Software Project Management

CENG 323 – Project Management

14 December 2022, @IZTECH

Fundamental Concepts

Week 10

Stakeholders

Project Manager

Activities/Tasks
Work Breakdown Structure

Estimation
Duration, Effort, Resource

Scheduling
Dependency, Network diagram, Critical path, Gantt chart, Milestone

Optimizing a Plan
Fast tracking, Project crashing

Week 11

Resource management
Roles & Responsibilities, RACI matrix, Organization chart
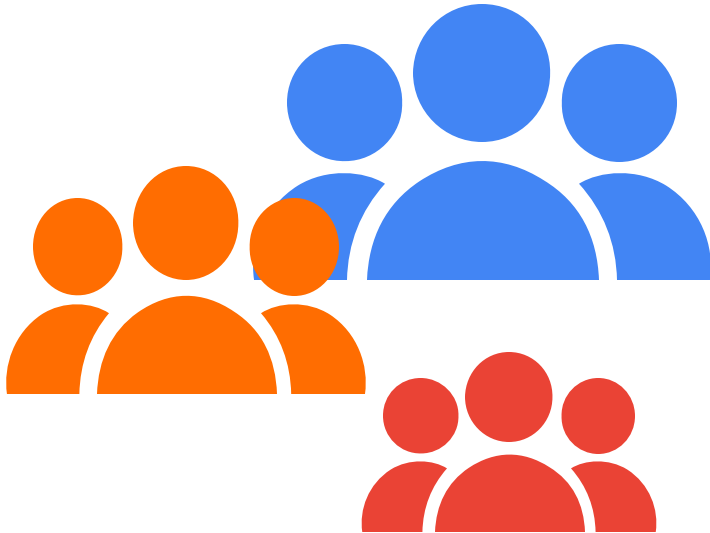
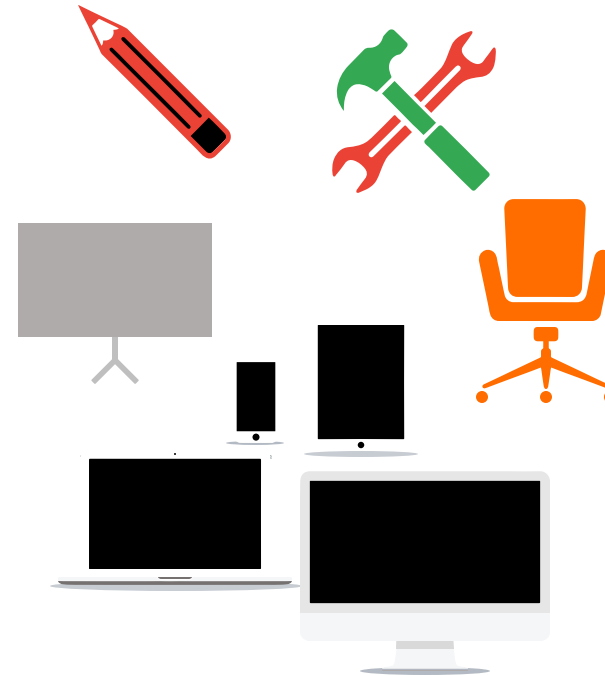**Communications management**

Cost
Direct/Indirect, Budget

Risk
Risk matrix, Risk register, Risk response

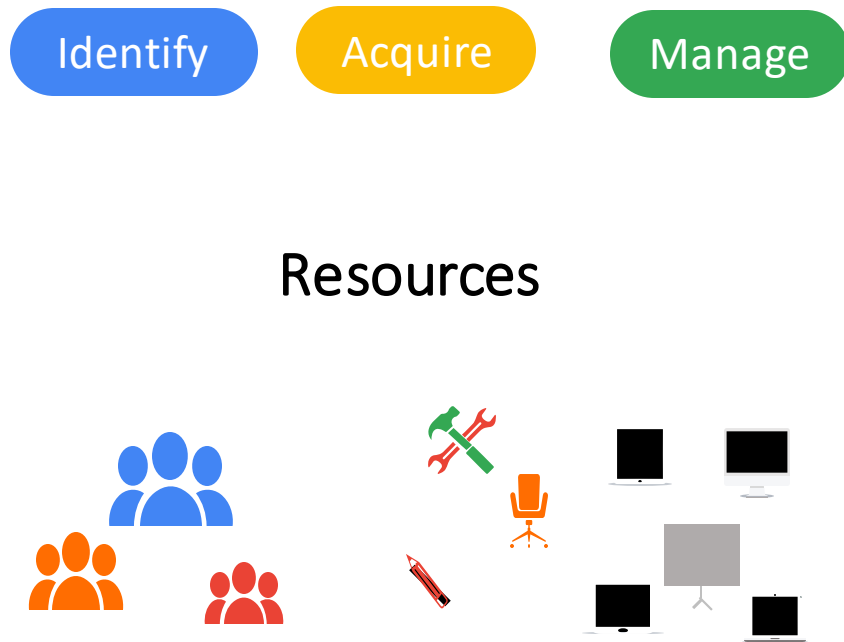# You need resources ...

