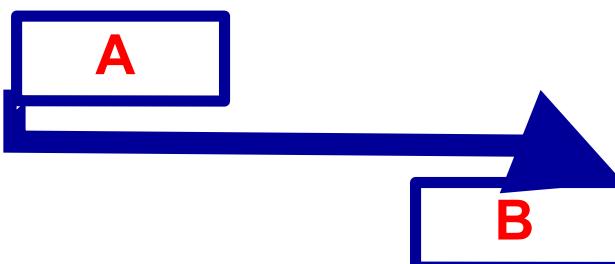
Other types of antecedents:



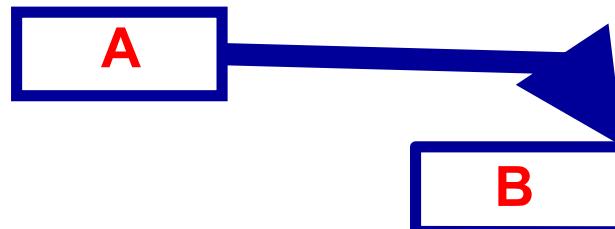
Finish - start  
type



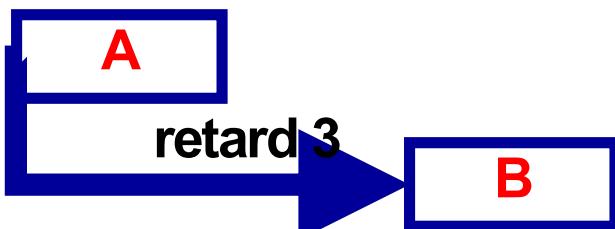
Start – start  
type



Start – finish  
type



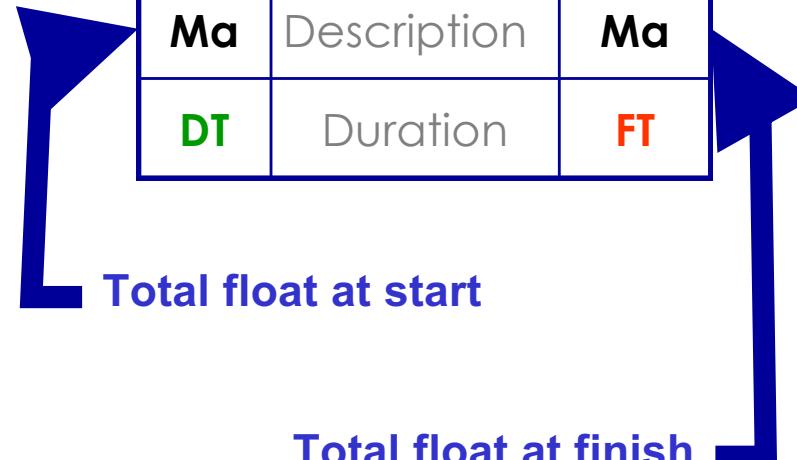
Finish – finish  
type



Start – delayed start  
type

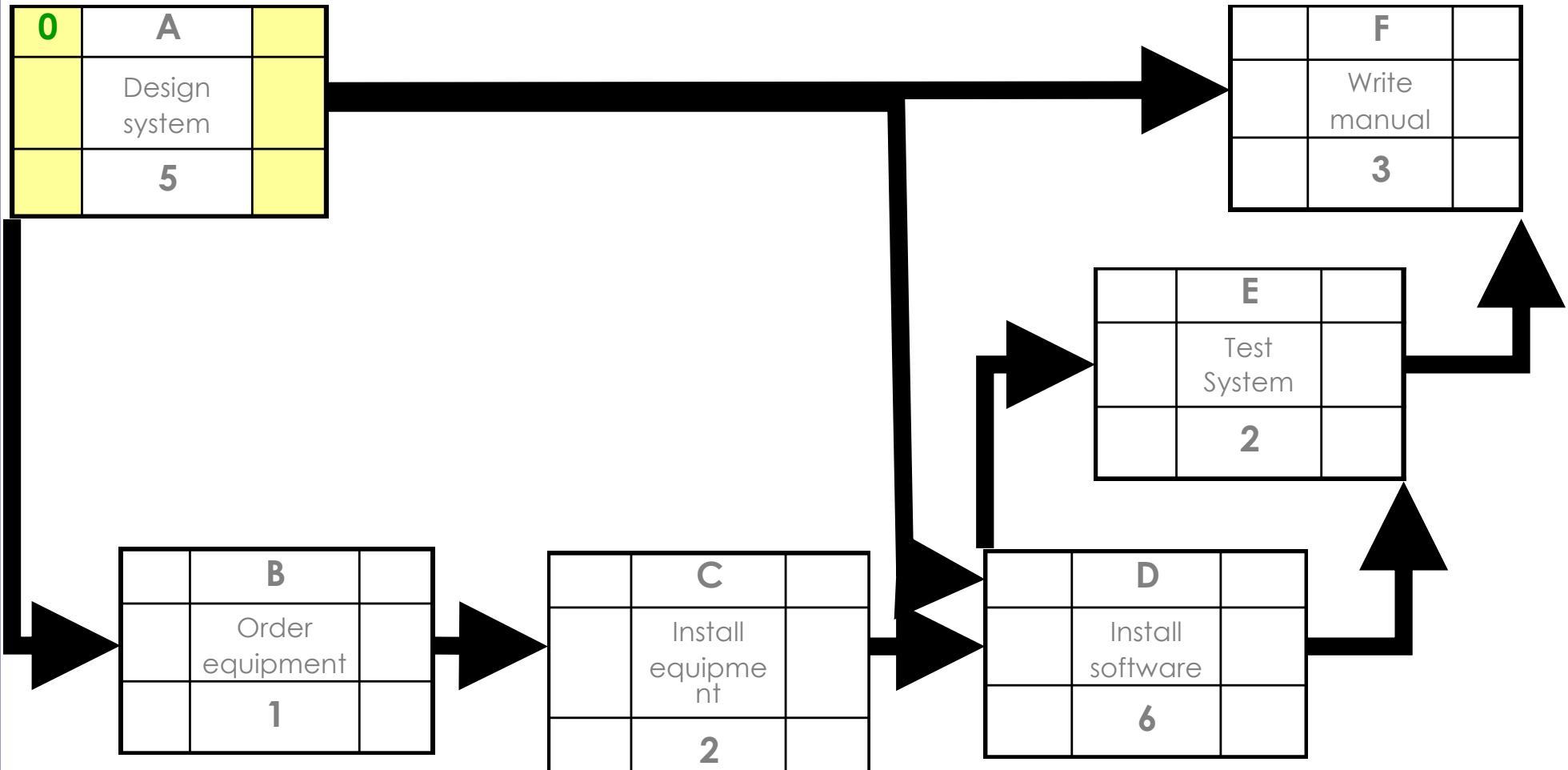
Progression of task  
structuring:

DH	N°	FH
Ma	Description	Ma
DT	Duration	FT



## 5. Potentials method

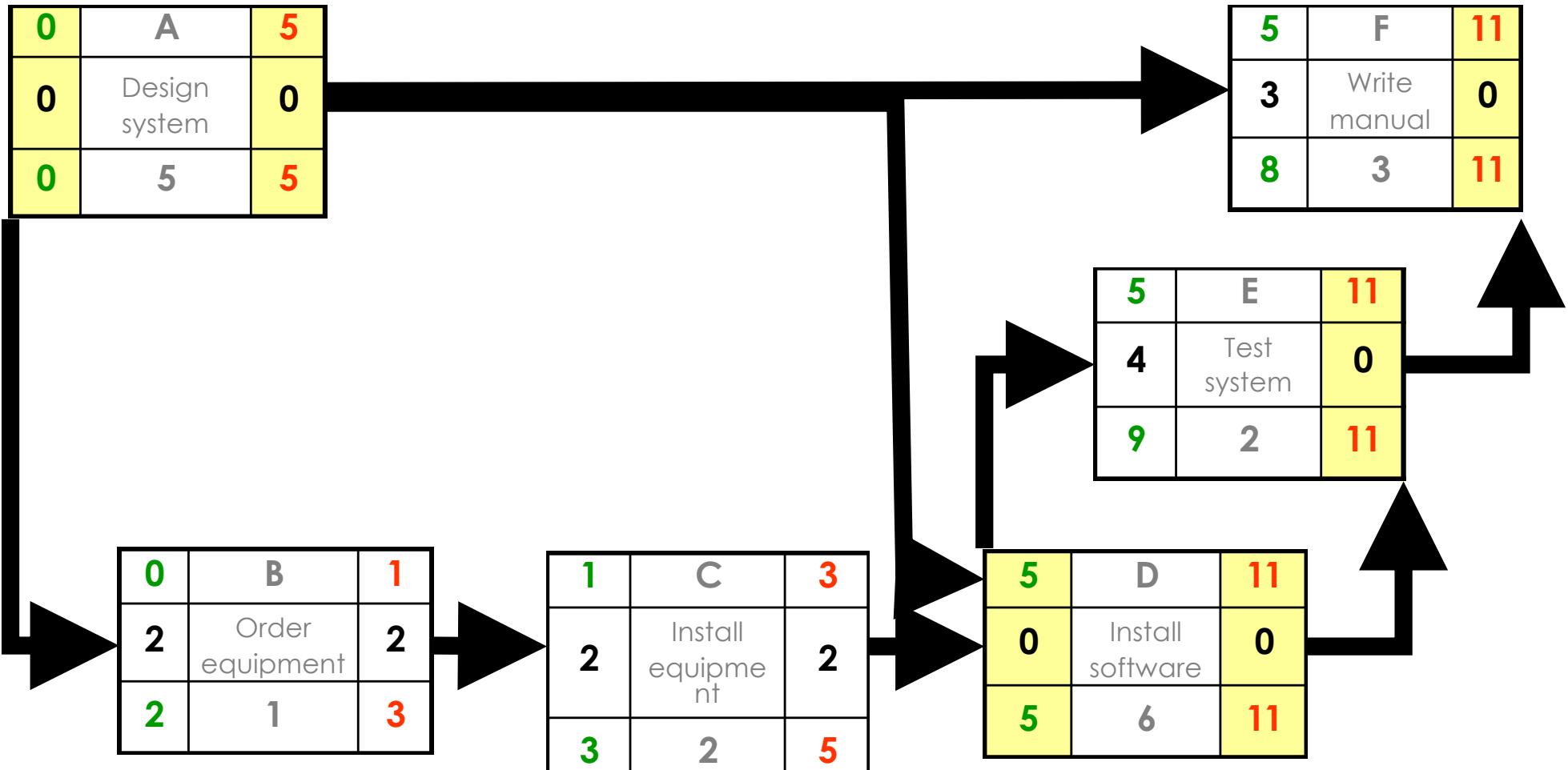
Example :



DH	N°	FH
Ma	Description	Ma
DT	Duration	FT

## 5. Potentials method

Example :



