

# Overview of project management according to PMBOK® guide 6th edition

**This material is intended to help students preparing for PMI - PMP® or CAPM® certification memorize better key terms and processes of PMBOK® guide 6th edition.**

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Last update 17/05/2018

Many thanks to Jan Doležal and Jan Vorel for reviews of this document.

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I will welcome any comments from your part!

## Introduction

*PMI-PMP is the most recognized project management certification worldwide. To be able to pass the exam you must understand the different aspects of project management, including:*

- **Technical project management** such as construction of the Work breakdown structure, development of the project schedule, budget and the risk management.
- **Leadership** and other soft skill topics, such as motivation, communication skills and conflict resolution
- **Strategic and business management**, that includes understanding of benefits and project environment.

*There will be many situational questions, where you must be able to apply your knowledge and skills in real life situations, with no black and white choices.*

*You are not supposed to memorize the PMBOK standard, but you are supposed to know the key terms and processes included in PMBOK. My goal was to prepare an overview with pictures, that help you memorize this content better.*

*Please check our company websites for more PMI-PMP related material*

<http://www.projectman.cz/en/tema/pmi-pmp>

<http://www.pmconsulting.cz/company-profile/>

Text in normal font correspond to PMBOK© guide definitions

*Our comments are added in Italics*

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Number corresponds to the number of chapter in PMBOK

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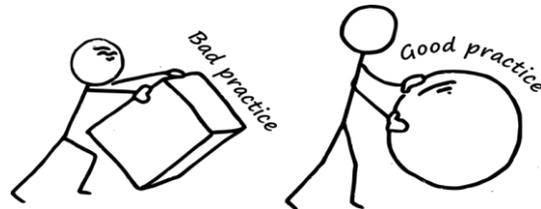
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# 1. Key terms

## 1.1 PMBOK® Guide

Recognized as a Good Practice

*There is general agreement that applying these practices will increase your chance of success.*



## 1.2 Project

A project is a temporary endeavor undertaken to create a unique product, service or result.  
*Project is relatively isolated effort with predetermined goal, scope, time and budget.*



## 1.3 Project management

Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements.

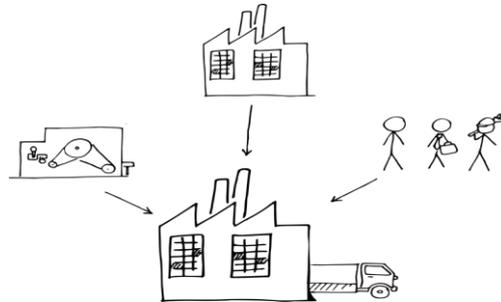
*Management means that you are not supposed to build the house, but use your skills to organize others.*



## 1.4 Program

A program is a group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually.

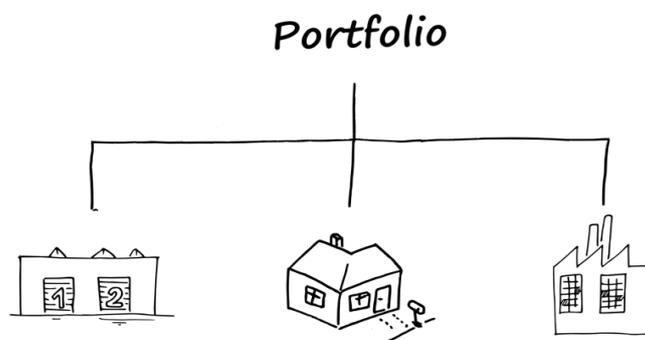
*Program is bigger and is successful if it achieves the objective - start of new production factory. It consists of projects, such as construction of the factory, building of machinery and hiring of staff.*



## 1.5 Portfolio

Collections of projects or programs grouped together to facilitate effective management to meet strategic business objective.

*The company is building houses, factories and warehouses - this is the portfolio. If they decide that building family houses is no longer profitable, they made a portfolio decision. Portfolio is driven by strategic objectives of the organization. A project could be successful, but terminated by the organization if it is not supporting its strategy.*



## 1.6 Project management processes

PMBOK standard is based on 49 processes that are performed continuously throughout the project.

Each process has:



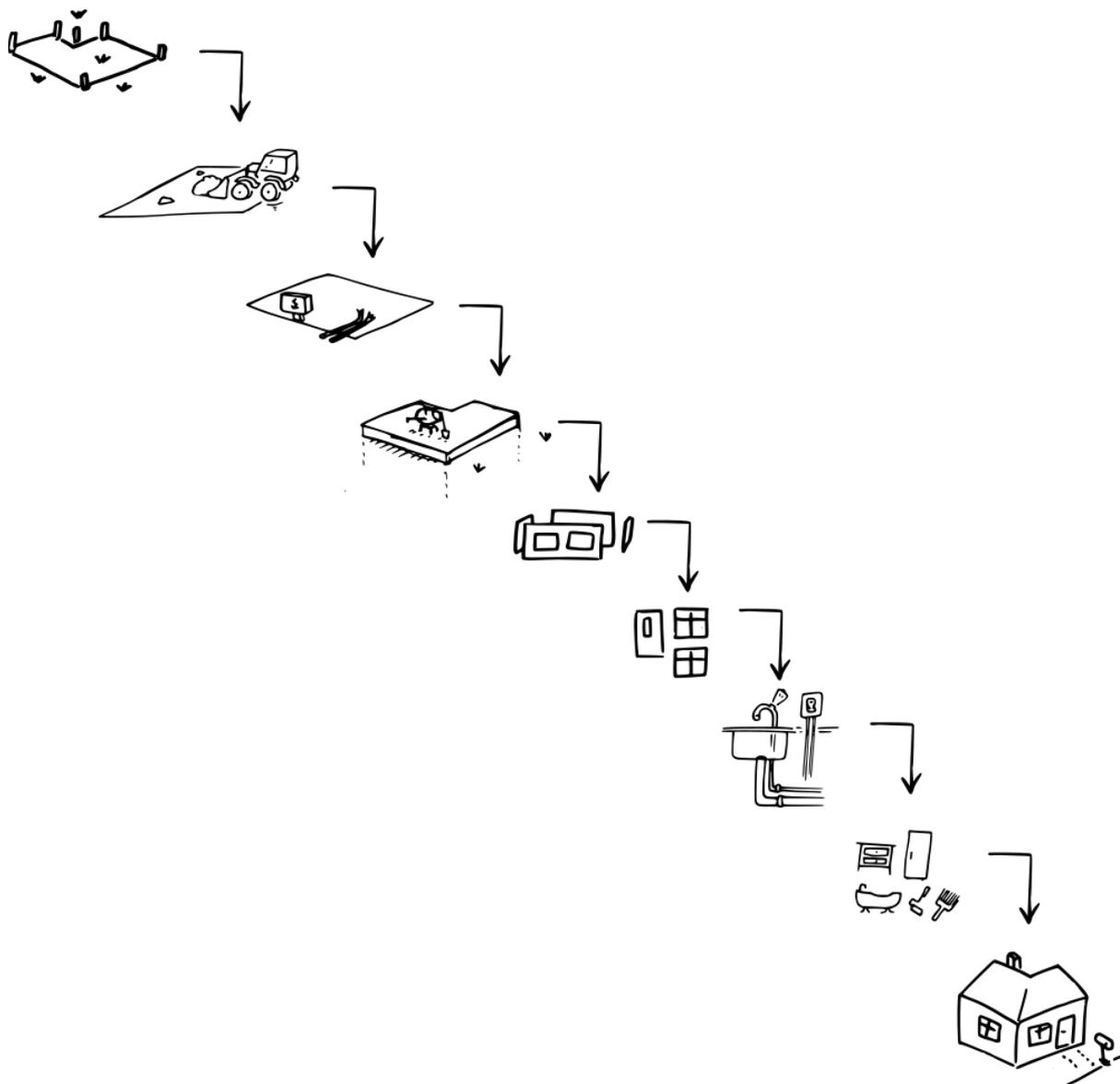
## 1.7 Project lifecycle

A project life cycle is a series of phases that a project passes through from its initiation to its completion.

*Project lifecycle helps you plan and control progress of your project.*

There are 3 major types of project lifecycle:

1. Predictive (waterfall)
2. Iterative and Incremental
3. Agile



Knowledge Area	Project Management Process Groups				
	Initiating	Planning	Executing	Monitoring and Controlling	Closing
<b>4. Project Integration Management</b>	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project or Phase
<b>5. Project Scope Management</b>		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
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<b>10. Project Communications Management</b>		10.1 Plan Communications Management	10.2. Manage Communications	10.3 Monitor Communications	
<b>11. Project Risk Management</b>		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6. Implement Risk Responses	11.7 Monitor Risks	
<b>12. Project Procurement Management</b>		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
<b>13. Project Stakeholder Management</b>	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

## Initiating Process Group

Those processes performed to define a new project or a new phase of an existing project by obtaining authorization to start the project or phase.

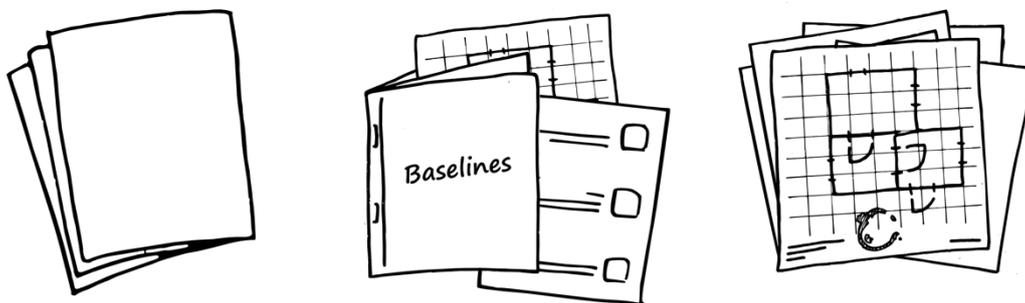
*In the beginning you need to prepare a high level description of project - project charter and identify stakeholders.*



## Planning Process Group

Those processes require establishing the scope of the project, refining the objectives and defining the course of action required to attain those objectives.