Team

Physical

Project Resource Management

Identify   Acquire   Manage

Resources

- Plan Resource Management
- Estimate Activity Resources
- Acquire Resources
- Develop Team
- Manage Team
- Control Resources

Plan Resource Management

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

Resources needed

Roles & Responsibilities

Organization Chart

Training
Team development
Motivation

Ref: [PMI], [Greene]
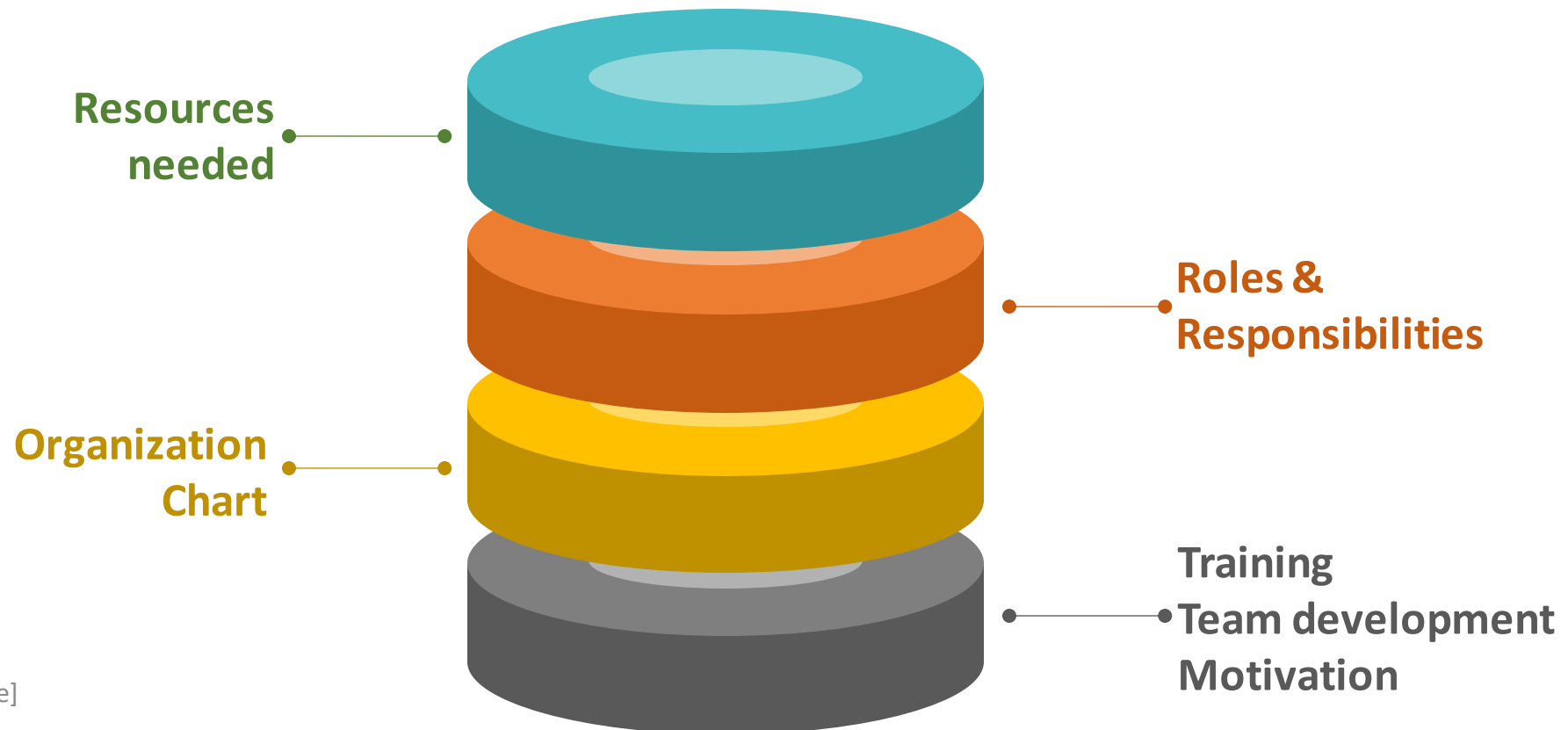
Roles & Responsibilities

Role

The function assumed by, or assigned to, a person in the project.