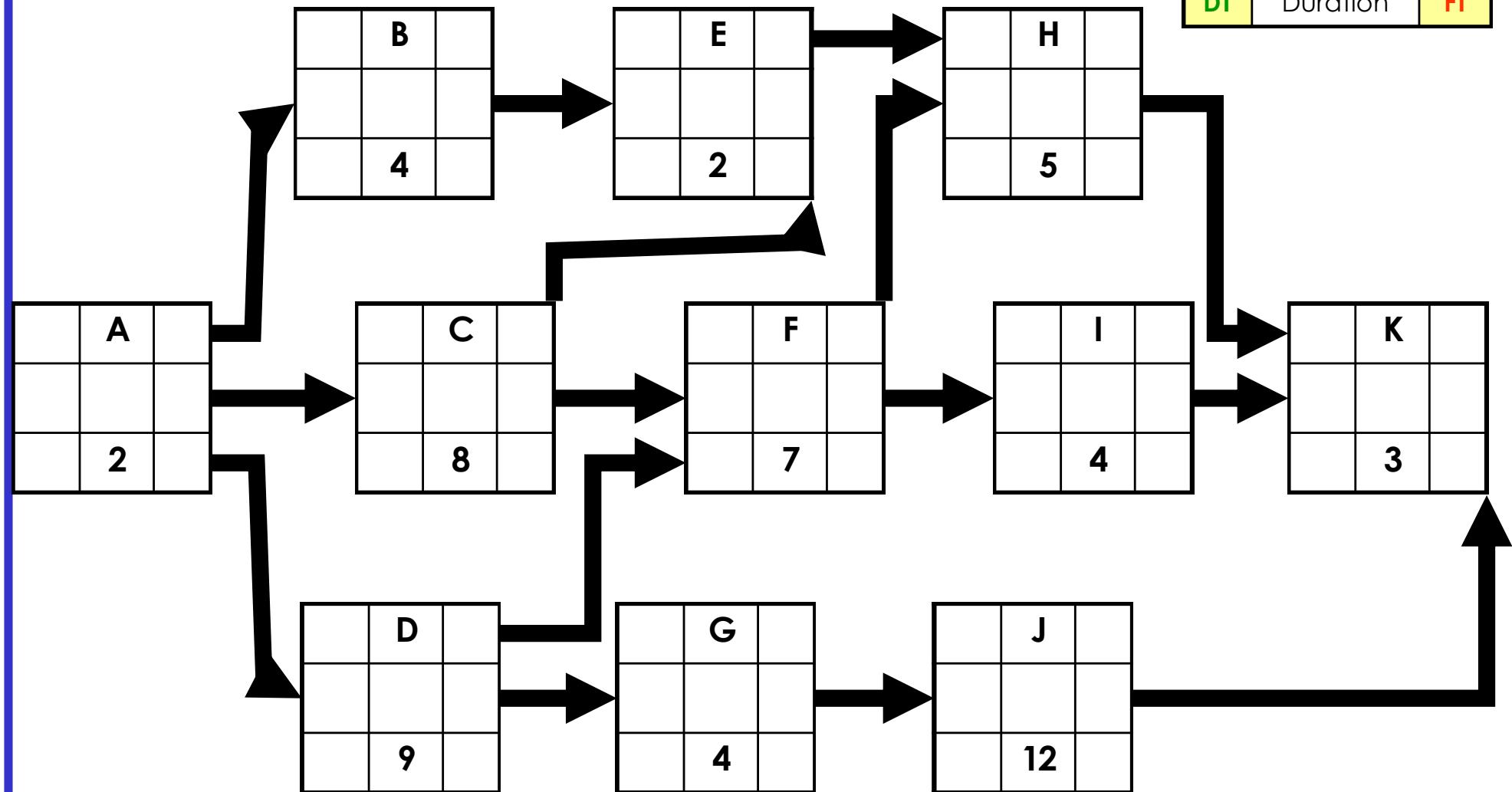
Tasks can be critical at start, at finish or on both dates !

DH	N°	FH
Ma	Description	Ma
DT	Duration	FT

## 5. Potentials method

Exercise with several types of dependency:

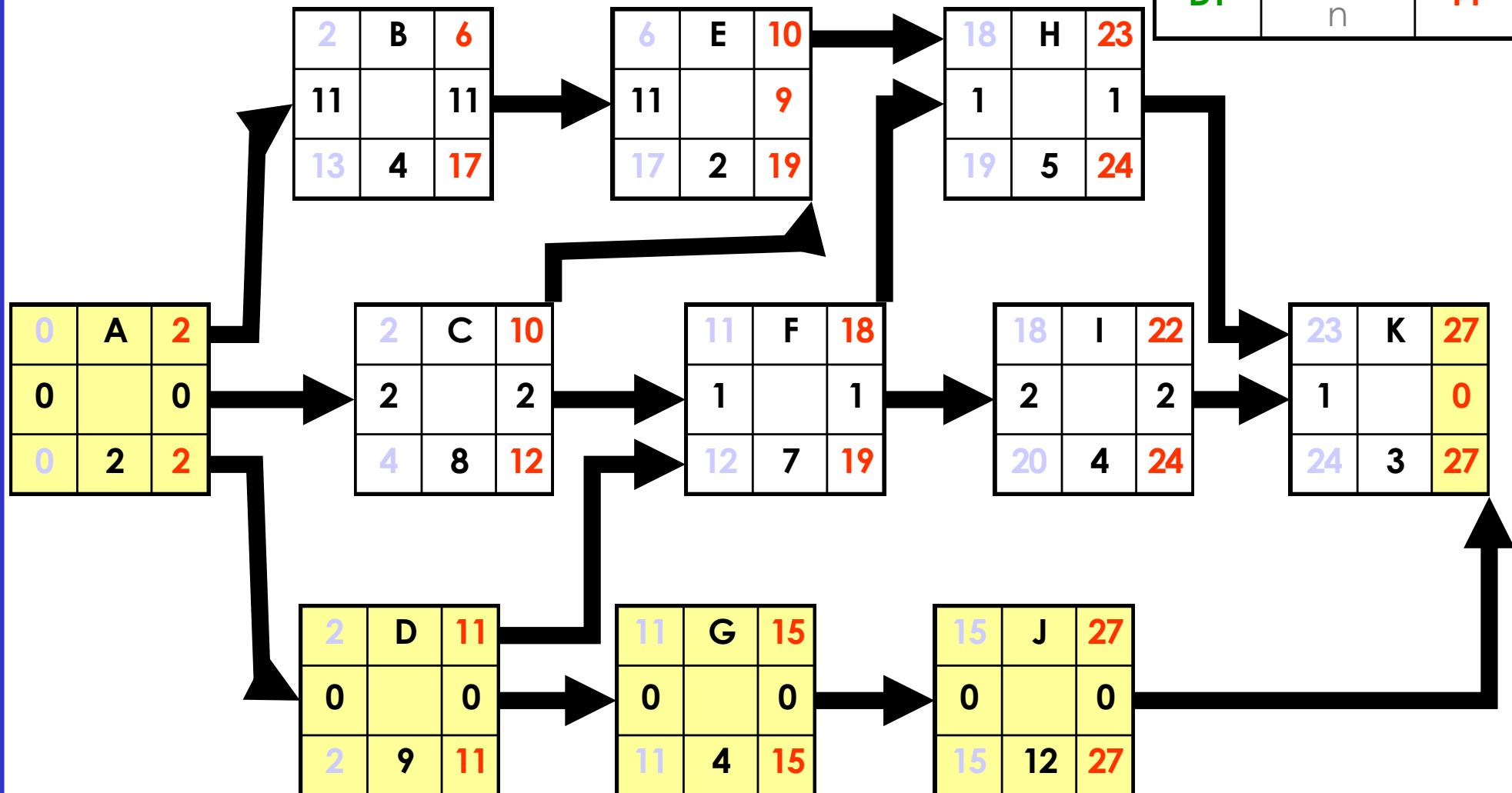
DH	N°	FH
Ma	Description	Ma
DT	Duration	FT



# 5. Potentials method

Exercise with several types of dependency:

DH	N°	FH
Ma	Description	
DT	Duration	FT



## 5. Gantt chart

Tool developed in 1917 by Henry Gantt which enables:

- graphical representation of:
  - *the temporal organisation of tasks or work packages,*
  - *use of resources by the tasks,*
  - *work progress,*
  - *temporal margins,*
- display of the schedule and use of resources.

**Principle :**

- put on an orthonormal basis (or a chart) :
  - *on the y axis, tasks or resources are represented by rectangles whose length is proportional to the duration (actual or forecast),*
  - *on the x axis, temporal scale (month, weeks, periods, etc.),*
  - *links between tasks or resources in order to plot dependencies,*
- fill the rectangles proportionally to the degree of completion of the tasks.

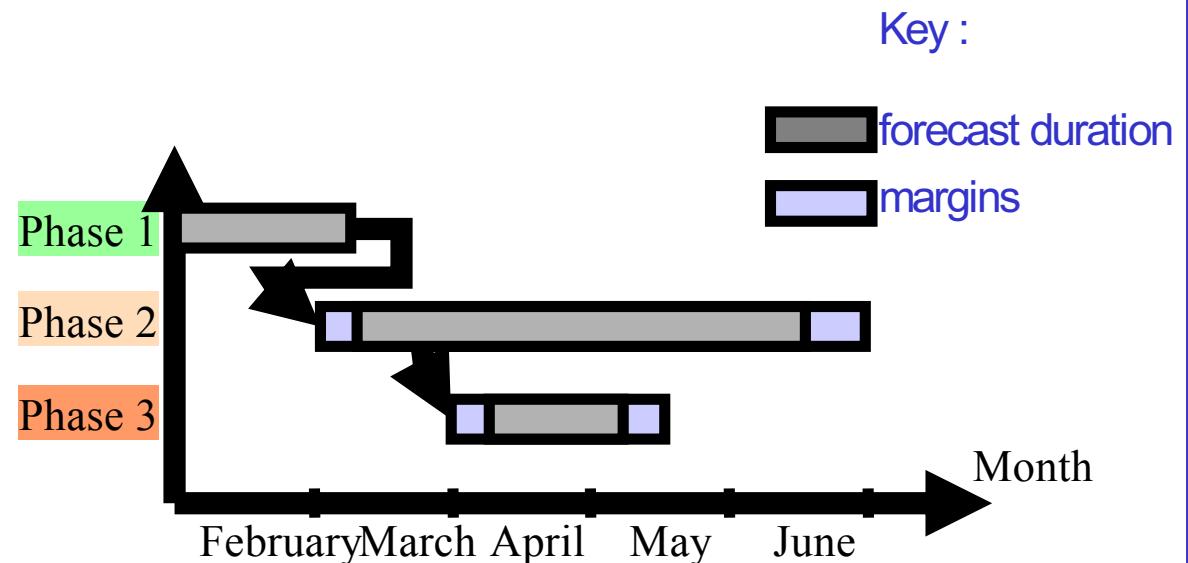
Simple, visual tool used in all types of projects, whatever their size or domain.