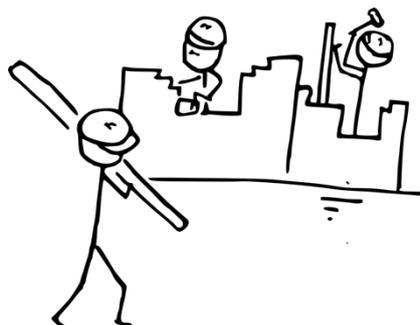
*Planning is putting together detailed plans - baselines of scope, time and cost and management plans, such as communication management plan.*



## Executing Process Group

Those processes performed to complete the work defined in the project management plan to satisfy the project specifications.

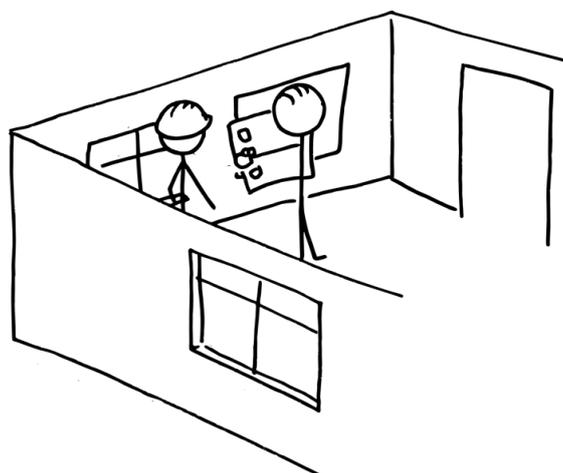
*This is the building of the house.*



## Monitoring and Controlling Process Group

Those processes required to track, review and regulate the process and performance of the project; identify any areas in which changes to the plan are required; and initiate the corresponding changes.

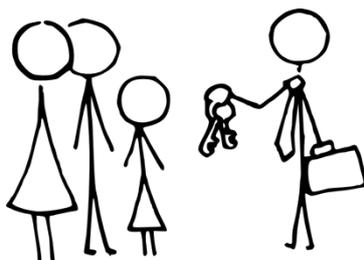
*Unfortunately, things do not always go according to plan. You must have a method to monitor the real situation, compare it to original plan and do corrections in form of changes.*



## Closing Process Group

Those processes performed to conclude all activities across all process groups to formally complete the project, phase or contractual obligations.

*At the end you hand over final product, conduct lessons learned and terminate project activities.*



## 1.8 Project business documents

**Business case** - economic feasibility and the validity of the benefits

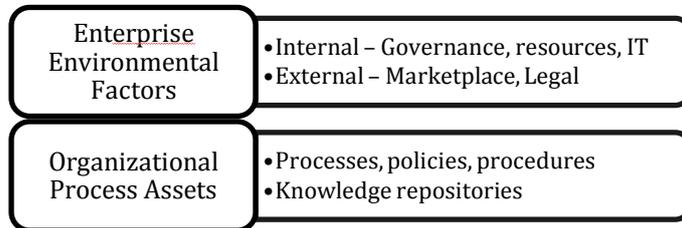
**Project benefits management plan** - how and when the benefits of the project will be delivered

**Project success measures**

## 2. The Environment in which Projects Operate

### 2.1 Enterprise Environmental Factors and Organizational Process Assets

Projects exist and operate in environments that may have an influence on them.



### 2.2 Organizational Structures

There are numerous types of organizations. Depending of the type the role and authority of project manager change:

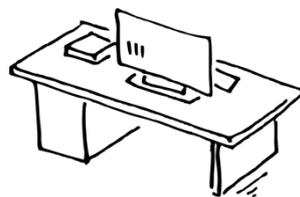
- Organic / Simple
- **Functional Organization**
- **Matrix Organization**
  - **Weak Matrix**
  - **Balanced Matrix**
  - **Strong Matrix**
- **Projectized organization**
- Virtual
- Hybrid organization

### 2.3 Project management office

Managing shared resources across all projects.

Identifying and developing project management methodology, best practices and standards

- **Supportive** – consultative role
- **Controlling** – provide support and requires compliance
- **Directive** – directly manages projects



### 3. The Role of the Project Manager

#### 3.1 Project Manager

Project manager is the person assigned by the performing organization to lead the team that is responsible for achieving the project objectives.

#### 3.2 Project Manager Competencies



**Technical project management** – scope, time, cost, risk management

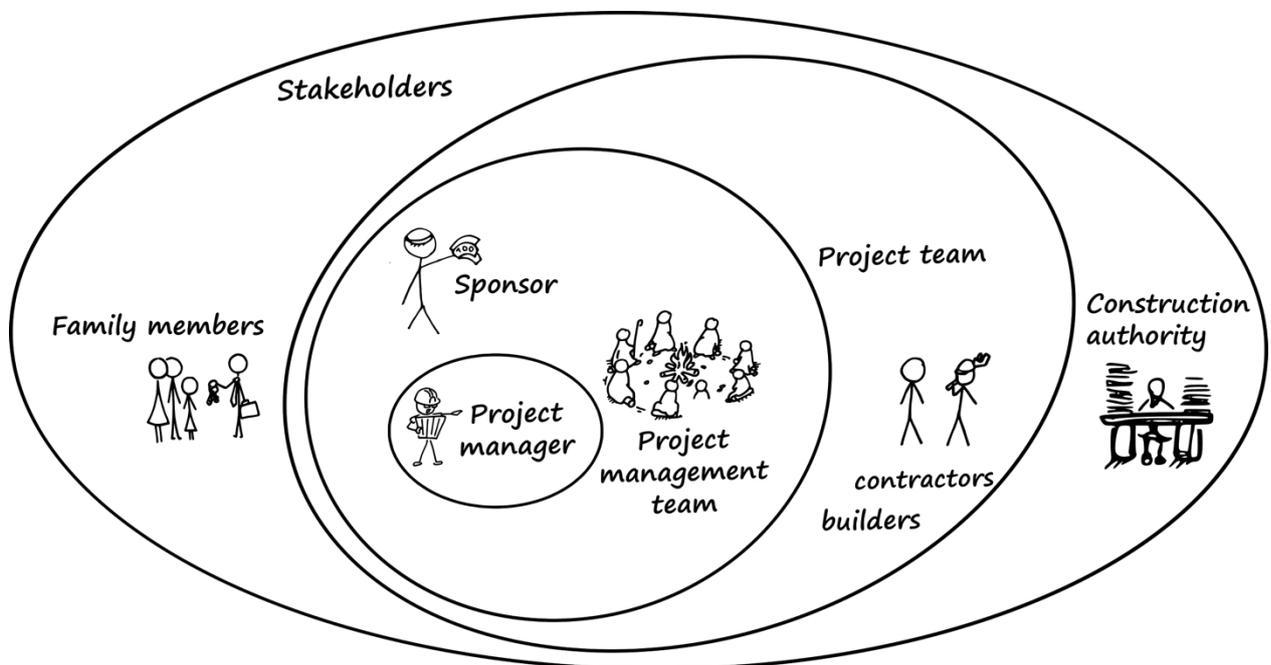
**Leadership** – motivating and guiding others

**Strategic and Business Management** – industry knowledge, strategy and business context

#### 3.3 Project stakeholders

A stakeholder is an individual, group or organization who may affect, be affected by, or perceive itself to be affected by a decision, activity or outcome of a project.

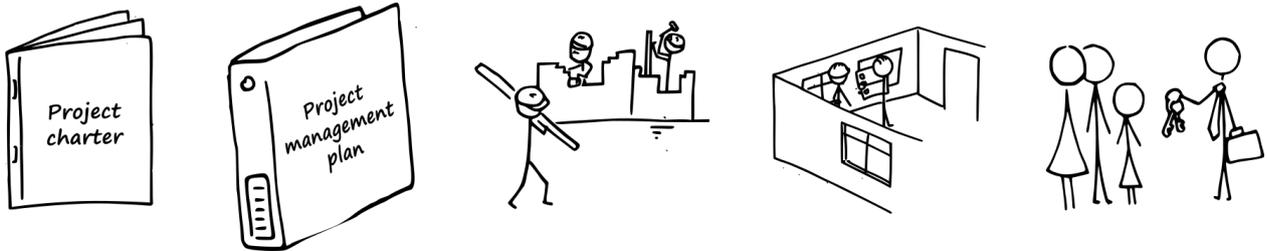
*Stakeholders have various interests and if you do not understand and manage stakeholders, they can become adversaries of your project.*



## KNOWLEDGE AREAS

### 4. Project Integration Management

**Project integration management** includes the processes and activities needed to **identify, define, combine, unify and coordinate the various processes** and project management activities within the Project management process groups.



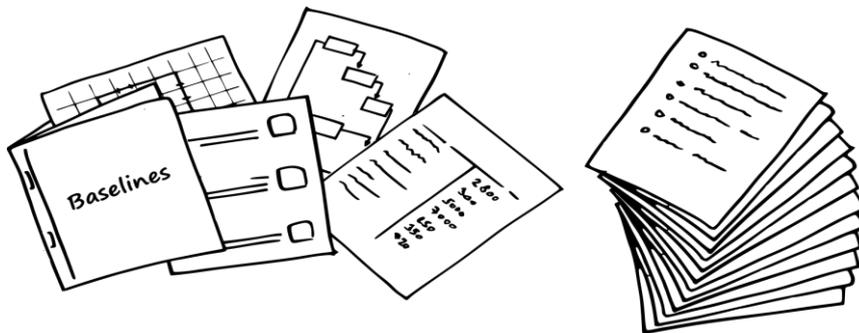
#### 4.1 Develop Project Charter

**Develop Project Charter** is the process of **developing a document that formally authorizes the existence of a project** and provides **project manager with the authority** to apply organizational resources to project activities.



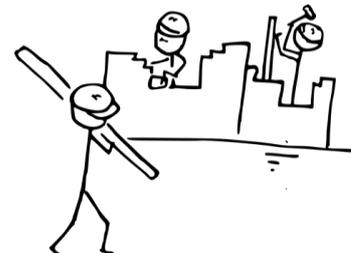
#### 4.2 Develop Project Management Plan

**Develop project management plan** is the process of defining, preparing, and coordinating **all plan components and consolidating them** into an integrated **project management plan**.