Responsibility

The assigned duties and work that a project team member is expected to perform in order to complete the project's activities.
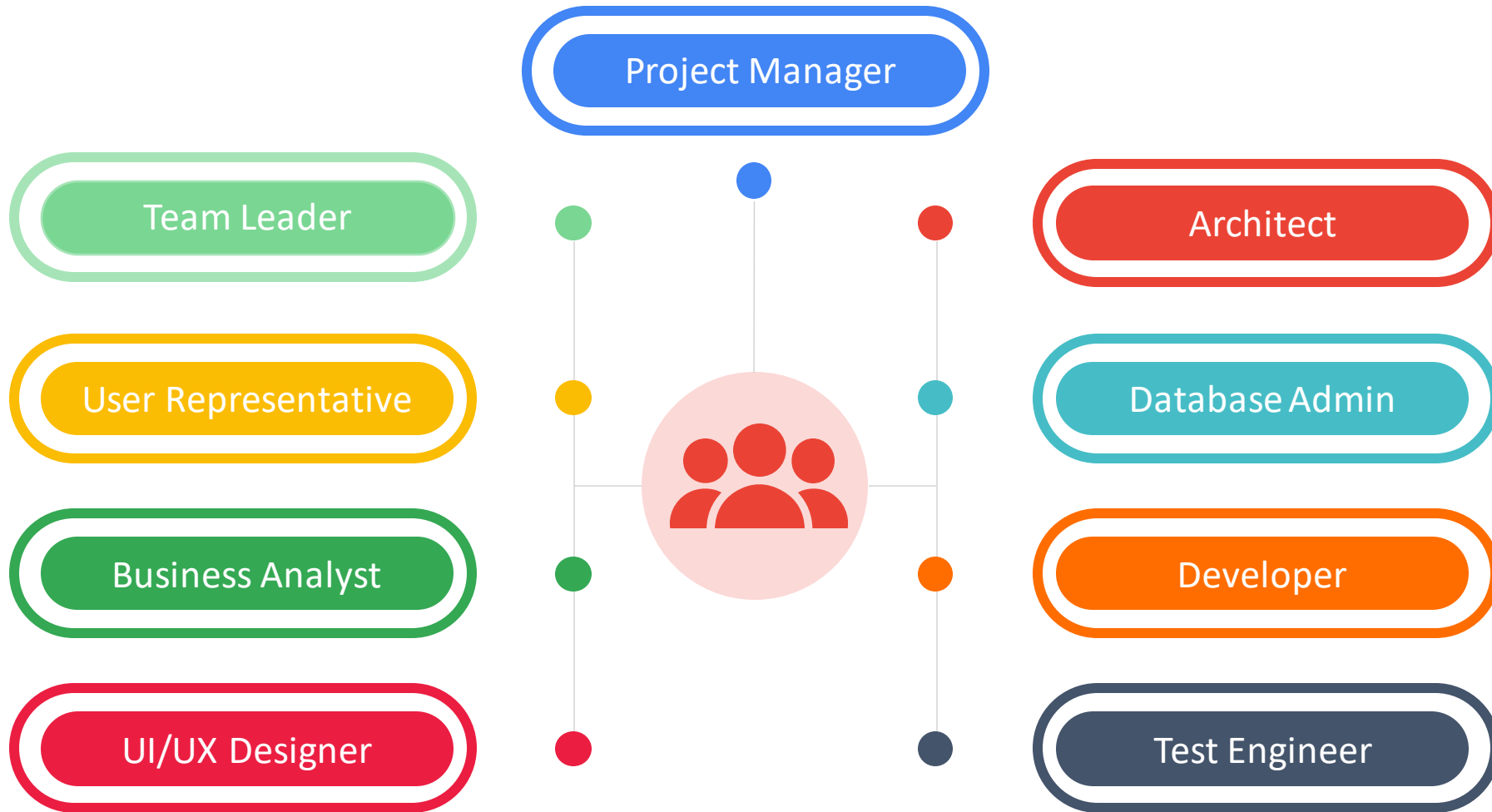
Responsibilities of Business Analyst

Define business requirements
Plan the requirements approach
Identify project stakeholders and user classes
Elicit requirements
Analyze requirements
Document requirements
Communicate requirements
Lead requirements validation
Facilitate requirements prioritization
Manage requirements

RACI Matrix

WORK PACKAGE	P1	P2	P3	P4	P5	P6	P7	P8
WP0. Project Management	AR	C	C	C	C	C	C	C
WP1. Case Study Requirements	C	C	C	AR	R	C	C	R
WP2. Network Architecture Definition		AR			C		C	C
WP3. Software Development	AR			R	C	R		C
WP4. Assessment and Evaluation	C	C	R		AR	R	R	R
WP5. Sustainability & Exploitation	R	R	AR	R	R	R	R	R
WP6. Dissemination	R	R	R	R	R	AR	R	R

- **Responsible:** people expected to actively participate in the activity and contribute to the best of their abilities

- **Accountable:** person who is ultimately responsible for the results

- **Consulted:** people who must be consulted before a final decision is made

- **Informed:** people affected by the activity/decision; informed, they do not participate in the effort

Ref: [Villafiorita]