# 5. Gantt chart

Two types of Gantt chart:

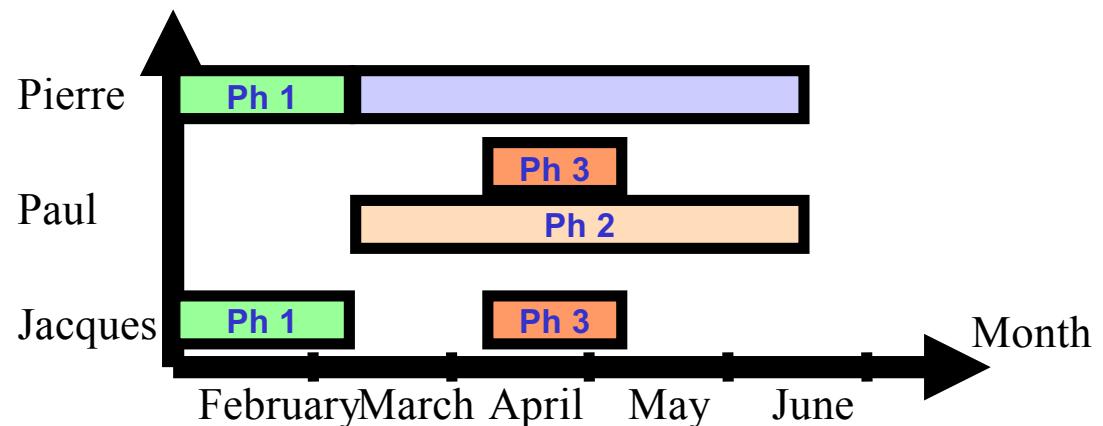
## Tasks / time

Displays the organisation of tasks on the timeline with precedences and margins



## Resources / tasks / time

Displays the use of resources within the tasks and timescale.



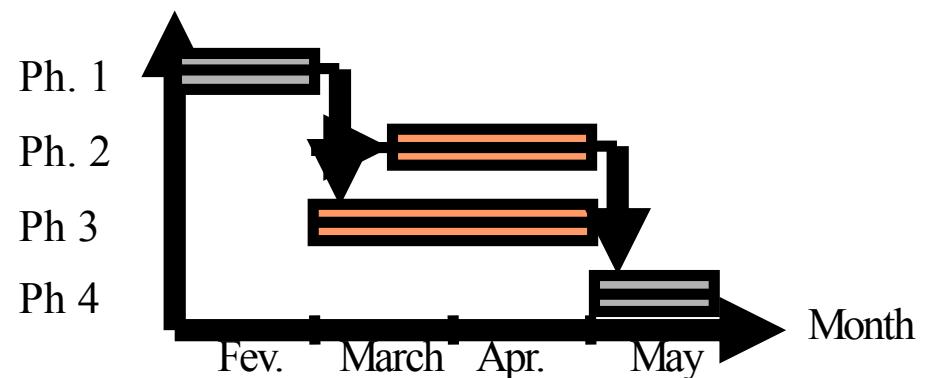
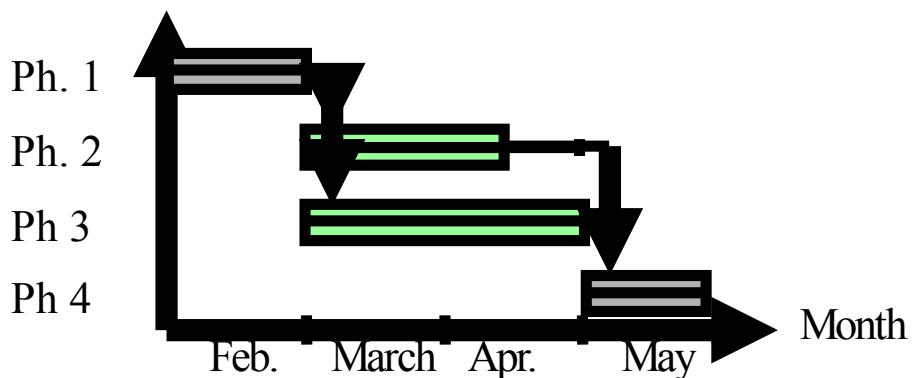
# 5. Setting milestones

## Setting downstream milestones

This involves making tasks start as early as possible, when the resources are available.

Planning is done from the start of the project and enables you to calculate:

- early start and finish dates of the tasks,
- earliest finish date of the project



## Setting upstream milestones

This involves making tasks start as late as possible, when the resources are available.

Planning is done from the end of the project and enables you to calculate :

- late start and finish dates of the tasks,
- margins and critical path.

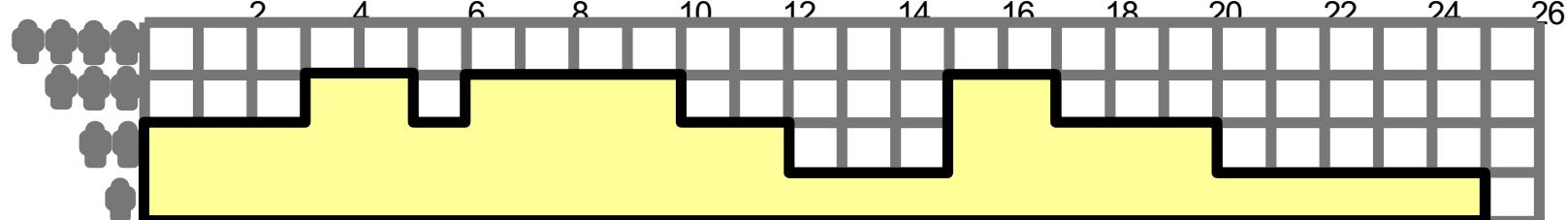
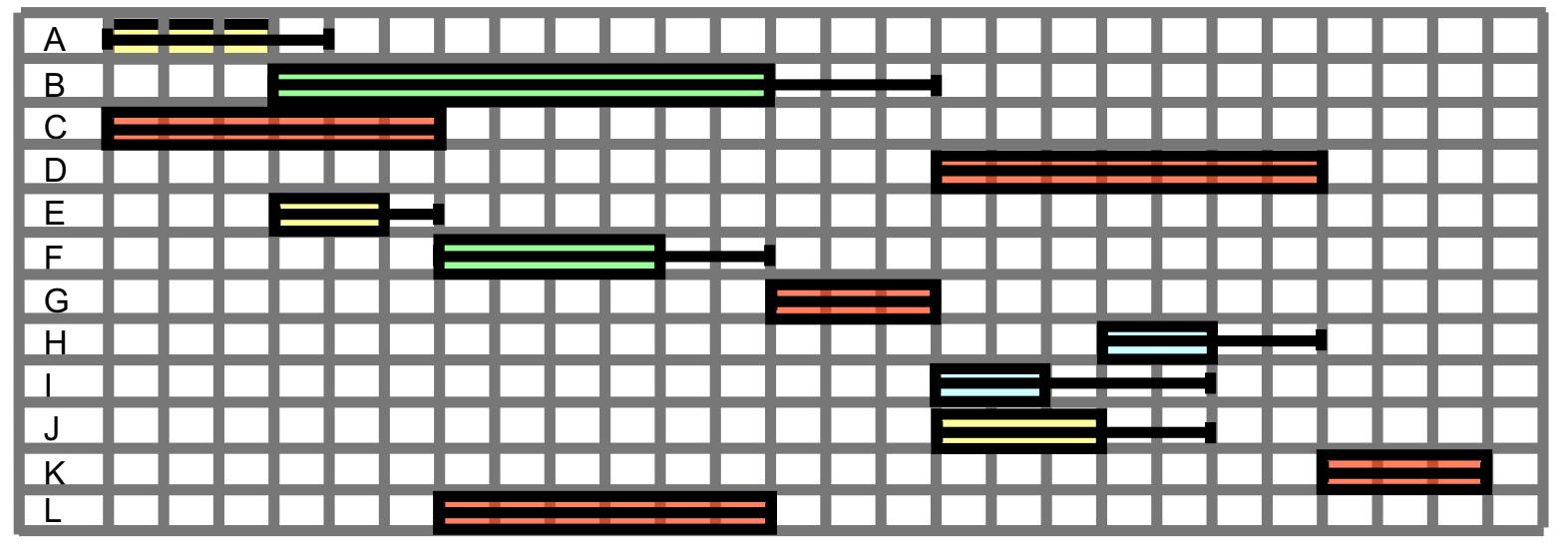
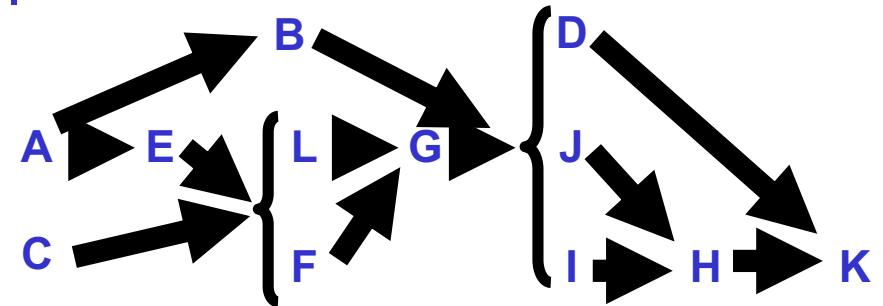
# 5. Gantt chart

## Manpower

Displays the number of resources required .



Try to keep the workforce  
the same size.



# 5. Monitoring Gantt chart

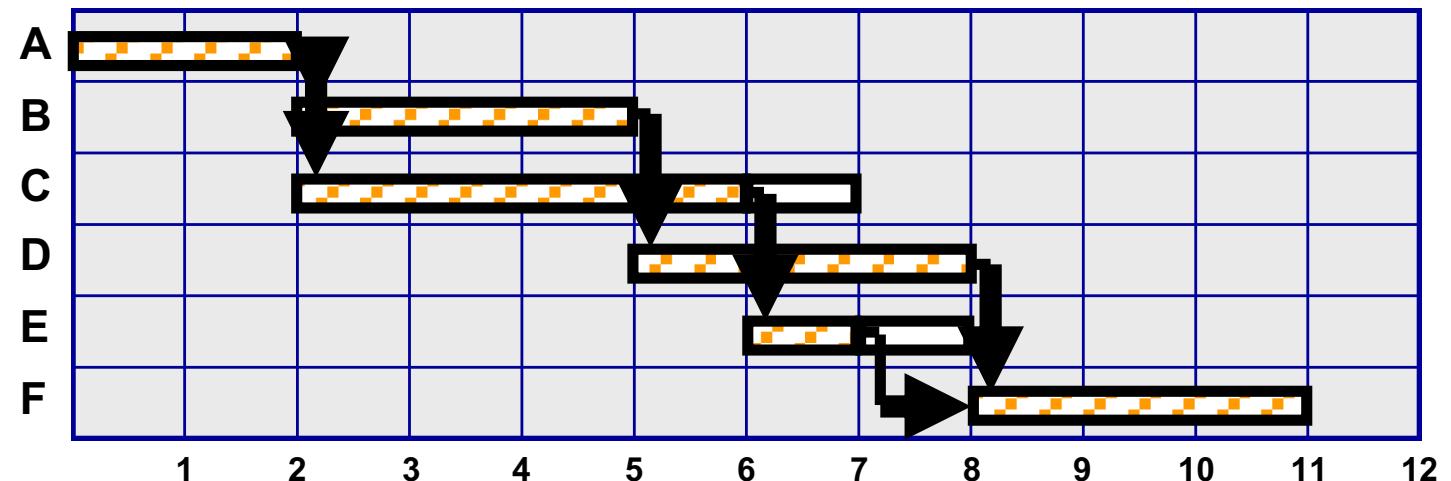
## Objective

To have a display tool capable of highlighting disparities as early as possible.