#### 4.3 Direct and Manage Project Work

**Direct and Manage Project Work** is the process of leading and **performing the work** defined in the project management plan and implementing approved changes to **achieve the project's objectives**.



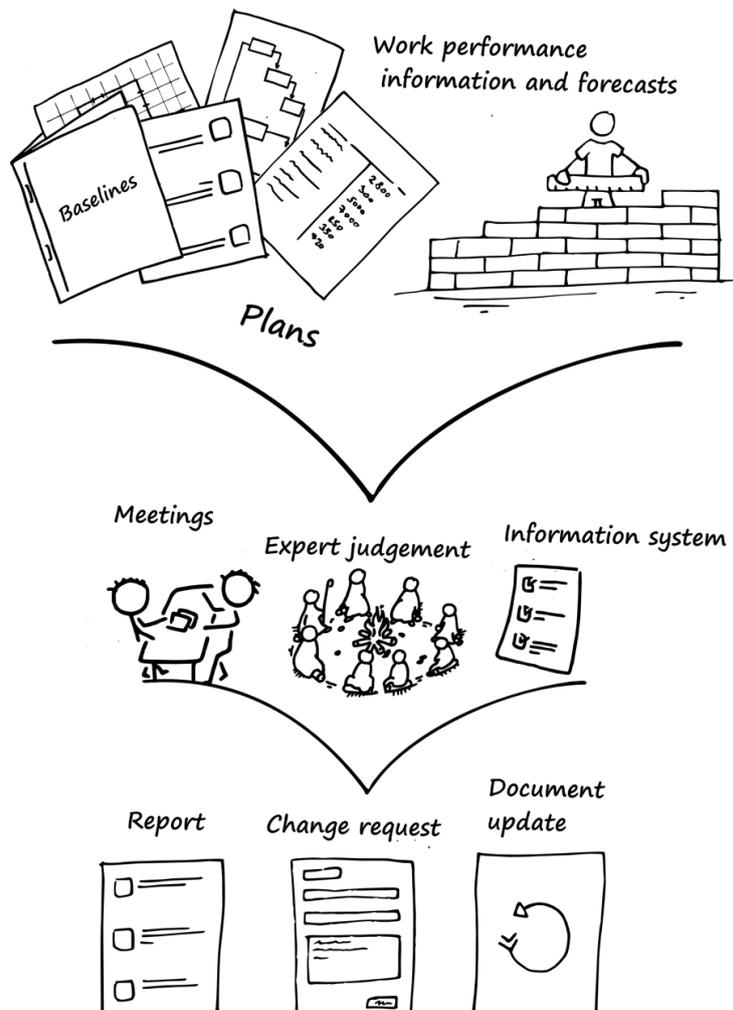
#### 4.4 Manage Project Knowledge

**Manage Project Knowledge** is the process of **using existing knowledge** and **creating new knowledge** to achieve the project's objectives and contribute to organizational learning.



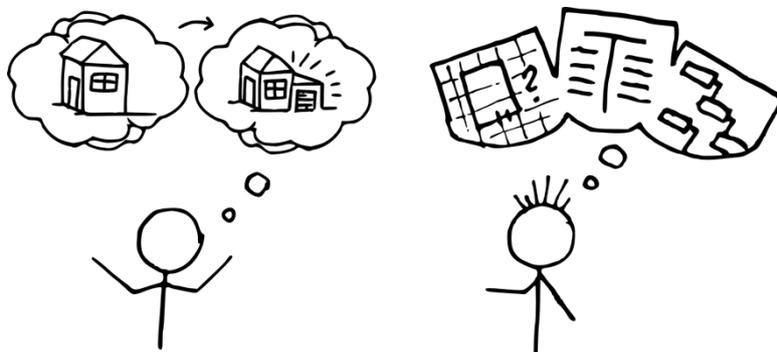
#### 4.5 Monitor and Control Project Work

**Monitor and Control Project Work** is the process of **tracking**, reviewing and reporting the **progress** to meet the performance objectives defined in the project management plan.



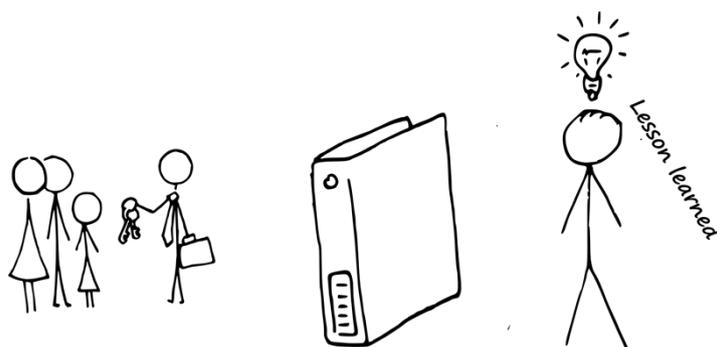
## 4.6 Perform Integrated Change Control

**Perform Integrated Change Control** is the process of **reviewing all change requests, approving changes and managing changes** to the deliverables, project documents and the project management plan; and communicating the decisions.



## 4.7 Close Project or Phase

**Close Project or Phase** is the process of **finalizing all activities** for the project, phase or contract.

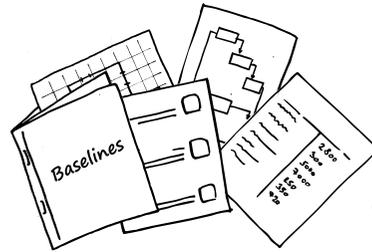


# 4 Project Integration Management

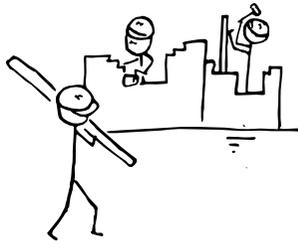
4.1 Develop Project Charter



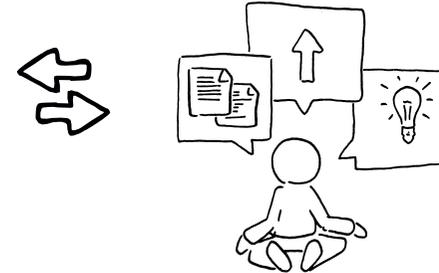
4.2 Develop Project Management Plan



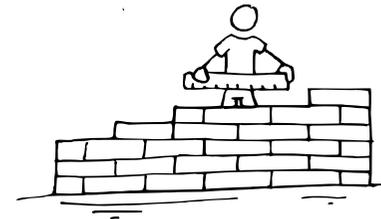
4.3 Direct and Manage Project Work



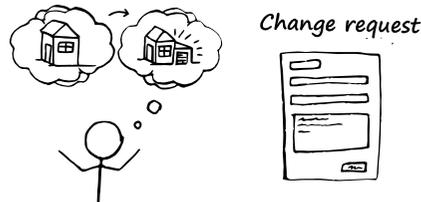
4.4 Manage Project Knowledge



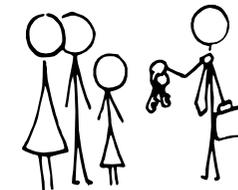
4.5 Monitor and Control Project Work



4.6 Perform Integrated Change Control



4.7 Close Project or Phase



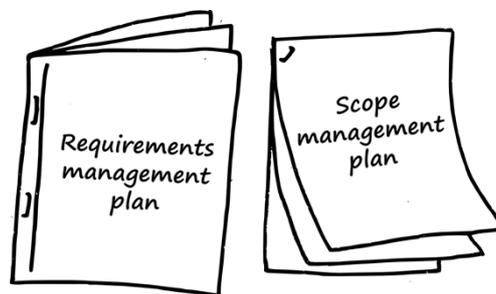
## 5. Project Scope Management

**Project Scope Management** includes processes required to ensure that the **project includes all the work required, and only the work required**, to complete the project successfully.

### 5.1 Plan Scope management

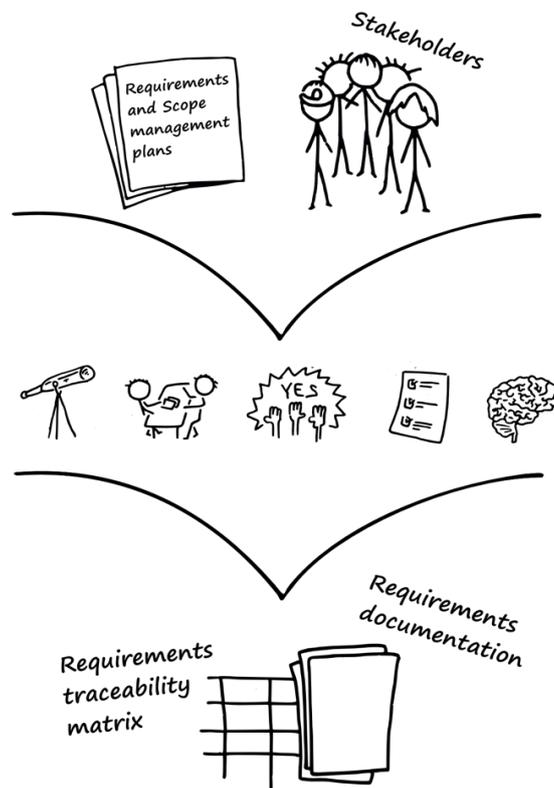
**Plan Scope Management** is the process of **creating a scope management plan** that documents how the project scope will be defined, validated, and controlled.

*In fact two plans can be prepared: **Scope management plan** and **Requirements management plan**.*



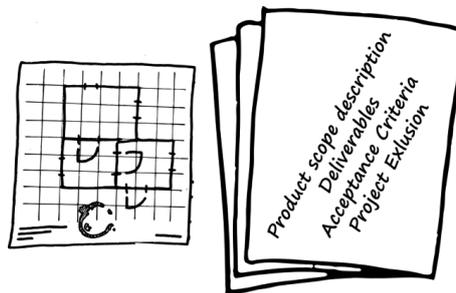
### 5.2 Collect Requirements

**Collect requirements** is the process of **determining, documenting, and managing stakeholder needs** and requirements to meet the project objectives.