Organization Chart

shows how your team members relate with one another
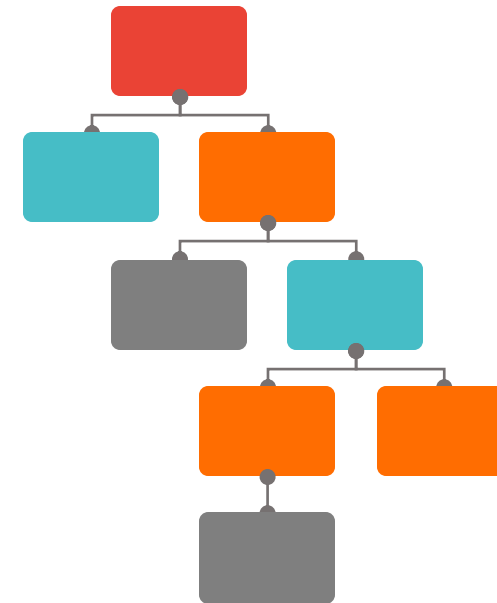
An Example of Project Organization Chart
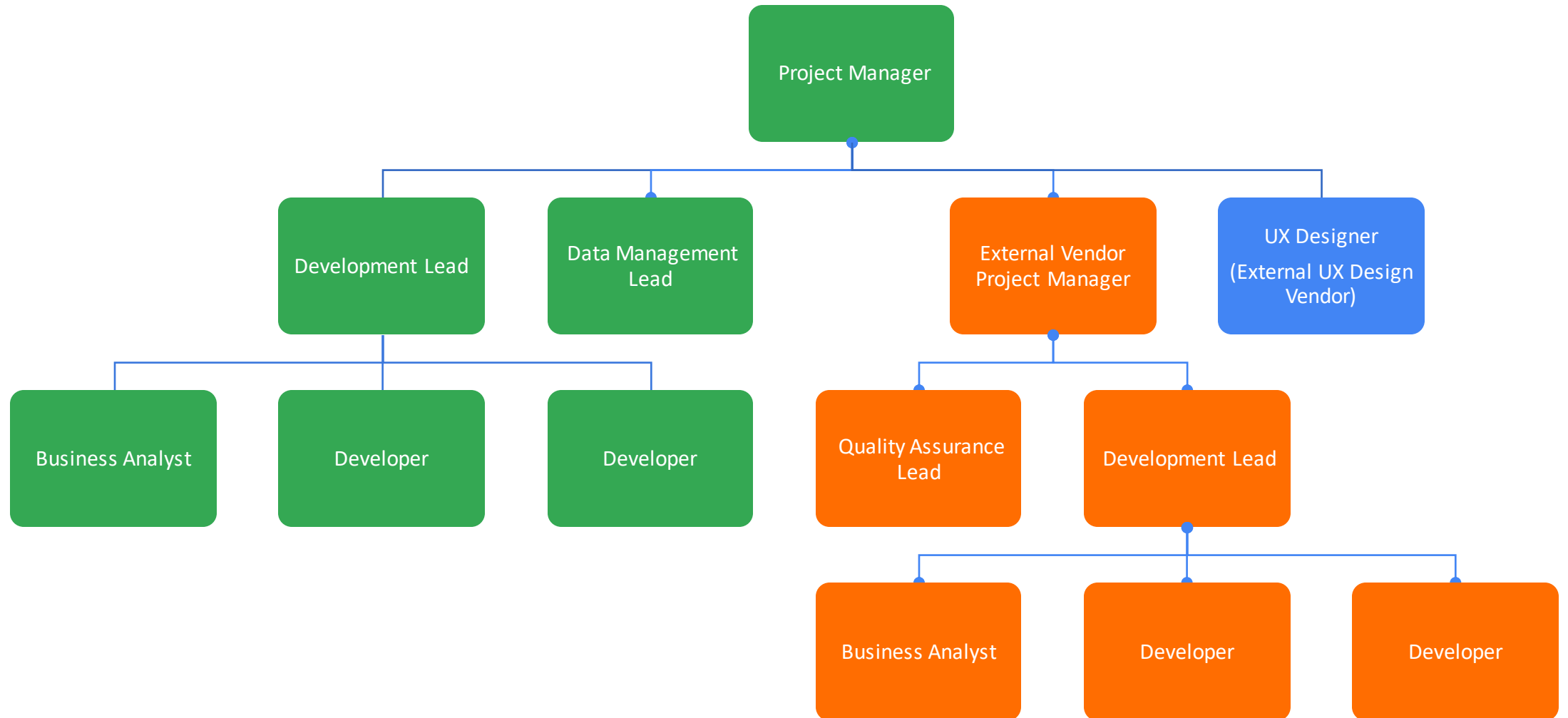
Communications Management

Communications Management makes sure **everybody** gets the **right message** at the **right time**.

| Initiate | → | Plan | → | Execute | → | Close |

Communication needs to happen throughout the entire life cycle of the project.

Ref: [Greene], [Google]
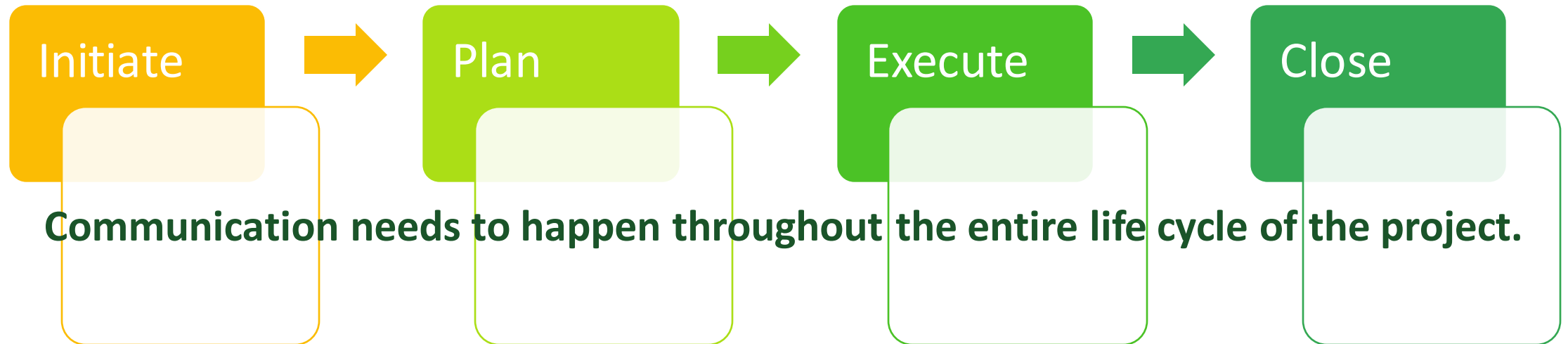
Communications Management

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**.