**Monitoring Gantt chart** : entry-level tool.

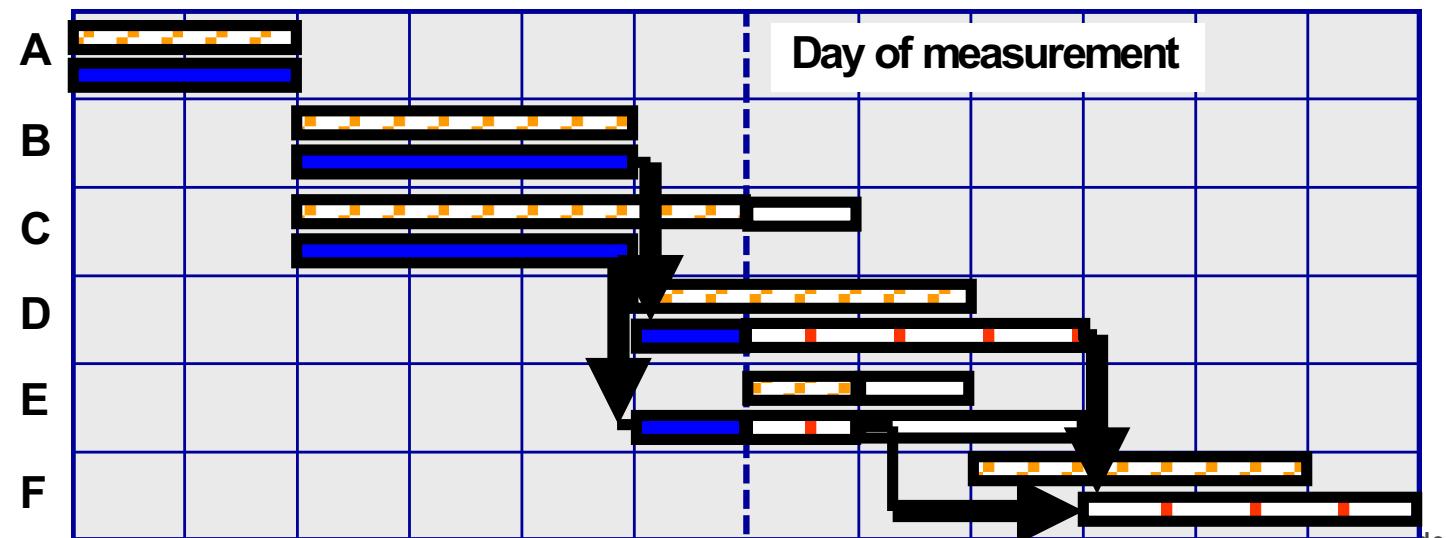
**Reference chart**

- Duration reference
- Margin



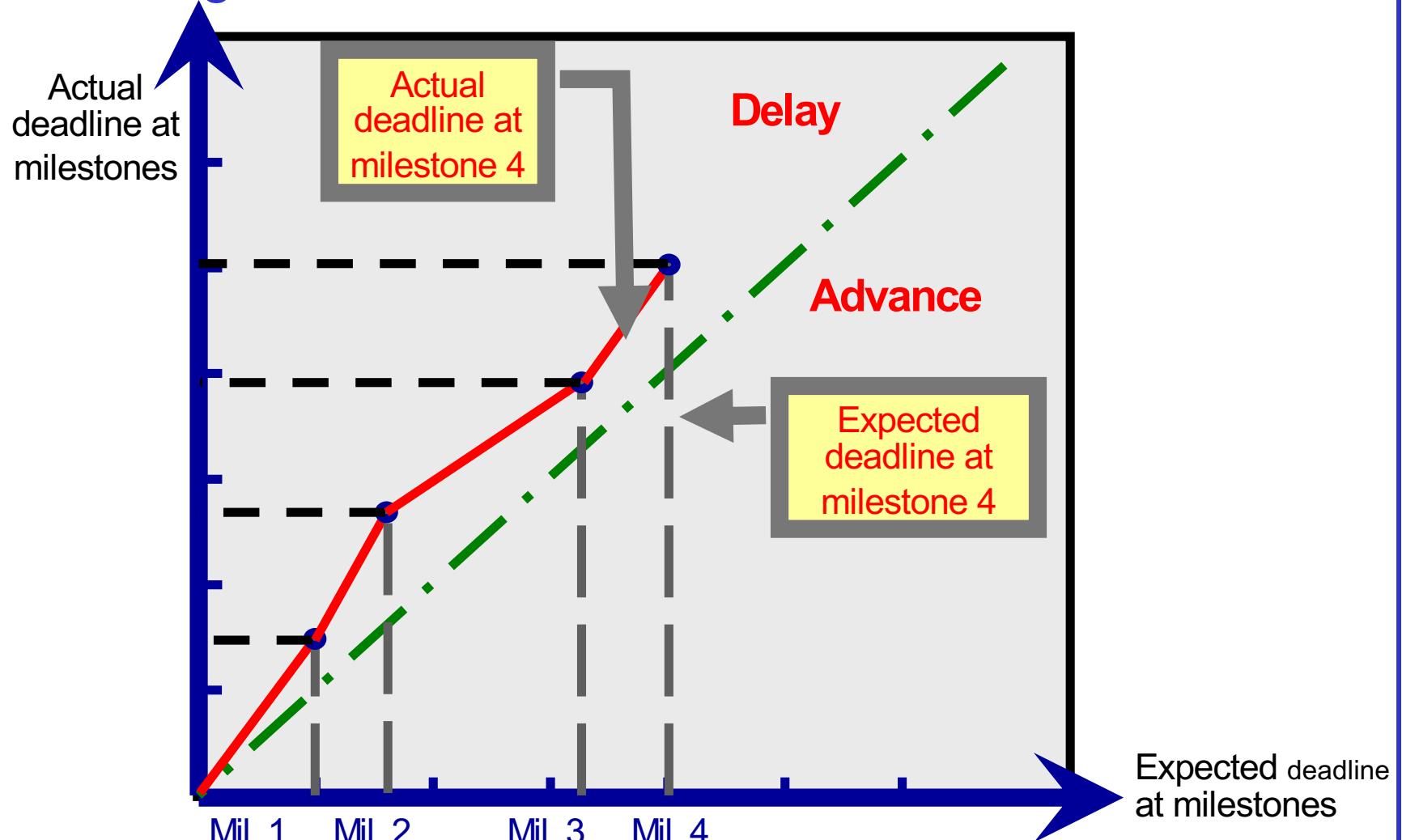
**Monitoring chart  
In 6<sup>th</sup> period**

- Work done to date
- Work still to be done



## 5. Monitoring chart with milestones

### Deadline monitoring



### Role :

- to display drifts away from the deadline and the trend at milestones,
- reschedule the finish date of the project.

## 6. Scheduling and smoothing

# 6. Scheduling resources

## Types of dependencies between tasks

Technical or logical dependencies:

- logical sequence of tasks
- technical organisation.

Physical dependencies:

- need to keep to a restricted access slot.

Resource dependencies:

- human, physical or material resources,
- raw materials,
- working capital.

Classification of scheduling problems:

- **Time constraint**

A time constraint means that time (duration of the project) is fixed, but resources are flexible.

- **Resource constraint**

A resource constraint indicates that resources are fixed, but duration is changeable.

# 6. Scheduling resources

Scheduling assumption:

- the staggering of work is prohibited.

**Method 1 : Levelling demand for resources**

Principle :

- delay non-critical activities by using the margin to reduce the maximum level of demand for resources,
- increase the minimum level of demand for resources.

**Method 2 : Scheduling resources**

Principle :

- draw up a priority list for resources,
- allocate them so as to minimise delays without exceeding allocated resources or modifying the technical dependencies of the network.

Heuristic objective :

- To allocate resources to activities so as to minimise delays.

Priority allocation rules

- minimum margin,
- shortest duration,
- lowest activity identification number.

# 6. Scheduling resources

**Types of smoothing :** based on the equation: Work = Duration x Resource units

- with fixed work: duration is variable,
- with fixed duration: work is variable.

**Factors to consider**

- skills of the resource for the allotted task,
- abilities of the resource and number of overtime hours,
- tensions between staff
- level of detail required to complete task,
- future requirements in terms of human resources.

**Consequences of smoothing workload :**

- skills of the resource for the allotted task
- reduction in margin,
- reduction in flexibility of planned schedule,
- increase in delays,
- increase in number of critical and sub-critical activities,
- reduction in available margins,
- increase in complexity of scheduling

## 7. Project monitoring

« How does a project get to be a year late?  
One day at a time. ».

*Frederick Brooks, « The mythical Man Month »*

# 7. Why monitoring is necessary

To avoid too many delays you must:

- regularly evaluate performance,
- constantly monitor the project.

**Evaluation :**

- set performance and results indicators,
- set reporting methods: system tools, stakeholders, frequency...,
- centralise all information relating to the project,
- summarise results and distribute to relevant stakeholders.

**Monitoring:**

- define each person's responsibilities,
- limit the growth of small problems,
- implement problem-solving measures and follow them
- concentrate on key objectives (priority matrix).

**Basic tasks for a project manager.**

# 7. Report format

## Example format of task report :

- 1** – Progress made since last report
- 2** – Current project status
  - commitment of resources
  - budget status
  - completed deliverables
  - deliverables in progress with completion rate.
- 3** – Overall trends between now and the end of the project
- 4** – Problems and questions
  - previous problem-solving measures
  - new disparities and problems identified
  - measures undertaken.
- 5** – Planned corrective action
- 6** – Updated schedule

# 7. Dealing with conflict

- Five ways of resolving conflict:

## forcing

- force the relevant parties to come to an agreement
- quick and lasting solution,
- solution not always the best.