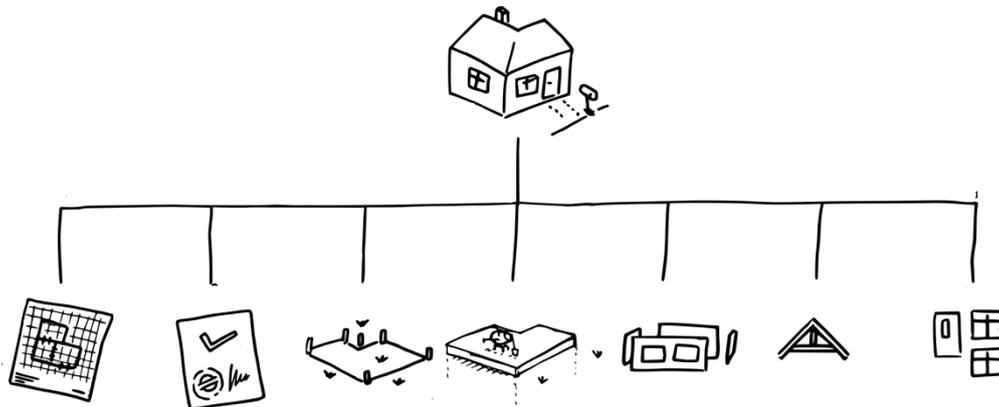
### 5.3 Define Scope

**Define Scope** is the process of **developing a detailed description** of the project and product.



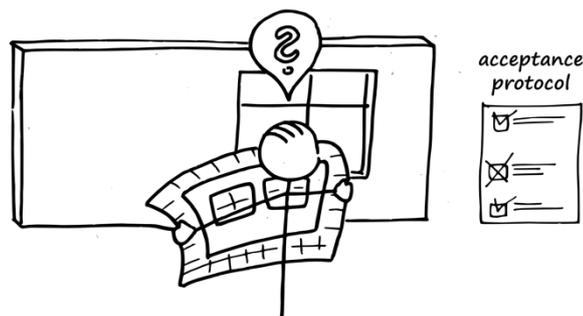
### 5.4 Create WBS

**Create WBS (Work Breakdown Structure)** is the process of **subdividing project deliverables and project work** into smaller, more manageable components.



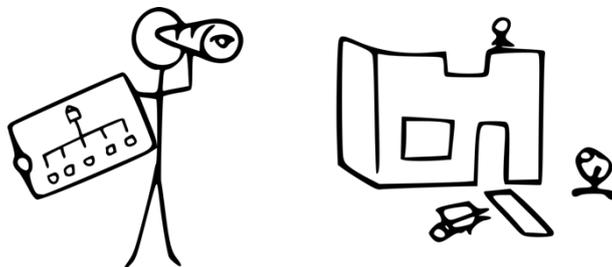
### 5.5 Validate Scope

**Validate Scope** is the process of **formalizing acceptance** of the completed project deliverables.



## 5.6 Control Scope

**Control Scope** is the process of **monitoring the status** of the project and product scope and **managing changes** to the scope baseline.

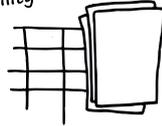


# 5 Project Scope Management

## 5.1 Plan Scope Management



Requirements traceability matrix

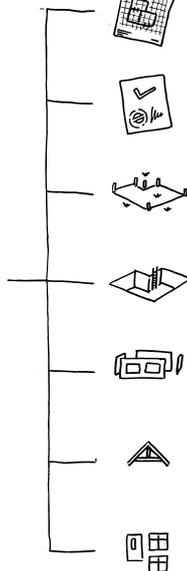


Requirements documentation

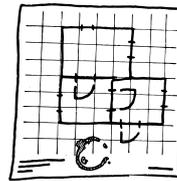
### Tools & Techniques

- Expert judgment
- Data gathering
- Data analysis
- Decision making
- Data representation
- Interpersonal and team skills
- Context diagrams
- Prototypes

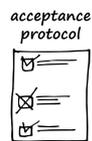
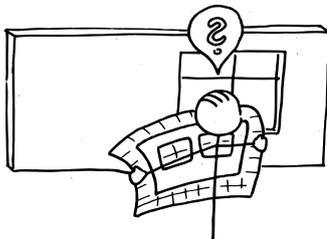
## 5.4 Create WBS



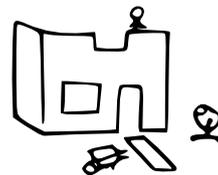
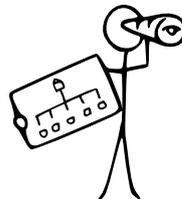
## 5.3 Define Scope



## 5.5 Validate Scope

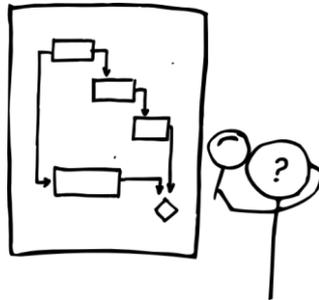


## 5.6 Control Scope



## 6. Project Schedule Management

**Project Schedule Management** includes the processes required to **manage timely completion of the project.**



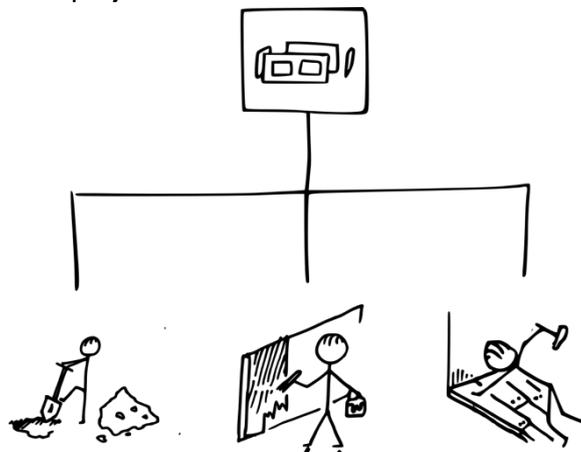
### 6.1 Plan Schedule Management

**Plan Schedule Management** is the process of **establishing** the policies, **procedures, and documentation** for planning, developing, managing, executing, and controlling **the project schedule.**



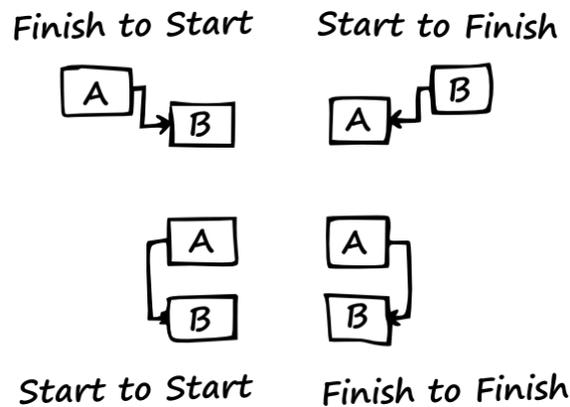
### 6.2 Define Activities

**Define Activities** is the process of **identifying and documenting the specific actions** to be performed to produce the project deliverables.



### 6.3 Sequence Activities

**Sequence Activities** is the process of **identifying and documenting relationships** among the project activities.



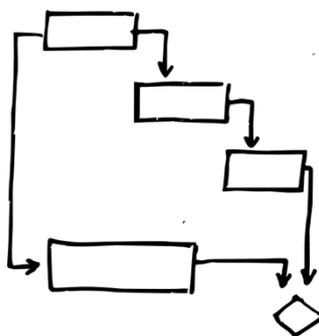
### 6.4 Estimate Activity Durations

**Estimate Activity Durations** is the process of **estimating the number of work periods** needed to complete individual activities with estimated resources.



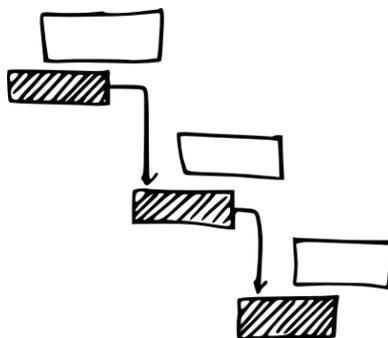
### 6.5 Develop Schedule

**Develop Schedule** is the process of **analyzing activity sequences, durations, resource requirements** and schedule constraints to create a **schedule model for project execution and monitoring and controlling**.



## 6.6 Control Schedule

**Control Schedule** is the process of **monitoring the status** of project to **update the project schedule progress** and **managing changes** to the **schedule baseline**.

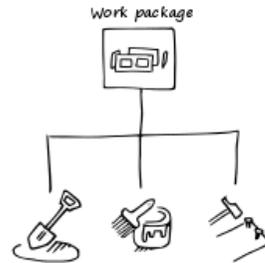


# 6 Project Schedule Management

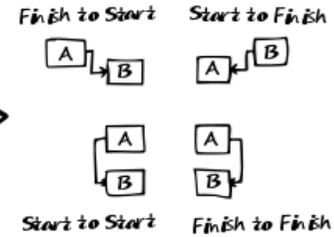
## 6.1 Plan Schedule Management



## 6.2 Define Activities



## 6.3 Sequence Activities

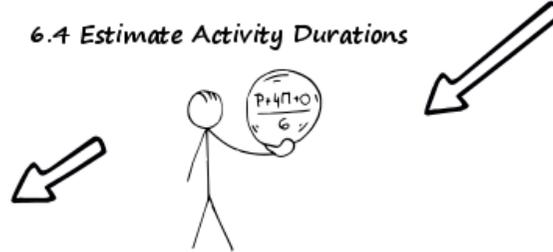


### ESIMATING

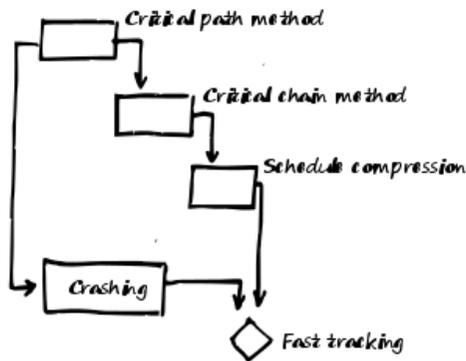
- Expert judgment
- Analogous estimating
- Parametric estimating
- Three-point estimates
- Group decision making techniques
- Reserve analysis

Bottom up estimating

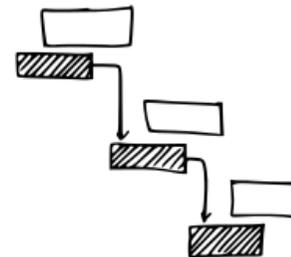
## 6.4 Estimate Activity Durations



## 6.5 Develop Schedule

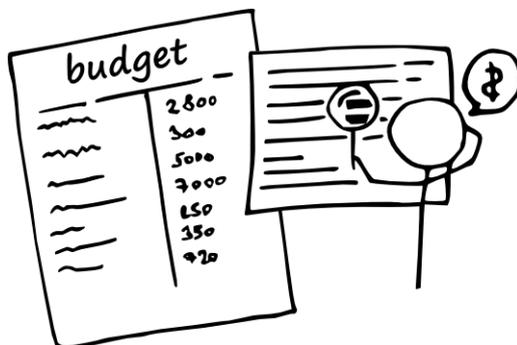


## 6.6 Control Schedule



## 7. Project Cost Management

**Project Cost Management** includes the processes involved in **planning, estimating, budgeting, funding, managing and controlling costs** so that the project can be completed within the approved budget.