1. Developing a strategy

2. Implementing the strategy

The project communications management processes are:

- Plan Communications Management

- Manage Communications

- Monitor Communications

Communication Plan

Communication plan organizes and documents the process, types, and expectations of communication for the project.

An Example

Event	Rationale	Frequency	Deliverable
Status meeting	All of the stakeholders feel that it is important that they meet face to face periodically.	Biweekly	Meeting minutes to be emailed to all stakeholders. Archived in the document repository.
Budget report	Since costs are very important, we will create a budget report weekly to track how we are doing.	Weekly	Report to be e-mailed to all stakeholders.

Ref: [Greene], [Google]

Communication Plan Examples

Type of Communication	Recipients	Frequency	Key Dates	Delivery Method	Goal	Sender/Owner
Project Newsletter	Key Stakeholders	Monthly	First Monday	Email	Status Update Overview	Project manager
Daily Stand-ups	Core Team	Daily	12pm ET	In-person / Video conference	Progress Update, Blockers, Next Steps	Team lead
Weekly Check-in	Marketing	Weekly	Wednesday 2pm	Email + Video conference	Backlog grooming, Demo	Project manager
Weekly Check-in	Procurement	Weekly	Wednesday 3pm	Email + Video conference	Launch Prep	Project manager / Team lead
Weekly Check-in	Product Development	Weekly	Wednesday 4pm	Email + Video conference	Key learnings & Celebration	Project manager

Project Communication Plan

Project Title:	Plant Pals
Project Manager:	Rowena Halford
Executive Sponsor:	JuAnne Ng
Principal Stakeholder:	Emilio Garcia
Date:	8/24/2020

Deliverable Info	Recipient(s)	Delivery Method(s)	Schedule	Who's Responsible?
Project Information	Project Manager	Sharepoint	As needed	Project manager
Project Status	Project Team	ePortfolio	By noon Tues	Project manager
Agenda Minutes	Steering Com.	Email	Monthly	Project manager
Timeline Update	Project Manager	Meetings	As needed	Project manager
Project Updates	ITEC / Exec. Sponsor	Team meetings	As needed	Project Team
Project Risks	OU Steering Com.	Risk Devel	As needed	Project manager

Resource Links	Sharepoint	Core Team Mtg Notes
	ePortfolio	Stakeholder Mtg Notes
	Risk Assessment	Timeline
	User Feedback Surveys	Marketing Docs

Cost Management

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

Plan cost management

Estimate costs

Determine budget

Control costs

Cost Management

Every project boils down to money!

$$

That's why no project plan is complete until you come up with a budget.

[Greene]

Direct Costs

costs related to the production of the project outputs

Personnel
The salaries of people directly involved in the project (gross, not net!)

Materials & Supply
Costs of the material necessary to produce project outputs
Usually accounted if the project has specific needs

Hardware & Software
Systems required for developing the system
Usually accounted if the project has specific needs

Travel, Meetings, Events
costs necessary to meet with customers and other stakeholders

Consultants & Subcontracting
costs related to work that is subcontracted

Other Costs
Books, Training, Renting equipment, …

Ref: [Villafiorita]

Indirect Costs

expenses necessary to run the facility and make work actually doable

General Overheads

- Office space costs (rent, heating, ...)
- Consumables
- Standard equipment
- Administrative Staff
- Networking

Project Overheads

costs necessary to run the project-specific infrastructure

Ref: [Villafiorita]

Budget

The estimated monetary resources needed to achieve the Project's goals and objectives.

Milestones can act as checkpoints for budget management and payment.

	Labor		Materials		Fixed cost	TARGET BUDGET $	ACTUAL BUDGET $	UNDER/OVER $
TASK	Hrs	Rate	Units	$/Unit		Budget	Actual	Under/Over
CATEGORY								
Task						$		$
Task						$		$
Task						$		$
Task						$		$
						$	$	
CATEGORY								
Task						$		$
Task						$		$
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CATEGORY								
Task						$		$
Task						$		$
Task						$		$
Task						$		$
						$	$	
CATEGORY								
Task						$		$
Task						$		$
Task						$		$
TOTAL						$		$

Microsoft Excel Budget Templates

Microsoft Excel Website Budget Template

Google Sheets Budget Template

Ref: [Google]

Budget Example

	Unit Cost	Overhead	Efforts/Units	Total	Comments
Personnel					
Resource A	$50	$30	100	$8,000	
Resource B	$40	$30	100	$7,000	
Total Personnel Cost				$15,000	
Hardware & Software					
Tablet computer	$300		2	$600	Two tablets for testing the application
Notebook	$1,000		2	$2,000	Two notebooks for the personnel
MS Teams	$500		1	$500	for communication
Visual Studio	$250		2	$500	for development
Total Hardware & Software				$3,600	
Other Costs					
Travel	$1,000		4	$4,000	for two onsite meetings
Training	$500		2	$1,000	
Total Other Costs				$5,000	
Contingency (10%)				$2,360	
TOTAL				**$25,960**	

Money that is included to cover potentially unforeseen events that are not accounted for in a cost estimate.