## smoothing

- reduce each person's constraints in order to reach agreement,
- longer solution,
- temporary and not ideal solution – allowing frustration.

## compromise

- similar to smoothing,
- if solution is well thought out and detailed then it is permanent,
- stakeholders always frustrated (have to compromise too much).

## confrontation

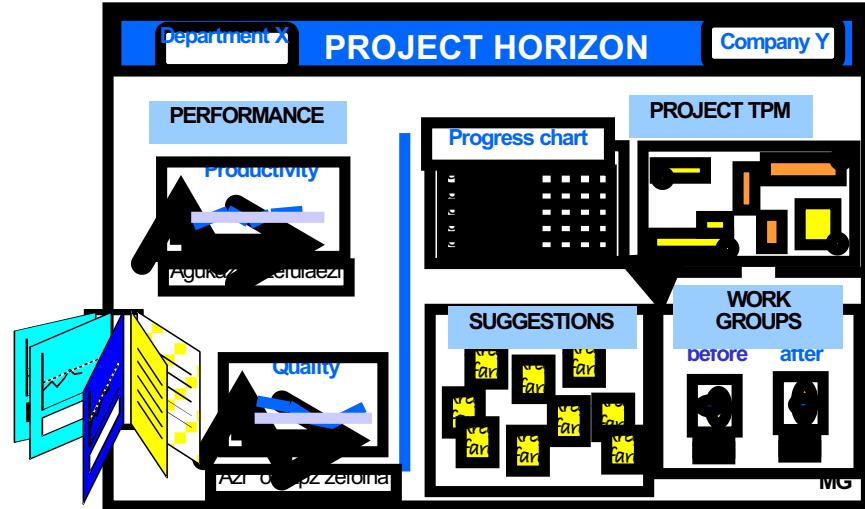
- look for precise solution by prioritising each person's constraints and expectations,
- longer time to reach the solution, but the best and lasting.

## withdrawal

- problem put to one side and therefore not resolved,
- loss of commitment on the part of stakeholders,
- worst method.

Interpersonal relations	Personal objectives
bad	good
good	bad
medium	medium
excellent	excellent
bad	bad

# 7. Plan of communication



## Objective :

to inform project stakeholders and the company's entire staff about the project, its objectives, its progress, the people involved ... at the launch of, during and at the end of the project.

## Advantages :

- staff understand the importance of the project to the company,
- staff are more supportive of the project,
- the project team feels less isolated.

# 7. Meetings



## Before

- Prepare items for discussion
- Provide participants with 1) agenda,  
2) information to read prior to the meeting.
- Appoint a strong chairperson



## Beginning

Re-state objectives, agenda, length of meeting..

## During

Summarise following discussion of each item.

## End

Conclusion, i.e.:  
- summary of decisions made  
- measures to be taken  
- date of next meeting

Don't hog the floor!

And, what's more important, get the quieter ones to speak

Afterwards  
Circulate the minutes

# 7. Project monitoring

## **Update project progress at a given date :**

- According to predefined, important project milestones
- According to a predefined update frequency
- In relation to the handling of a particular critical problem
- ...

## **Project follow-up: no turning back**

- You cannot change what has already happened
- Preventive action
- Corrective action

# 7. Project monitoring

## **Set up the project team :**

- Define skills needed
- Identify skills of available human resources
- Allocate human resources in a relevant way
- Clearly allocate responsibilities and make sure everybody understands his/her role and objectives, but also the global objectives

## **Be a team / be part of a team :**

- Mutual respect
- Responsibility
- Autonomy does not mean individualism
- Reactivity and communication
- No fear / no misplaced egos

## **Be meticulous :**

- Traceability
  - Actions log
  - Documentation
  - Write what will be done, do what you wrote

## 7. Project monitoring

**Project management / monitoring should help, not hinder your project**

**Project progress update frequency should be adapted to :**

- the scale of the project
- the difficulty level of the project / work package / task
- the different levels of reporting needed (technical, financial, commercial); reported information and its presentation should be filtered / relevant with respect to the audience (technical management team, technical development team, executive officers, financial, commercial or administrative team);
- the organization of the different functions of the company / laboratory
- the identified key milestones (technical / financial / commercial) of the project
- ...

# **7. Production project : example of standard milestones**

## **1 – Launching the project :**

- Contract approval, set-up of the project team (project management, technical / commercial / quality teams), definition of the main steps, set up a quality plan, relations between the stakeholders.

## **2 – Requirements review (WHAT) :**

- WHAT will be done ; functionality and performance of the system to be developed

## **3 – Design review (HOW) :**

- HOW it will be done / implemented

## **4 – Approval / delivery reviews :**

- Approval plan, reports
- Delivery procedure / testing and reporting (approved by / with the customer)
- Factory / site acceptance

## **5 – Project closure and evaluation / assessment :**

- Technical assessment, and listing of what can be reused
- Commercial, costs, human assessment

**Possibility to redefine / negotiate project objectives.**

**Do not combine successive steps.**

## **7. Study / research project : example of standard milestones**

### **1 – Launching the project :**

- Contract approval, set-up of the project team (project management, technical / commercial / quality teams), definition of the main steps, set up a quality plan, relations between the stakeholders.

### **2 – Requirements review (WHAT) :**

- Review of the study's objectives ; feasibility problems, prototyping stages planning

### **3 – Design review (HOW) :**

- HOW it will be done

### **4 – Validation / Delivery reviews :**

- Study acceptance procedure / report (approved by / with the customer)

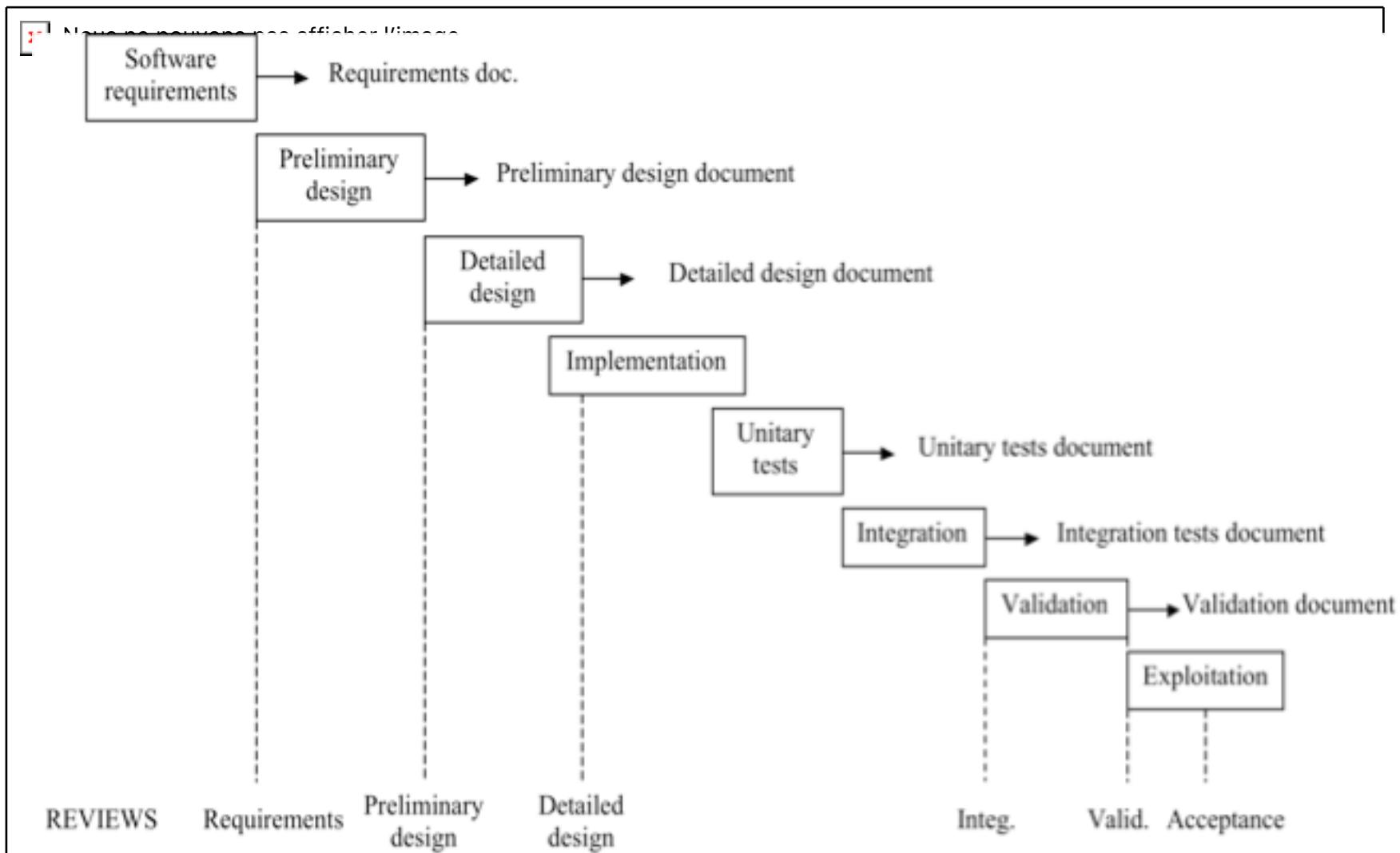
### **5 – Project closure and evaluation / assessment :**

- Technical assessment, and listing of what can be reused
- Commercial, costs, human assessment