### 7.1 Plan Cost Management

Plan Cost Management is the process that establishes the policies, procedures, and documentation for planning, managing, expending, and controlling project costs.



### 7.2 Estimate Cost

**Estimate Costs** is the process of **developing an approximation of the cost of resources** needed to complete project work.



2 999 \$



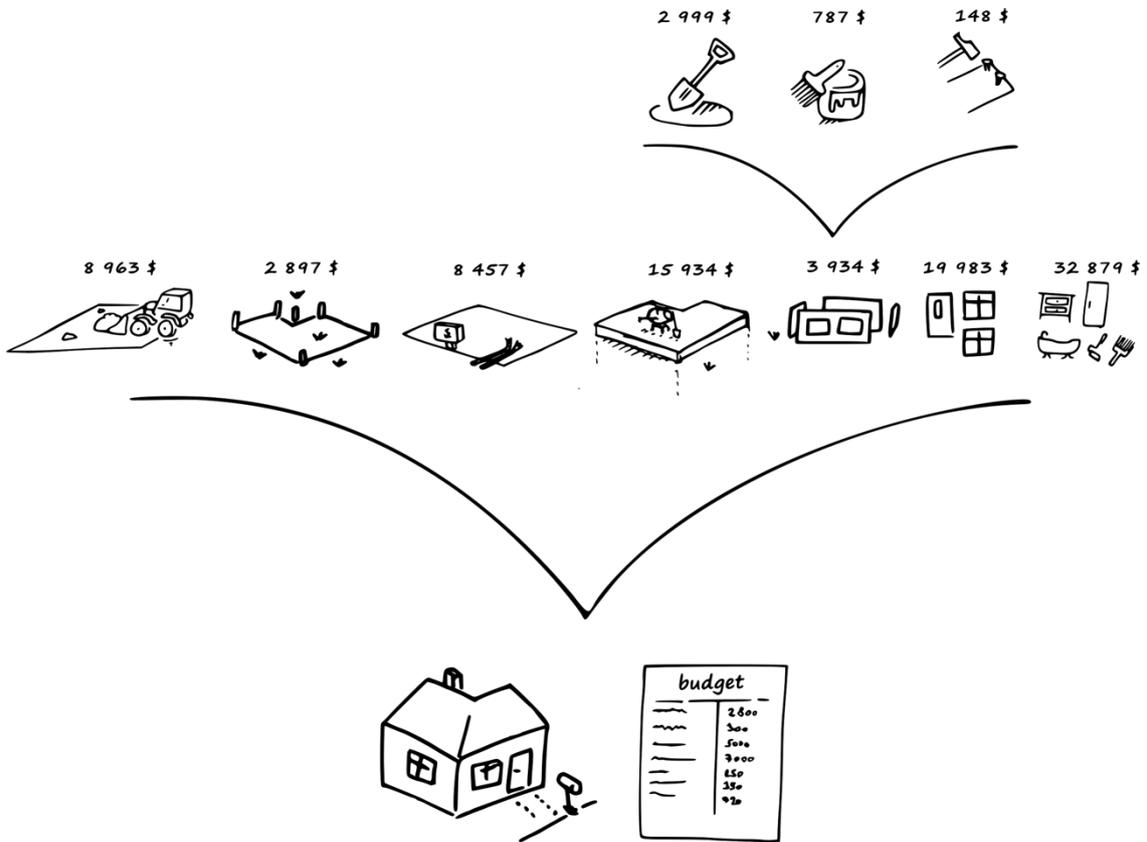
787 \$



148 \$

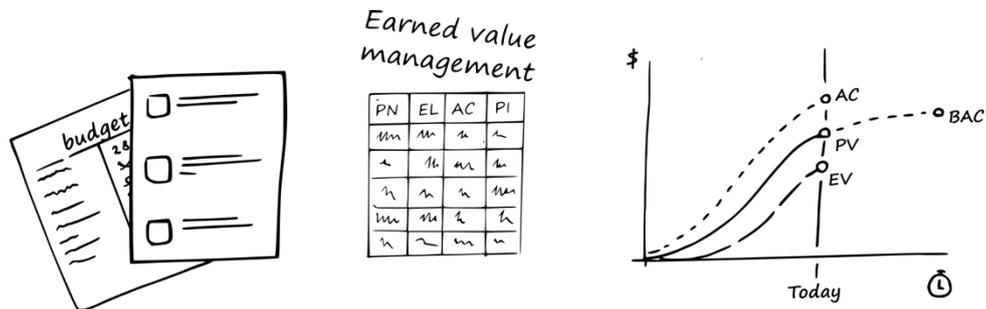
### 7.3 Determine Budget

**Determine Budget** is the process of **aggregating the estimated costs** of individual activities or work packages to **establish an authorized cost baseline**.



### 7.4 Control Costs

**Control Costs** is the process of **monitoring the status of the project** to **update the project costs** and managing changes to the cost baseline.

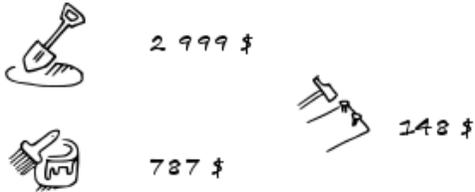


# 7 Project Cost Management

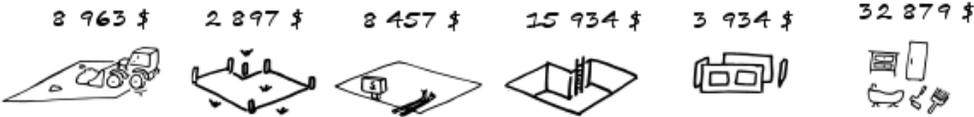
## 7.1 Cost Management Plan



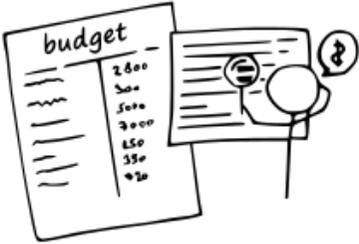
## 7.2 Estimate Costs



## 7.3 Determine Budget



## 7.4 Control Costs



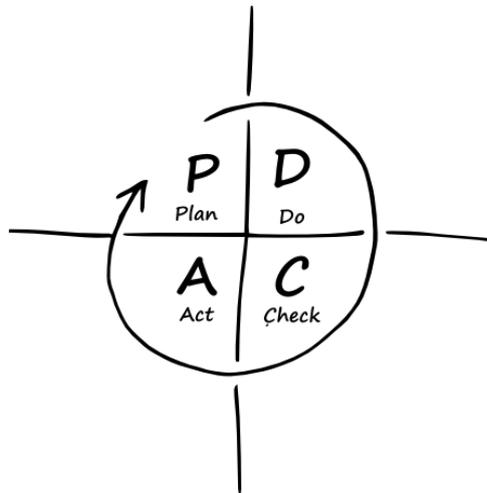
Earned value management

PV	EV	AC
M	M	M
A	M	M
M	M	M
M	M	M
M	M	M



## 8. Project Quality Management

**Project Quality Management** includes the processes for incorporating the organization's quality policies regarding planning, managing, and controlling project and product quality requirements in order to meet stakeholders' objectives.



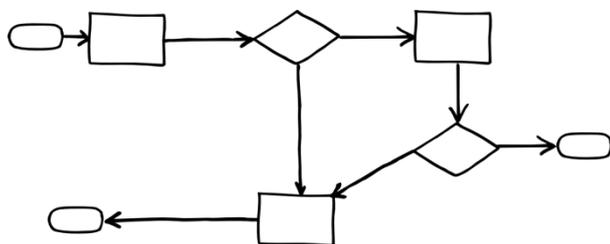
### 8.1 Plan Quality Management

**Plan Quality Management** is the process of **identifying quality requirements and/or standards** for the project and its deliverables, and **documenting how the project will demonstrate compliance** with quality requirements and/or standards.



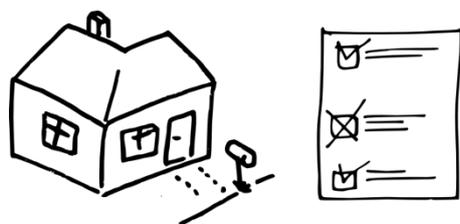
## 8.2 Manage Quality

**Manage Quality** is the process of **translating the quality management plan** into **executable quality** activities that incorporate the organization's quality policies into the project.



## 8.3 Control Quality

**Control Quality** is the process of **monitoring and recording results** of executing the quality activities in order to **assess performance and ensure the project outputs are complete, and meet customer expectations**.