Ref: [Villafiorita], [Google]

What is Risk?

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. A risk may have one or more **causes** and, if it occurs, it may have one or more **impacts**.

Risk vs. Issue

RISK

ISSUE

a **potential event** which can occur

a **known or real problem** that can

and can impact your project

affect the ability to complete a

task

Ref: [Google]

Risk Management

Risk management collects techniques, know-how and processes to help **identify**, **assess**, **manage**, and **monitor** risks

The objectives of Project Risk Management are to increase the **probability** and the **impact** of positive events and decrease the probability and impact of events adverse to the project.

Ref: [Villafiorita]

Risk Management

Identification	Assessment	Response planning	Monitoring & Control

What are the risks?
- Resources
- Critical path
- Assumptions
- ...

Prioritize risks
- Probability
- Impact

Risk matrix

Risk responses
- Avoid
- Mitigate
- Transfer
- Accept

Risk register

Ref: [Grushka-Cockayne], [Villafiorita], [Greene]

Fishbone Diagram

Fishbone diagrams help the team to brainstorm potential causes of a problem or risk and sort them into useful categories.
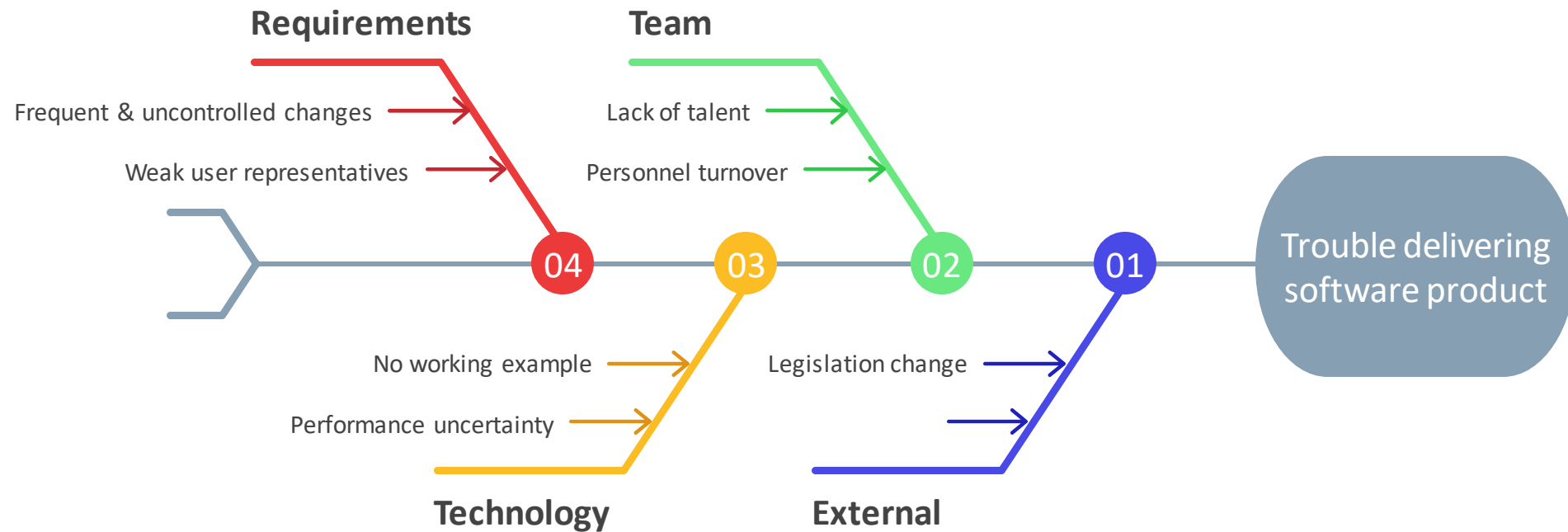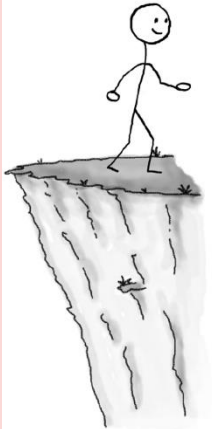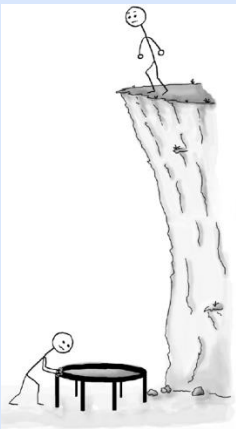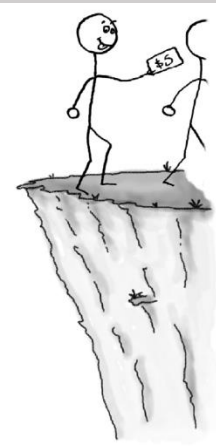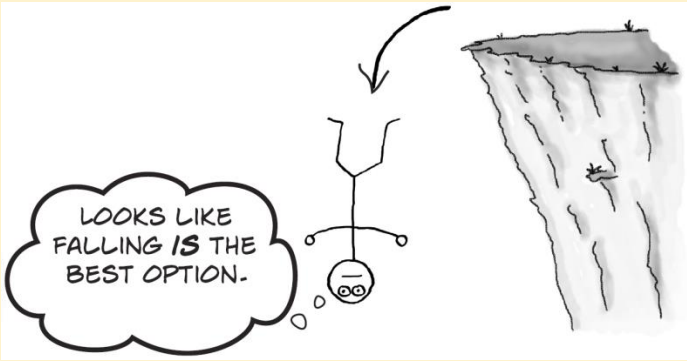
Risk Matrix