**Possibility to redefine / negotiate project objectives.**

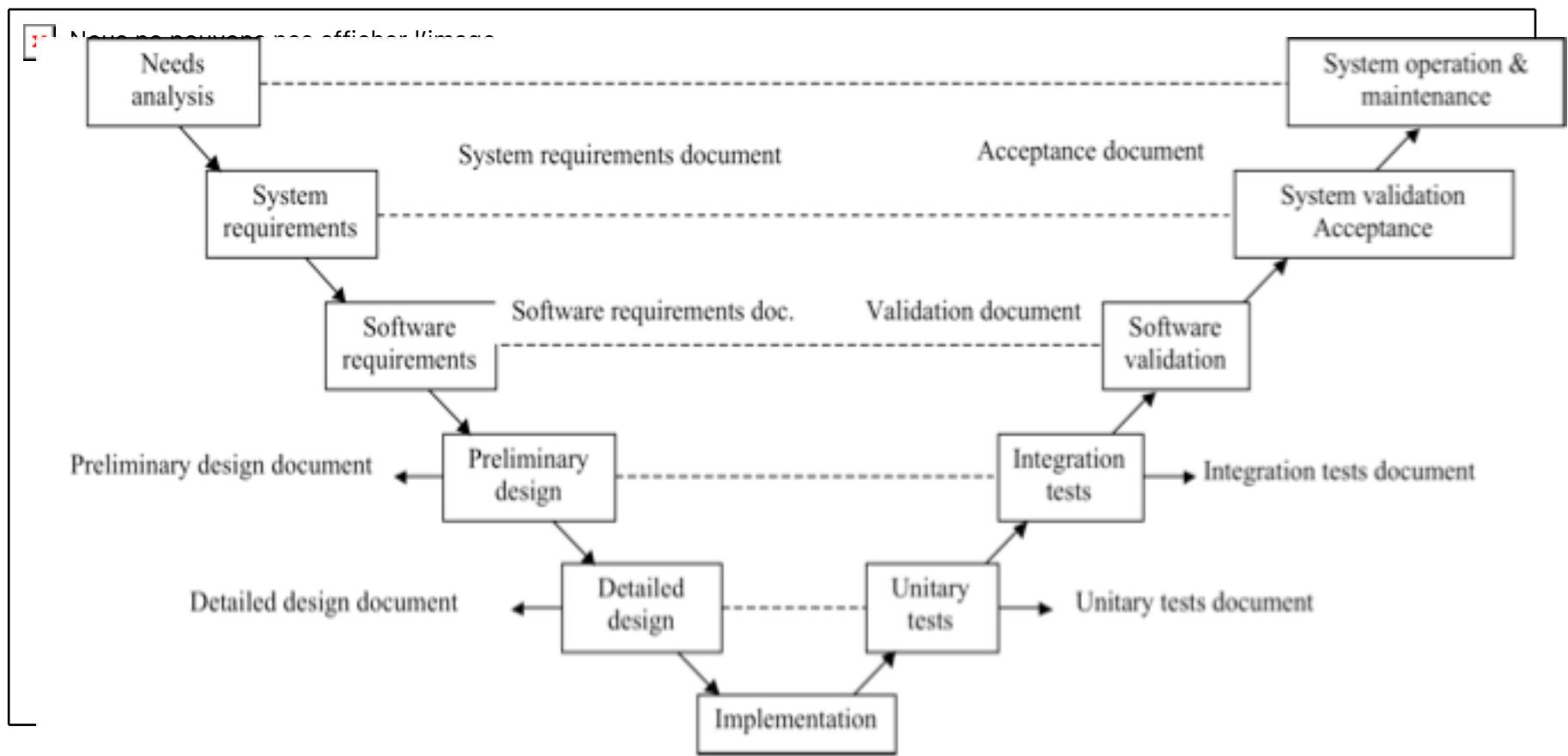
**Do not combine successive steps.**

# Cascade Cycle



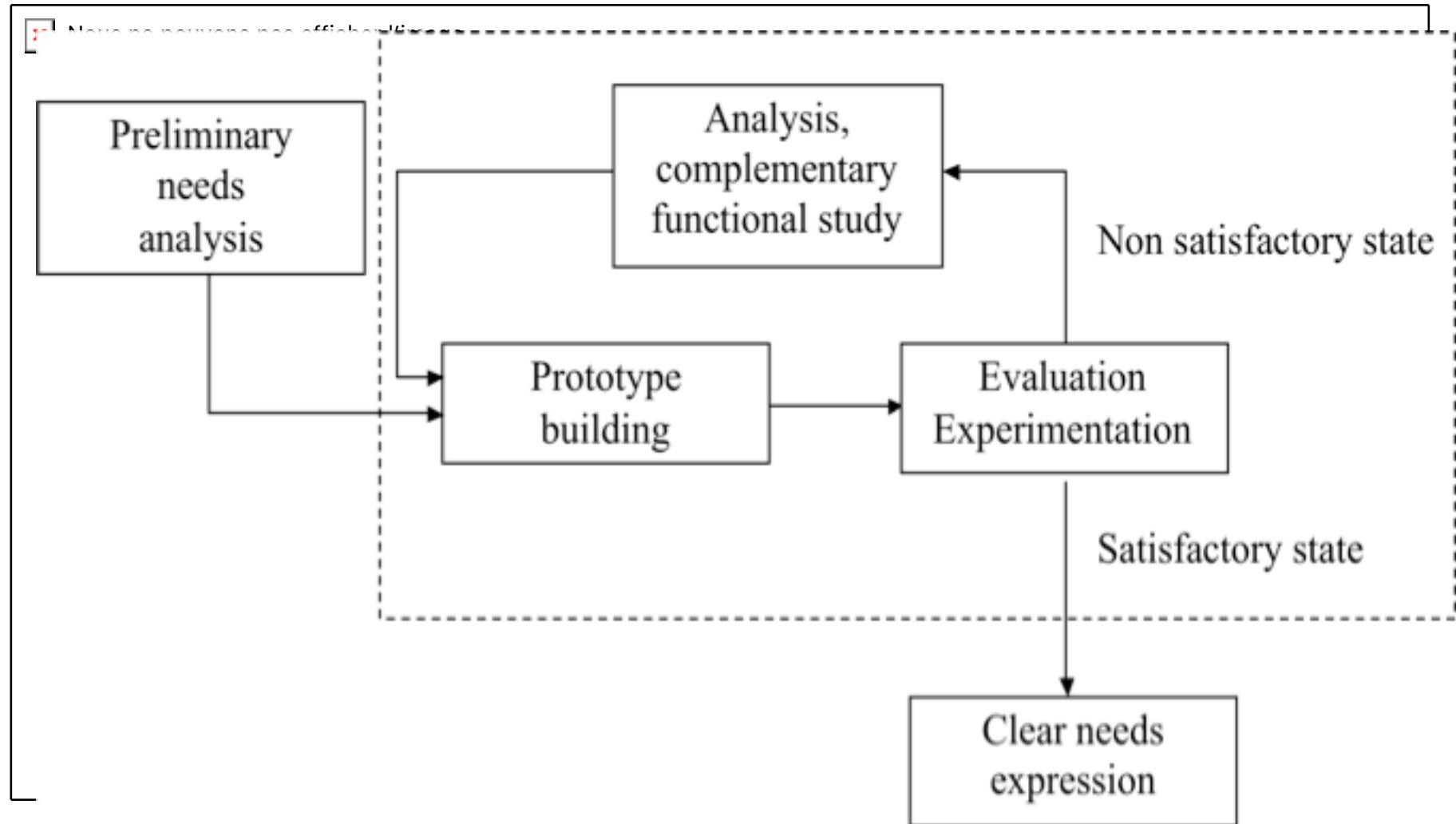
- limited traceability, errors have serious consequences

# V Cycle



- Overcome limitations of the cascade cycle
- Separate functional matters (needs) and design and development matters
- Traceability (global consistency, distribution of updates)
- Errors are detected earlier

# Prototyping



- When needs are poorly defined
- R&D project, validation of critical points (partial prototyping)

# 7. Monitoring a project

**2 approaches :**

- Update using the workload (*charge* in French)
- Update using the elapsed time / duration (*durée* in French)

**It is also necessary to monitor costs.**

## 7. Monitoring a project

### Monitoring a project using elapsed time / duration (*durée*):

- Update one task at a time, or update a set of tasks
- Update actual elapsed time / duration between the start date of the project and the current date
- Percentage of planned duration elapsed, and percentage of work done are NOT the same
- Processing both independently over a whole (large) project may be a (too) heavy task
  
- Update the progress status of one task at a time : *manual* mode for classic tools (like MS Project)
  
- Update the progress status of a set of tasks: made possible by standard tools (e.g. MS Project) through *automatic* modes linking elapsed time and workload.
- Update the progress status of a set of tasks
- Delaying of non-completed tasks (the work that remains to be done) after a given date in the future.

## 7. Monitoring a project

**Monitoring a project using workload (charge) done :**

- Update data about the work which has actually been done.
- Possibility to associate workload and percentage of elapsed time / duration, or not.

## 7. Monitoring costs

### Monitoring the costs of a project :

- Enables monitoring of the project from a costs / financial point of view
- The financial management of a company (laboratory) seeks more predictive / reactive monitoring of the accounts and finances of the company (laboratory);
  - planning of the key financial milestones of each project
    - invoicing schedule ; milestones here are usually associated with a deliverable
    - Expenses schedule
  - monitor the costs of the projects

## 7. Monitoring costs

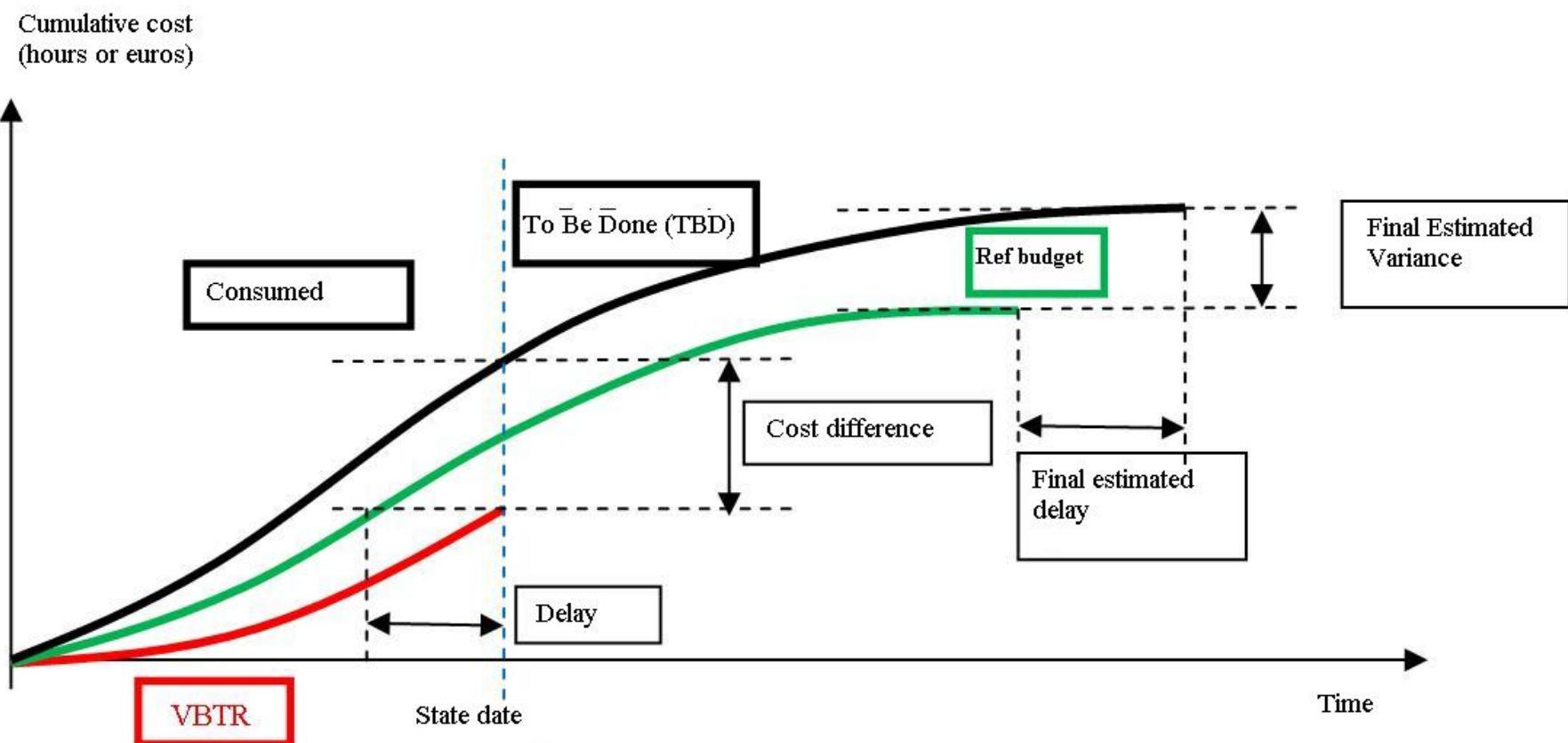
### Different kinds of costs :