# 8. Project Quality Management

## 8.1 Plan Quality Management



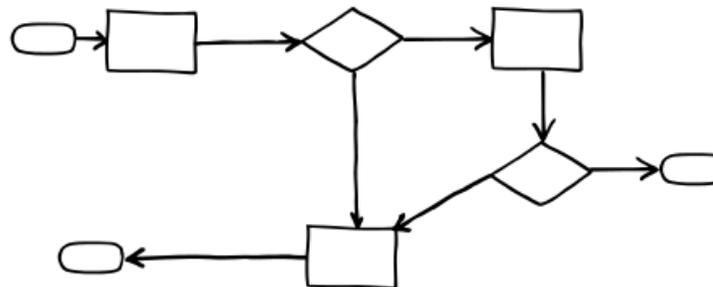
## 8.3 Control Quality



### Tools & Techniques

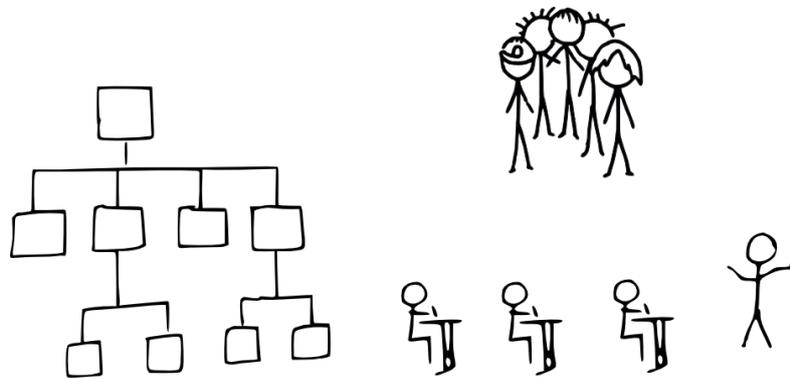
1. Cost-benefit analysis
2. Cost of quality
3. Cause and effect diagrams
4. Flowcharts & SIPOC
5. Checksheets
6. Histograms & Pareto diagrams
7. Control charts
8. Scatter diagrams
9. Benchmarking
10. Statistical sampling
11. Design for X

## 8.2 Manage Quality



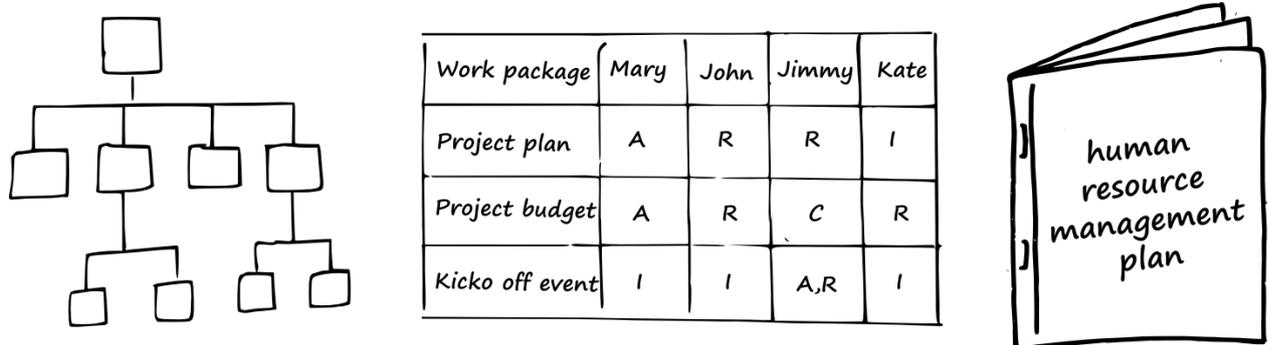
## 9. Project Resource Management

**Project Resource Management** includes the processes to **identify, acquire, and manage the resources** needed for the successful completion of the project.



### 9.1 Plan Resource Management

**Plan Resource Management** is the process of defining **how to estimate, acquire, manage, and use team and physical resources**.



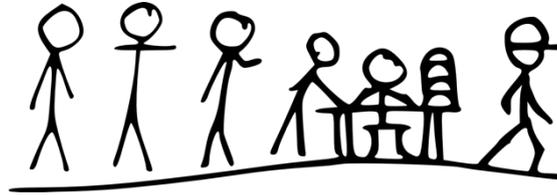
### 9.2 Estimate Activity Resources

**Estimate Activity Resources** is the process of **estimating team resources** and the type and quantities of **materials, people, equipment** or supplies necessary to perform project work.



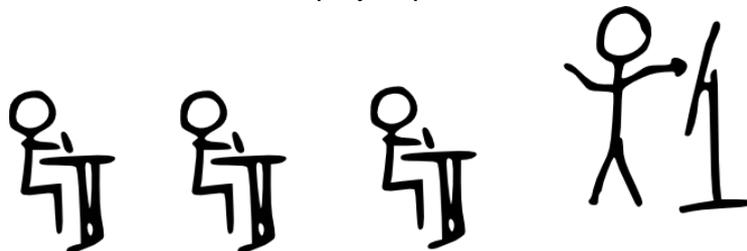
### 9.3 Acquire Resources

**Acquire Resources** is the process of **obtaining team members, facilities, equipment, materials**, supplies, and other resources necessary to complete project work.



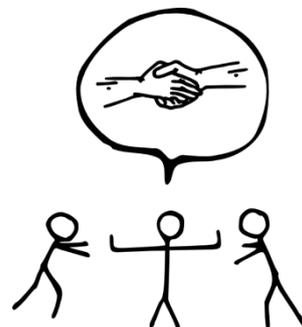
### 9.4 Develop Team

**Develop Team** is the process of **improving competencies, team member interaction** and the overall team environment to enhance project performance.



### 9.5 Manage Team

**Manage Team** is the process of **tracking team member performance, providing feedback, resolving issues** and managing team changes to optimize project performance.



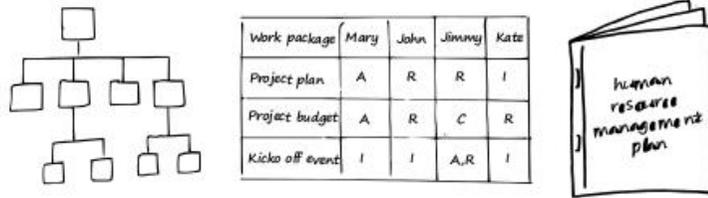
### 9.6 Control Resources

**Control Resources** is the process of **ensuring** that the physical **resources** assigned and allocated to the project **are available**, as well as **monitoring the planned versus actual utilization** of resources and **taking corrective action** as necessary.



# 9 Project Resource Management

## 9.1 Plan Resource Management



## 9.2 Estimate Activity Resources



## 9.3 Acquire Resources



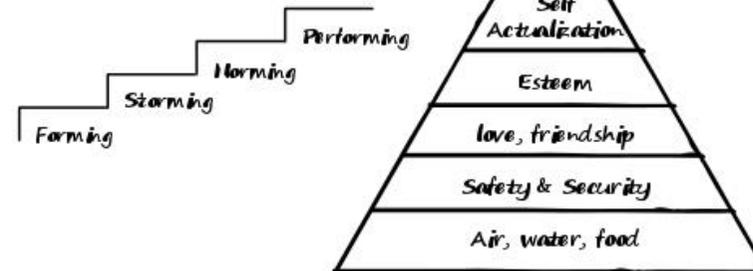
## 9.4 Develop Team



## 9.6 Control Resources

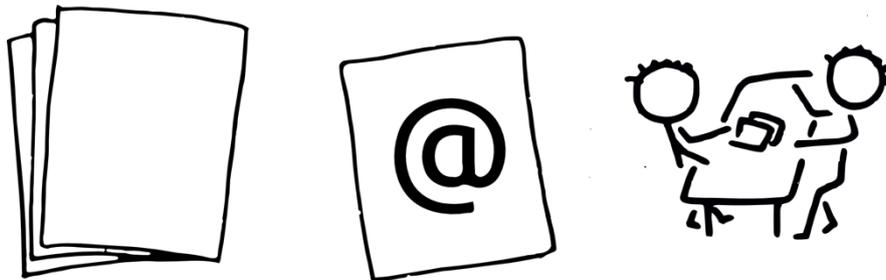


## 9.5 Manage Team



## 10. Project Communications Management

**Project Communications Management** includes the processes necessary to ensure that the information needs of the project and its stakeholders are met through development of artifacts and implementation of activities designed to achieve effective information exchange.



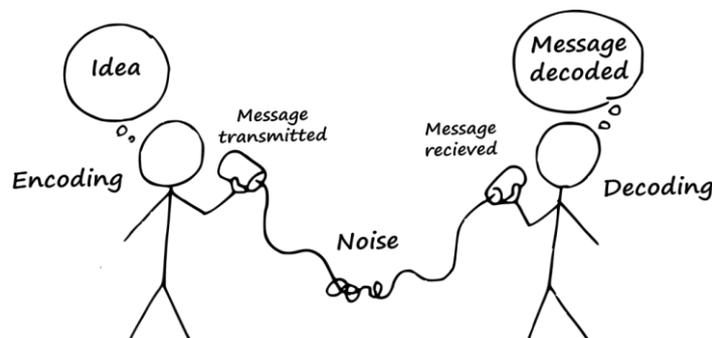
### 10.1 Plan Communications Management

**Plan Communications Management** is the process of developing an appropriate approach and plan for project communication activities based on the information needs of each stakeholder or group, available organizational assets, and the needs of the project.



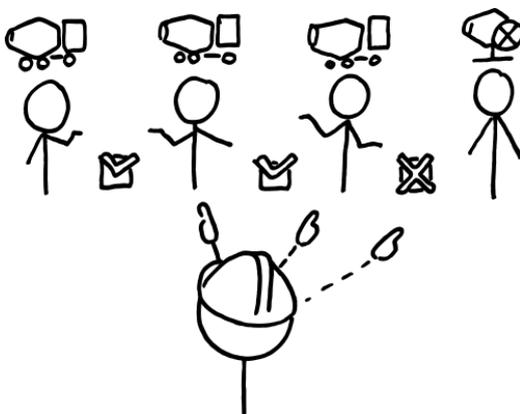
### 10.2 Manage Communications

**Manage Communications** is the process of ensuring timely and appropriate collection, creation, distribution, storage, retrieval, management, monitoring and the ultimate disposition of project information.