a tool used to prioritize project risk

the likelihood that a risk will occur

Likelihood

	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain (>75%)	Yellow	Red	Red	Red	Red
Likely (50-75%)	Green	Yellow	Red	Red	Red
Moderate (25-50%)	Green	Green	Yellow	Yellow	Red
Unlikely (10-25%)	Green	Green	Green	Yellow	Red
Rare (<10%)	Green	Green	Green	Green	Red

Impact

the damage a risk could cause, if it occurs

Ref: [Grushka-Cockayne], [Google]

Risk Responses

Risk Register

a table or chart that contains a list of risks

	ID	Risk Area	Risk Type	Probability Level	Impact Level	Timeline	Risk Score	Risk Mitigation Plan/Owner
1	OP01	Operations	Schedule	4	4	1	16	
2	W01	Team	Scope	3	3	3	9	
3	E09	Engineering	Cost	3	3	2	9	

Ref: [Grushka-Cockayne], [Google]

Risk Management – An Example

Risk ID	Risk Description	Probability	Influence	Effect on Cost/ Schedule/Quality
RI.1	Late submission of information, delays in document approval by the Customer	Medium	High	Schedule
RI.2	Incorrect or incomplete stated requirements	High	High	Cost, Schedule
RI.3	Changes in the requirements during development	High	High	Cost, Schedule
RI.4	Problems with the delivery of the product into production because of the unavailability of servers.	High	Medium	Schedule
RI.5	Problems of integration with internal systems of the Customer	Medium	Medium	Cost, Schedule, Quality
RI.6	Tight time limits that influence the testing flow	Medium	High	Cost, Schedule, Quality

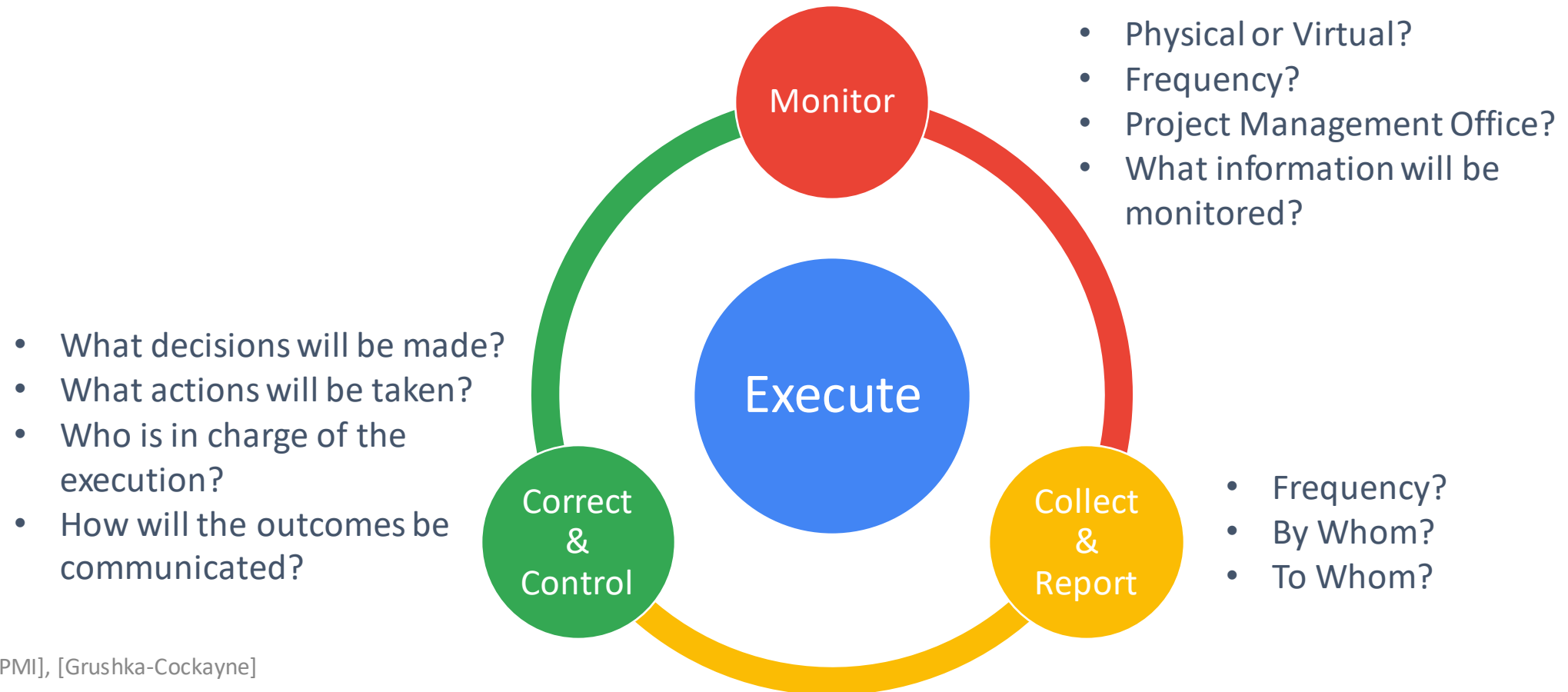| Risk ID	Actions to reduce the risk
RI.1	• Compliance with the rules of planning and organizing meetings. • Timely information about the unavailability of employees (due to vacation, illness, etc.). • Scheduling of meetings and the provision of the necessary information in advance.
RI.2	Splitting the development into short iterations. Frequent demonstrations of new functionality.
RI.3	• Fixing the basic list of requirements in the contract. • A dedicated Product Owner from the Customer. • Frequent demonstrations of new functionality.
RI.4	Getting further details on installing the product from the Customer's IT department as soon
RI.5	• Communicating with the stakeholder, who is responsible for the provision and operation of appropriate interfaces, in order to agree all the features and performance bottlenecks in advance. Trying to solve them before going live. • Installing the beta version of the product and testing the product in order to identify the problems associated with integration.
RI.6	Following the development schedule. Timely notification of potential problems or shifts in the schedule.