- Predefined costs associated to subcontracted tasks (fixed cost tasks)
- Costs associated with the workload done (depending on the hourly rate of the human resources)
  - Set and take into account an hourly overtime rate
  - Set a “cost per use” if the cost of the workload resource is a fixed cost for a given task
  - Differentiate hourly costs : various staff and skills levels categories, possible use of temporary employees
- Costs associated with the payment milestones
- Costs like travel expenses : possibility to set specific *resources budget*

# 7. Monitoring costs

In order to monitor the costs of a project :

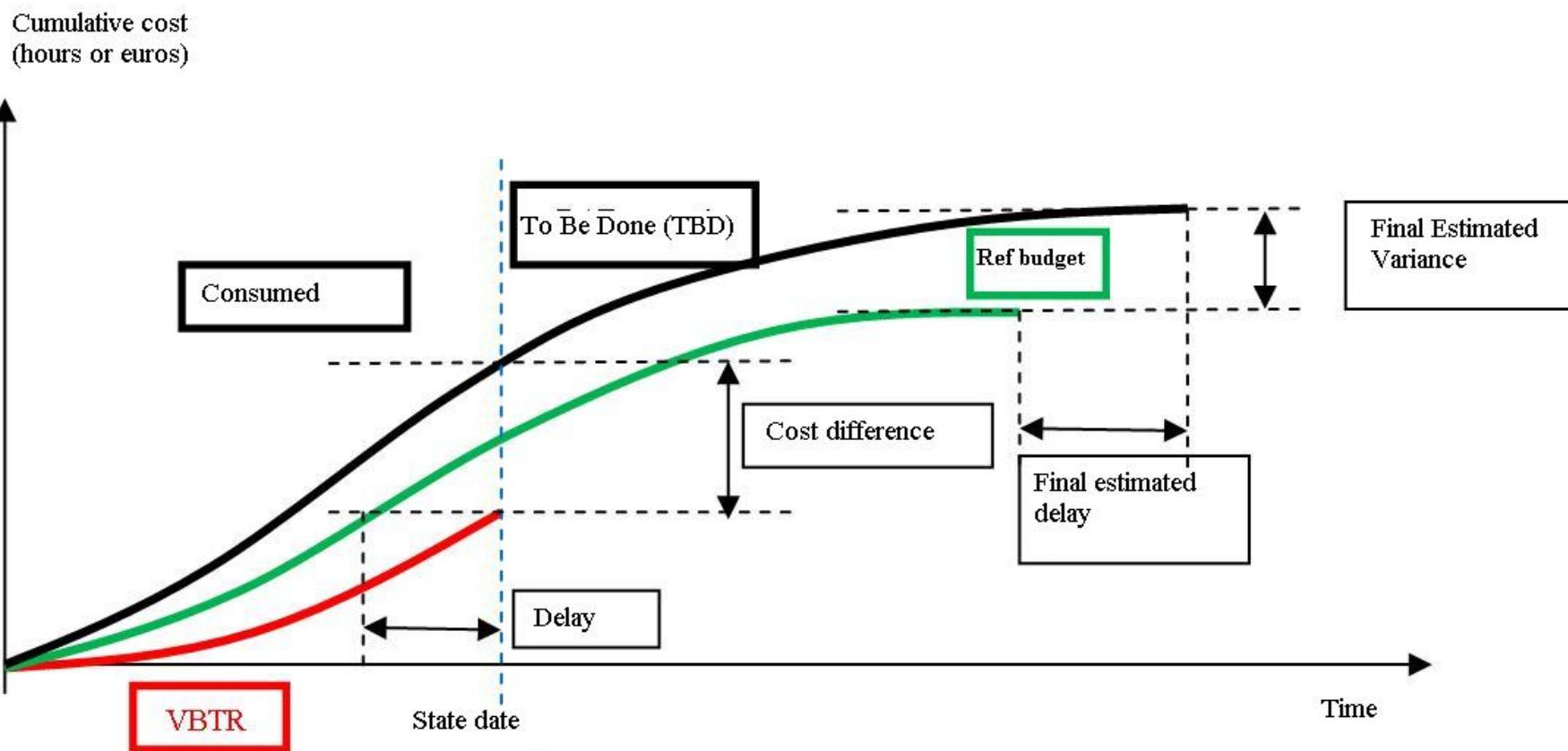
- Establish project costs during the planning stage
- Planning costs distributes tasks and costs / expenses through time
- During the execution of the project, the monitoring of costs can be reported using a graph known as an “S Curve” (see curve shape)



## 7. Monitoring costs

In the following graph:

- Lower curve: work done; stops at the current update date (state date)
- Intermediate curve: shows the reference budget planning
- Upper curve :
  - “consumed” part: real cost of the project
  - “To be done (TBD)”: Estimate to complete ETC



## 7. Monitoring costs

Define appropriate indicators helping to monitor :

- Deadline shifts with respect to initially planned (or re-planned) milestones and deadlines.
- Costs with respect to initially planned costs

## 7. Monitoring costs

### Earned value analysis

([http://fr.wikipedia.org/wiki/Gestion\\_de\\_la\\_valeur\\_acquise](http://fr.wikipedia.org/wiki/Gestion_de_la_valeur_acquise)) :

- Enables you to display progress of work done and budget consumption with regard to initial planning.
- Decision support : decision-making tool, helps to determine improvements to the project
  - Allocation of human / material resources
  - Productivity
  - Critical points to be improved
- Earned Value Management (EVM) : methodology created in the USA in order to be able to measure the performance of industrial production.
- Used for the first time by the US Air Force (early 1960s, military "Minuteman Missile Program »).

# 7. Monitoring costs – PHF

## Indicators :

- Based on the comparison of the following 3 basic data series
  - Value of work planned at the state date : BCWS ( Budgeted Cost of Work Scheduled) or *CBTP* (*Coût Budgéte du Travail Prévu*) in French.
  - Value of actual costs: ACWP (Actual Cost Work Performed) or *CRTE* (*Coût Réel du Travail Effectué*) in French.
  - Value of work done (or Earned Value, EV) : BCWP (Budgeted Cost Work Performed) or *CBTE* (*Coût Budgéte du Travail Effectué*) in French.
  - S Curve: display these 3 indicators through time
- Indicators : built to compare BCWS and ACWP to BCWP
  - $BCWP - BCWS = \text{Schedule Variance (SV)}$
  - $BCWP - ACWP = \text{Cost Variance (CV)}$
  - $BCWP / BCWS = \text{Schedule Performance Index (SPI)}$
  - $BCWP / ACWP = \text{Cost Performance Index (CPI)}$

Good indicators	Bad indicators
$SV \text{ or } CV > 0$	$SV \text{ or } CV < 0$
$SPI \text{ or } CPI > 1$	$SPI \text{ or } CPI < 1$

## 7. Monitoring costs

**Use indicators to monitor the financial aspects of your project progress. For example :**

- Productivity is good but project progress is too slow → resources are not sufficient
- Productivity is low → too much unplanned work ? Workload underestimated ?

**To monitor the costs of your project :**

- Establish reference budget for your project
- Compute BCWP
- Compare BCWP to BCWS
- Compare real costs to BCWP

**Monitoring project costs : 2 options**

- Actual workload and costs always and strictly linked by hourly rates (monitoring is more automatic / less precise)
- Actual workload and costs not strictly linked by hourly rates (monitoring is more precise / a heavier task)

# 7. Monitoring a project : two interesting log files

## 1 – Log file to monitor workload spent

- Daily basis
- Workload spent by each team member + corresponding task(s) / work package(s)
- Time unit : half day ?

Possible format : table with the following columns

Name	Date – A.M. / P.M.	Task code	Comments
------	--------------------	-----------	----------

## 2 – Log file to monitor actions (not tasks / work packages !)

Possible format : table with the following columns :

Time	What	Who	When	Status
------	------	-----	------	--------

## 8. Planning and monitoring a project A summary

# 8. Project monitoring and planning : a summary

## Define the scope of the project :

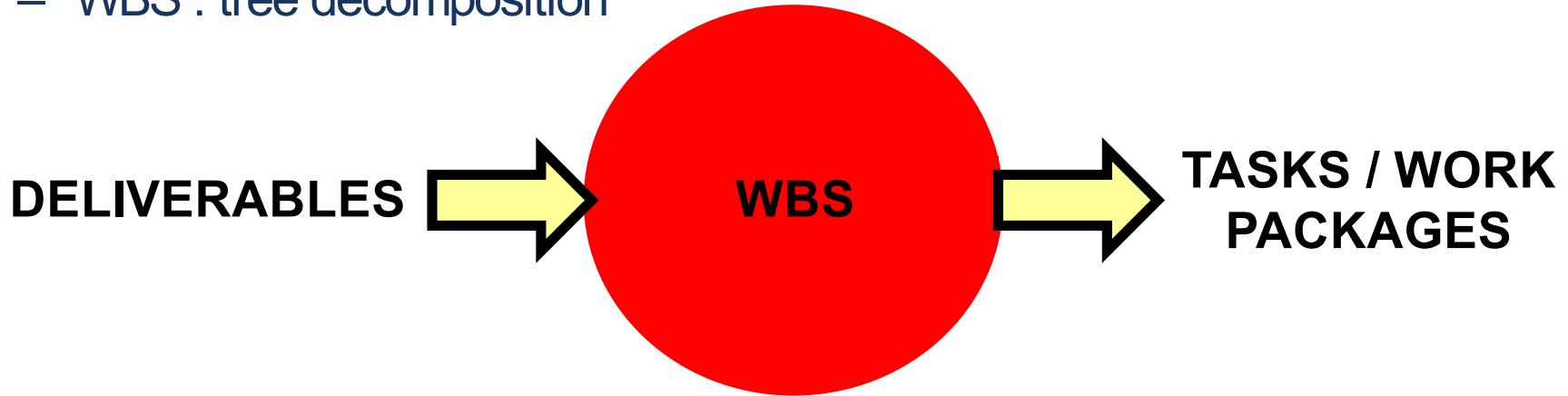
- Define **objectives** - What for ? Why ? What (key performance indicators) ? When (finish date) ? How much (budget) ?
- Define **clients** and **stakeholders** involved in the project : who is the end client ? Whose collaboration is required ? Whose approval is required ? Who can oppose or stop the project ? Who needs progress reports ? External experts ? Suppliers ?
- Define the main **needs / deliverables** + client(s)'s criteria of satisfaction, expected results, hoped-for result acceptable by the client(s)
- **Milestones** and their **schedule**
- **Technical requirements**
- **Limits** and **exclusions** of the project
- **Risks** (5Ms)
- **Review** content with the client(s)