### 10.3 Monitor Communications

**Monitor Communications** is the process of ensuring the **information needs of the project and its stakeholders are met.**

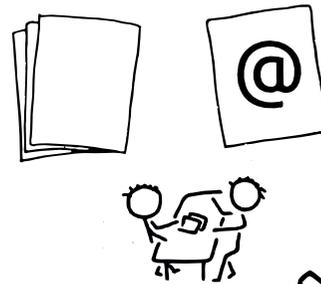


# 10. Project Communications Management

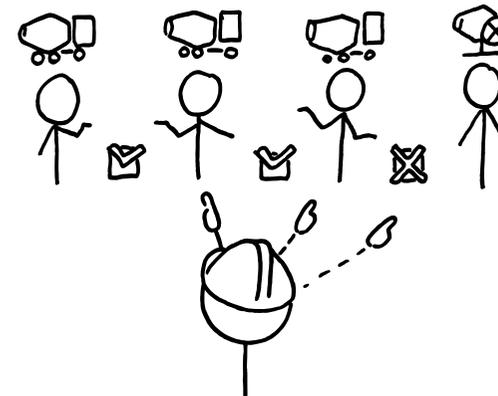
## 10.1 Plan Communications Management



## 10.2 Manage Communications



## 10.3 Monitor Communications



Communication Channels =  $n(n - 1)/2$

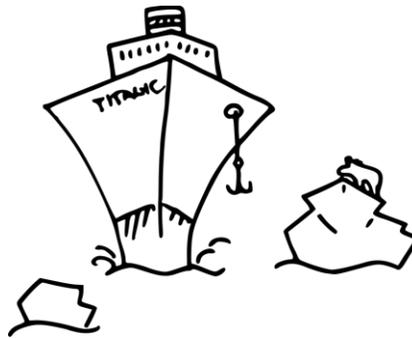
Communication skills

- Listening
- Questioning
- Fact finding
- Negotiating
- Summarizing, recapping and identifying the next stepsA)

## 11. Project Risk Management

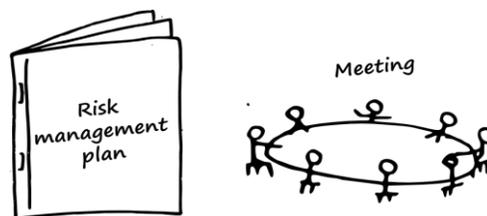
**Project Risk Management** includes the processes of conducting risk management planning, identification, analysis, response planning, response implementation, and monitoring risk on a project.

**Risk is an uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives such as scope, schedule, cost and quality.**



### 11.1 Plan Risk Management

**Plan Risk Management** is the process of defining how to conduct risk management activities for a project.



### 11.2 Identify Risks

**Identify Risks** is the process of identifying individual project risks as well as sources of overall project risk, and documenting their characteristics.

*Risk register*

ID	Event	Impact	Owner
1	~~~~~	~~~~~	~~~~~
2	~~~~~	~~~~~	~~~~~

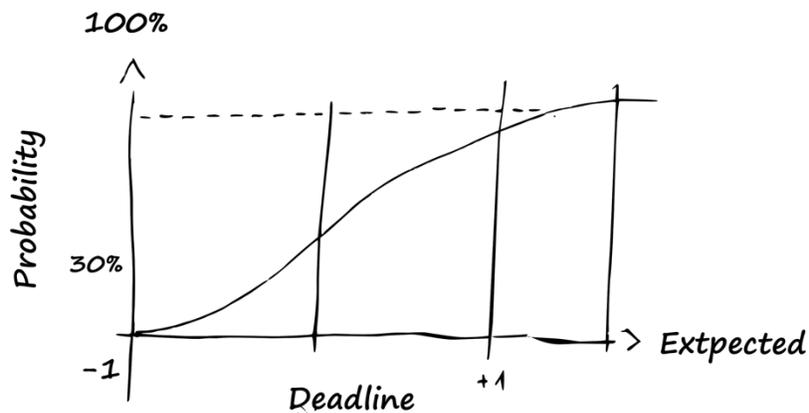
### 11.3 Perform Qualitative Risk Analysis

**Perform Qualitative Risk Analysis** is the process of **prioritizing individual project risks** for further analysis or action by assessing and combining their **probability of occurrence and impact** as well as other characteristics.



### 11.4 Perform quantitative risk analysis

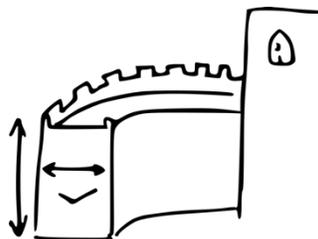
**Perform Quantitative Risk Analysis** is the process of **numerically analyzing** the combined effect of identified individual project risks and other sources of uncertainty on overall project objectives.



### 11.5 Plan Risk Responses

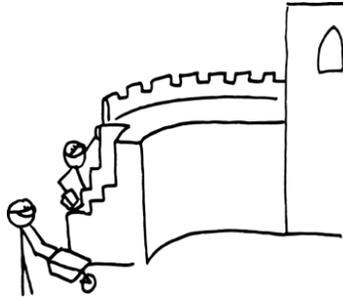
**Plan Risk Responses** is the process of **developing options, selecting strategies, and agreeing on actions** to address overall project exposure, as well as to **threat individual project risks**.

*Typical negative risk responses are: mitigate, accept, transfer, escalate and avoid, and you can also prepare a contingency plan - the plan when risk happens.*



## 11.6 Implement Risk Responses

**Implement Risk Responses** is the process of **implementing agreed-upon risk response plan**.



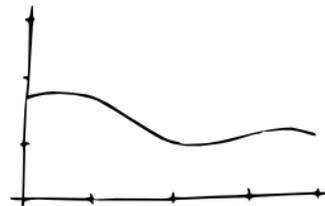
## 11.6 Monitor Risks

**Monitor Risks** is the process of **monitoring the implementation of agreed-upon risk response plans, tracking identified risks, identifying new risks and evaluating risk process effectiveness** throughout the project.

*Risk register*

<i>Event</i>	<i>Impact</i>	<i>Owner</i>
<i>~~~~~</i>	<i>~~~~~</i>	<i>~~~~~</i>
<i>~~~~~</i>	<i>~~~~~</i>	<i>~~~~~</i>

*Trend*





# 11 Project Risk Management

## 11.1 Plan Risk Management



## 11.2 Identify Risks

Risk register

ID	Event	Impact	Owner
1	~~~~~	~~~~~	~~~~~
2	~~~~~	~~~~~	~~~~~

## 11.3 Perform Qualitative Risk Analysis



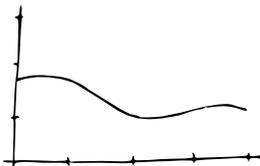
P=5					
P=4					
P=3					
P=2					
P=1					
Probability / Impact	I=1	I=2	I=3	I=4	I=5

## 11.7 Monitor Risks

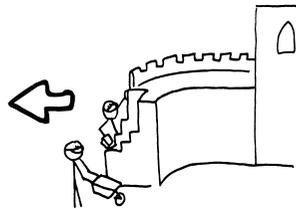
Risk register

Event	Impact	Owner
~~~~~	~~~~~	~~~~~
~~~~~	~~~~~	~~~~~

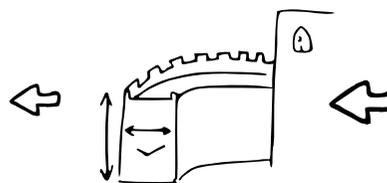
Trend



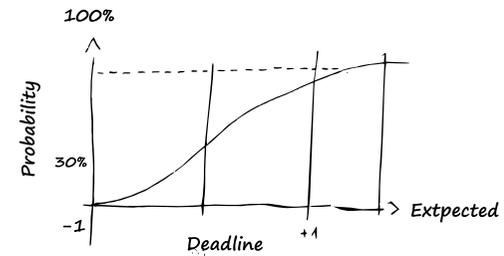
## 11.6 Implement Risk Responses



## 11.5 Plan Risk Responses



## 11.4 Perform Quantitative Risk Analysis



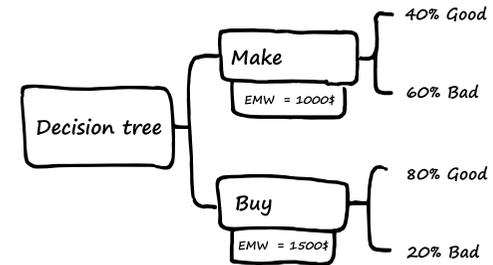
### Strategies for Threats

- Avoid
- Transfer
- Mitigage
- Accept
- Escalate



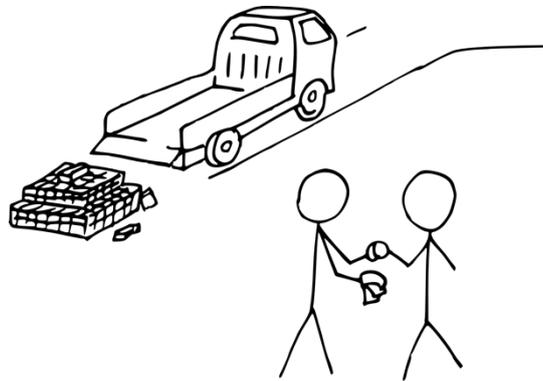
### Strategies for Opportunities

- Exploit
- Share
- Enhance
- Accept
- Escalate



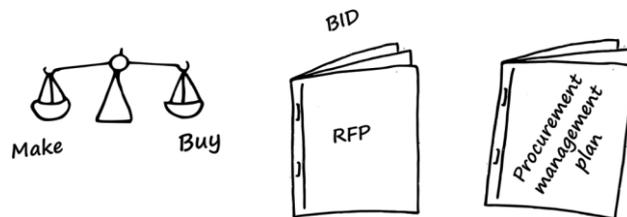
## 12. Project Procurement Management

**Project Procurement Management** includes the processes necessary to **purchase or acquire products, services, or results** needed from **outside the project team**.



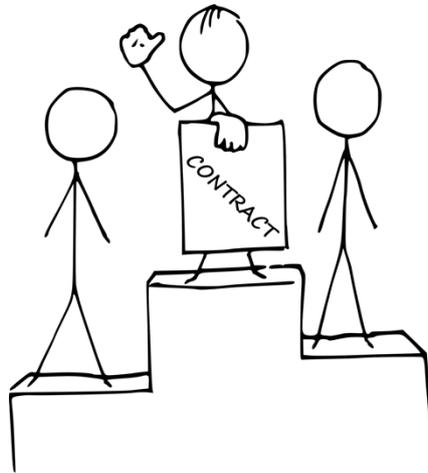
### 12.1 Plan Procurement Management

**Plan Procurement Management** is the process of **documenting project procurement decisions, specifying the approach and identifying potential sellers**.