Ref: https://blog.qatestlab.com/2019/06/20/software-testing-risks/

Project Life-Cycle

Initiate
- Establish organization
- Project charter & definition

Plan
- Identify scope
- Identify tasks, dependencies, and schedule
- Plan resources
- Clarify trade-offs and decision making principles
- Develop a risk management plan

Execute
- Monitor
- Communicate and report
- Correct and control

Close
- Sign off
- Conduct a formal post-mortem

Ref: [Grushka-Cockayne]

Project Execution

The objective is to complete the work defined in the project management plan to satisfy the project specifications.

Monitor
- Physical or Virtual?
- Frequency?
- Project Management Office?
- What information will be monitored?

Execute

Correct & Control
- What decisions will be made?
- What actions will be taken?
- Who is in charge of the execution?
- How will the outcomes be communicated?

Collect & Report
- Frequency?
- By Whom?
- To Whom?

Ref: [PMI], [Grushka-Cockayne]

In Project Closure …

- obtain **acceptance** by the customer or sponsor to formally close the project or phase

- conduct post-project or phase-end **review**

- document **lessons learned**

- **archive** all relevant project documents

- close out all **procurement** activities

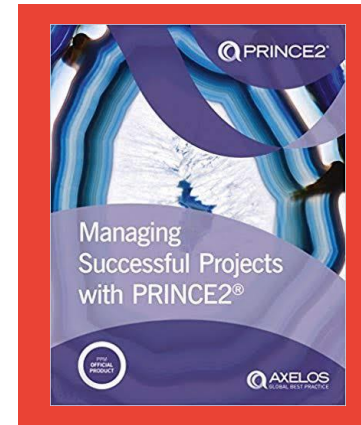- perform team members' **assessments** and **release** project resources

- …

Some Resources for PM
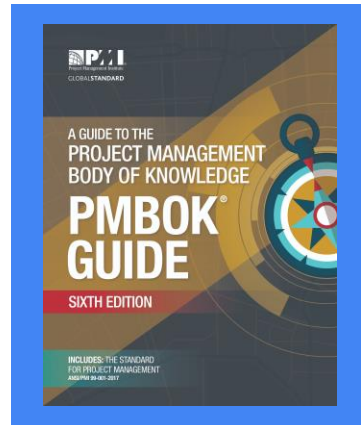
PMBOK   **PRINCE2**

References

[Google]	"Project Planning: Putting It All Together" course at coursera.org, Google.
[Greene]	Head First PMP, 3rd Edition, Jennifer Greene, Andrew Stellman, O'Reilly Media, 2013.
[Grushka-Cockayne]	"Fundamentals of Project Planning and Management" course at coursera.org, Yael Grushka-Cockayne.
[PRINCE2]	Managing Successful Projects with PRINCE2, 2017 Edition, The Stationery Office, 2017.
[PMI]	A Guide to the Project Management Body of Knowledge: PMBOK® Guide (6th Ed.), Project Management Institute, 2017.
[Valle]	Planning and Managing Software Projects 2014-15, Emanuele Della Valle, Politecnico Di Milano, http://emanueledellavalle.org.
[Villafiorita]	Introduction to Software Project Management, 1st Edition, Adolfo Villafiorita, Auerbach Publications, 2014.
[Wiegers]	Software Requirements, 3rd Ed, Karl Wiegers, Joy Beatty, Microsoft Press, 2013.