# 8. Project monitoring and planning : a summary

## Planning the project :

- WBS : tree decomposition



- difficult and key step of project planning
- Break down deliverables → sub-deliverables until sub-deliverables manageable by 1 identified person or group of people
- Identify work packages required to produce these sub-deliverables
- For each task : assign responsibility (1 person)



# 8. Project monitoring and planning : a summary

## Planning the project :

Define tasks and temporal constraints

2 kind of tasks : internal (done by your entity / company) and external (sub-contracted)

For internal tasks - fixed workload tasks

- Allocate human resources (work type), and respective hourly/daily rate and workload (quantity of work to be done, in hours / days / etc)
- Allocate material resources and associated costs
- INPUT of the planning tool (e.g. MS Project) : tasks, resources, workload
- OUTPUT (in the GANTT diagram) : duration / delay, cost
- Critical path : made of such tasks



# 8. Project monitoring and planning : a summary

## Planning the project :

For external tasks - fixed duration / cost

- Allocate duration (in hours / days / ...) and cost
- Resources (if any) : cost
- INPUT of the planning tool : duration / cost
- OUTPUT (in the GANTT diagram) : duration / cost
- Non critical tasks (no influence on the final date)

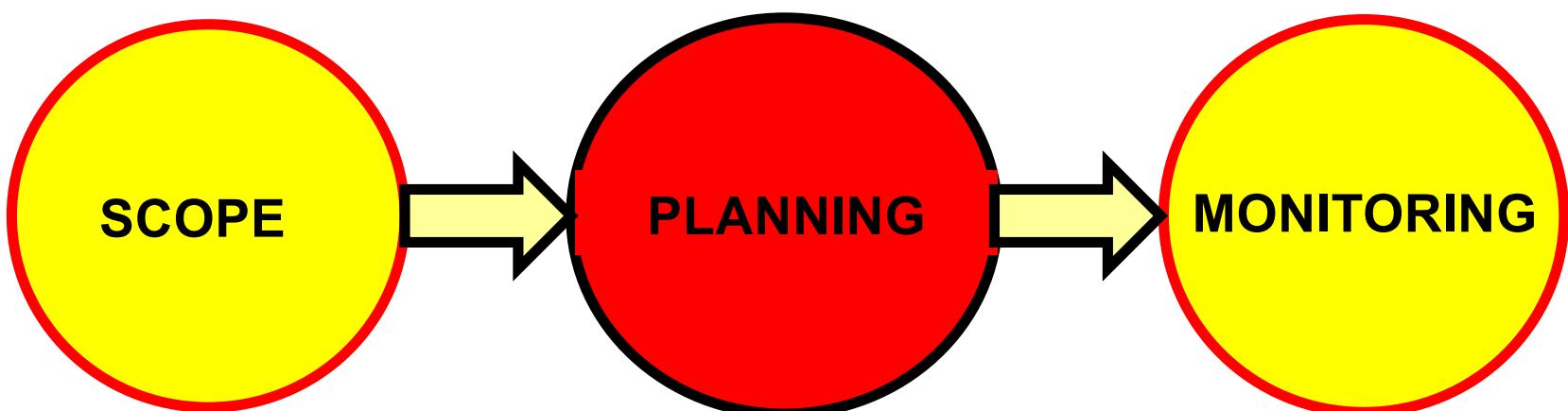
Specific tasks :

- Milestones : duration = 0 days
- Possibility to define recurrent tasks

Overallocations : use scheduling / temporal constraints and smoothing to solve them

OUTPUT of the planning phase : GANTT diagramm

Establish this planning as reference planning before starting the project



# 8. Project monitoring and planning : a summary

## Monitoring the project :

- Choose and respect adapted development cycle
- Use Monitoring Gantt, to compare progress status with respect to the reference Gantt diagram
- Monitor delays ( / client) and costs ( / your management)
- MS Project : 2 approaches for project monitoring : wrt workload / duration
- For each approach, 2 modes : manual (task by task) / automatic (set of / all tasks)
- Progress status : at the state date
- MS Project is a powerful tool → let MS Project do as much as it can for you !
- Minimize amount of data entered



# 8. Project monitoring and planning : a summary

## Monitoring the project :

- Compulsory reviews with the client : kick-off, requirements, acceptance, final
- Other review (internal or with client) : design, validation, ...
- Establish progress status at regular intervals of time
- Filter information delivered according to whom it is intended for (client, your management, commercial team, technical team)
- Finish in a stable state !
- Log file for a monitoring of daily events / tasks
- Log file for spent workload
- Deliverables : include user / designer manual
- Attention to team working



# 8. Project monitoring and planning : a summary

## Documents : remember to manage versions !

- One possible approach :
- Name your working documents the following way : NameRoot-work.ext  
(working documents are the only ones to be edited !)
- Name successive versions the following way : NameRoot-eXY.ext where "XY" stands for the version / edition number
- Procedure to save a given version :
  - At any time, NameRoot-work.ext is the only file to be open / edited
  - Save the working document
  - Copy the working document, rename it using the following name : NameRoot-eXY.ext (do NOT use "save as")
  - Make sure the saved version cannot be modified in the future



## **9. False ideas about projects**

## 9. False ideas

***Traditional company organisation (by job type and title) can work transversely as a result of the coordination by the project manager !***

True for simple projects which are rare !

False for difficult, innovative and risky projects which are common.

Project organisation can produce:

- confusion: who is responsible for what, who makes the decisions?
- conflict: why am I not in charge of this project or that task?
- misunderstandings: why has such a decision been made?

and therefore lead to mediocrity!

***Communication is good, but above all we must learn to communicate, to listen and to work together!***

## 9. False ideas

***A good project idea means guaranteed 100 % success!***

According to Carlos Ghosn :

« The idea is 10% of any success, implementation is 90% ! »

**A project is a decisions factory!**

Therefore:

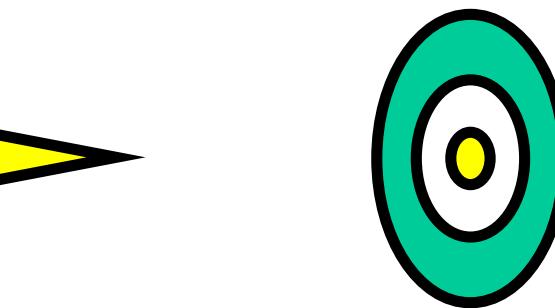
- ensure the relevance and viability of the project,
- plan « as far as is useful » the action to take,
- identify risks of failure and suggest alternative solutions,
- regularly question the relevance of the project,
- and communicate with the project stakeholders about positive and negative events and decisions made.

## 9. False ideas

***Once you start a project, there's no going back !***



Projects are launched in the dark



The target is often a moving one

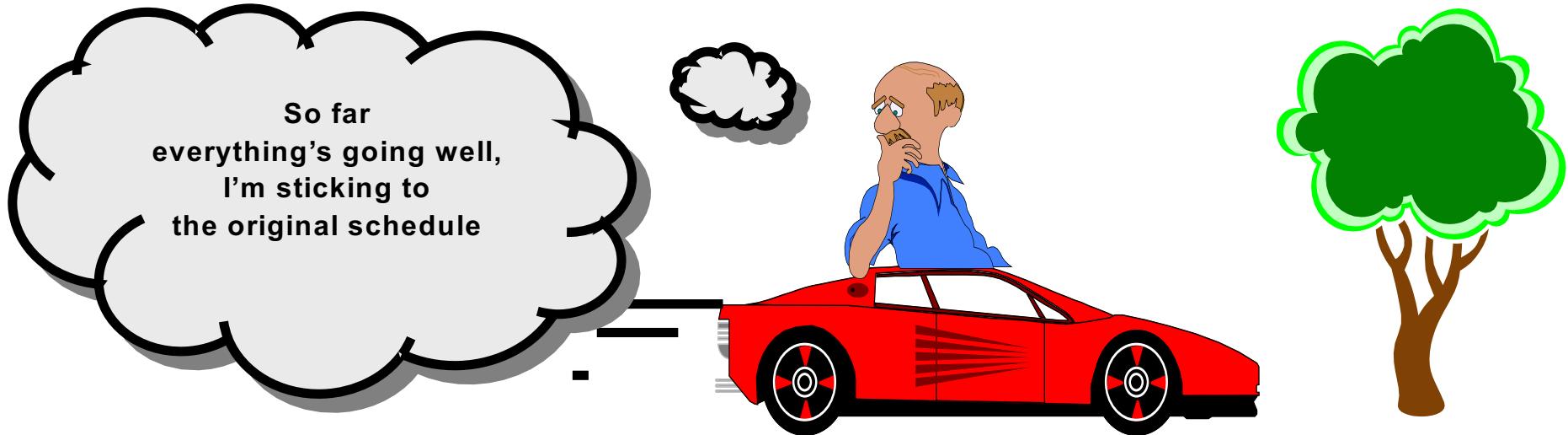
Doubt is cast on the durability of a project at each milestone:  
learn to kill a project before it becomes even more costly!

*It's like in poker :*

- *you have to pay to see (before the project),*
- *and know when to retire gracefully before you lose your shirt!*

## 9. False ideas

**You must stick to the original plan!**



The original plan is a guideline.

It enables us to know where we are and where we want to go!

It is not a constraint that must be adhered to, no matter what!

*To manage a project we must look:*

- *ahead to know where we're going and the path that remains to be followed,*
- *behind to know what has already been done in order to readjust budgets and deadlines.*

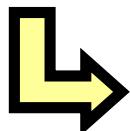
## 10. Conclusion

# 10. Conclusion

A project and its management :  
undeniable factors to a company's success  
key phases : planning and execution .

Project planning is:

- the setting of quantifiable objectives,
- the breakdown of the project into smaller tasks,
- the calculation and verification of necessary costs and deadlines,
- the identification of the risks of failure and drawing up of a backup plan,
- the allocation of resources, budget and deadlines,
- the allocation of responsibilities.



Sets guidelines for future projects!



Planning stage:  
necessary to the success of a project but not sufficient!

# 10. Conclusion

Six requirements for successful project management:

1. Project objectives are clearly defined.
2. Management is involved and committed - it supports the project and monitors its progress.
3. Roles and responsibilities are well defined and understood.
4. There are sufficient resources.
5. The project manager has authority and maintains good working relationships with the different departments within the company.
6. The project team is made up of skilled personnel who have the time required to do the job.