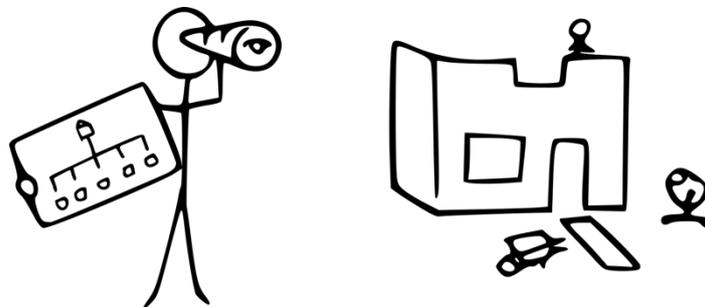
## 12.2 Conduct Procurements

**Conduct Procurements** is the process of **obtaining seller responses, selecting a seller and awarding a contract.**



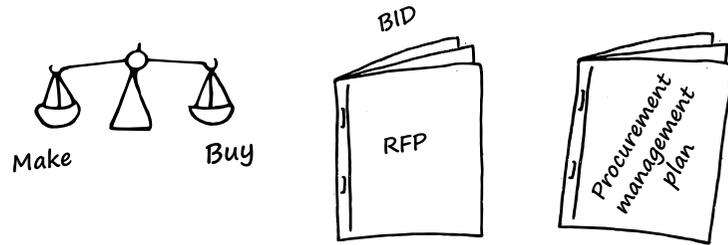
## 12.3 Control Procurements

**Control Procurements** is the process of **managing procurement relationships, monitoring contract performance, making changes and corrections** as appropriate, and closing out contracts.

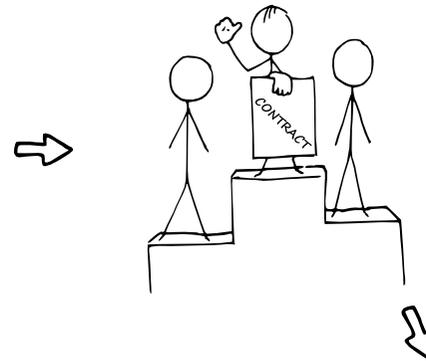


# 12 Project Procurement Management

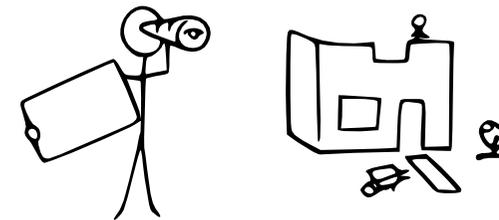
## 12.1 Plan Procurement management



## 12.2 Conduct Procurements



## 12.3 Control Procurements



### Contract types

#### Fixed-price contracts

- Firm fixed price contracts (FFP)
- Fixed price incentive fee contracts (FPIF)
- Fixed price with economic price adjustment contracts (FP-EPA)

#### Time and material contracts (T&M) - hybrid

#### Cost-reimbursable contracts

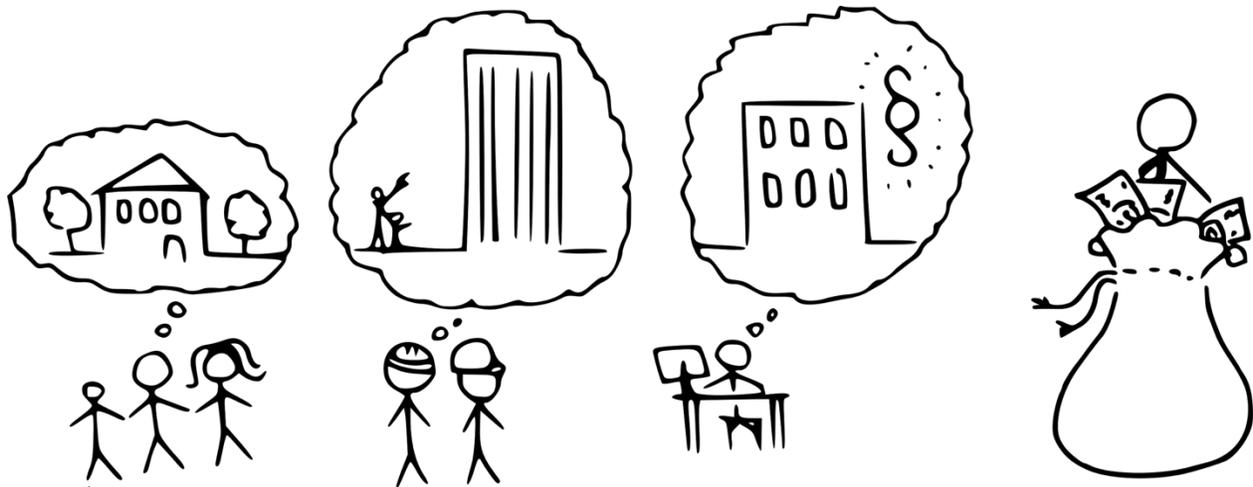
- Cost plus fee (CPF)
- Cost plus fixed fee contracts (CPFF)
- Cost plus incentive fee contracts (CPIF)
- Cost plus award fee contracts (CPAF)

## 13. Project Stakeholder Management

**Project Stakeholder Management** includes the processes required to **identify** the people, groups or organizations that **could impact or be impacted by the project**, to **analyze** stakeholder **expectations** and their **impact** on the project, and to develop appropriate **management strategies** for effectively engaging stakeholders in project decisions and execution.

### 13.1 Identify Stakeholders

**Identify Stakeholders** is the process of **identifying project stakeholders** regularly and **analyzing and documenting relevant information** regarding their **interests, involvement, interdependencies, influence and potential impact** on project success.



### 13.2 Plan Stakeholder Engagement

**Plan Stakeholder Engagement** is the process of developing approaches to involve project **stakeholders** based on **their needs, expectation, interests and potential impact** on the project.

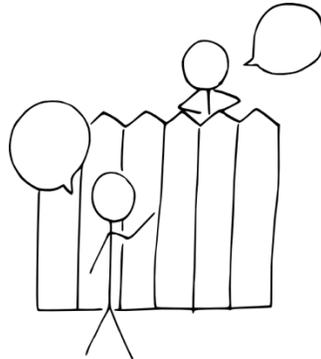
#### *Stakeholder engagement matrix*

*Comparing current (C) and desired (D) engagement levels of stakeholders*

Stakeholder	Unaware	Resistant	Neutral	Supportive	Leading
John		C		D	
Mary				C,D	

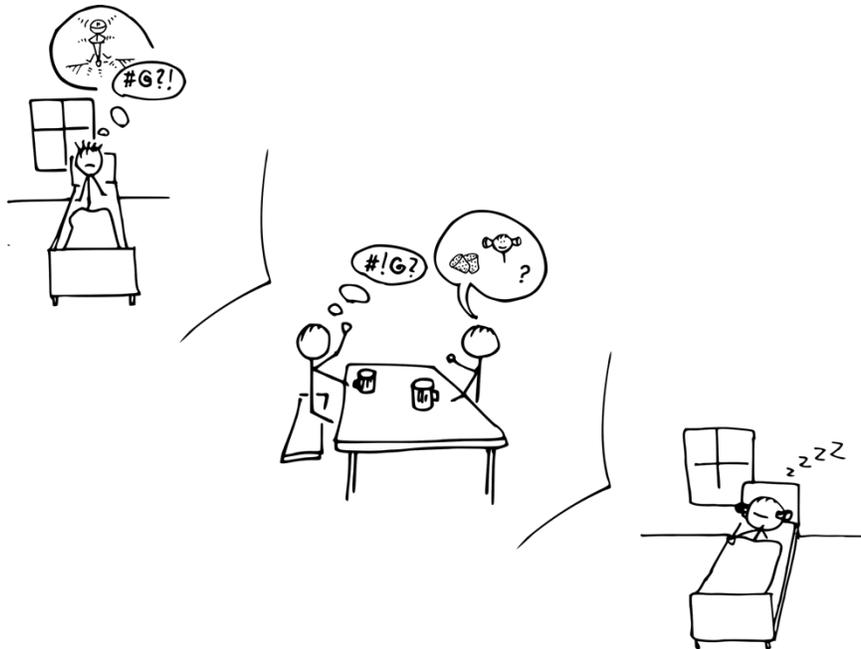
### 13.3 Manage Stakeholder Engagement

**Manage Stakeholder Engagement** is the process of **communicating and working with stakeholders** to meet their needs and expectation, **address issues**, and foster **appropriate stakeholder involvement**.



### 13.4 Monitor Stakeholder Engagement

**Monitor Stakeholder Engagement** is the process of **monitoring project stakeholder relationships** and **tailoring strategies** through the modification of engagement strategies and plans.



## A small test at the end:

Look at the following activities and decide in which knowledge area and process the activity could happen.

Activity	Knowledge area	Process No (eg 6.5)
You have received seller proposals and you are preparing a table with comparisons of the offers.		
You have registered a request for change and asked your team member to analyze impact, configuration items affected and estimate effort to build the change.		
You are performing a dry run of process to see if the process could work according to specified criteria.		
You have identified, that local authorities will be playing a crucial role in the approval process for the new plant.		
Your graphic designer has provided the effort estimate for the design of new website.		
You have found out, that the that your remote project team has not been informed about recent issues and decided to improve your communication with this team.		
Your estimate at completion is 100 000 USD higher than the original budget and you need to improve efficiency of your project team.		
You have decided to mitigate the possibility of delayed delivery of hardware by including penalty to the contract with supplier.		
You are doing workshops with customer, to understand what customer expects from the project.		
You have decided, that the business analyst will be also responsible for product design.		
Result: Each knowledge area should be represented once only.		

Good luck with your exam! Petr Janiš, PMP [petr@petrjanis.cz](mailto:petr@petrjanis.cz)