

Planning Projects

COMP6204: Software Project Management and Secure
Development

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Overview

- Objectives
- What is Project planning?
- Project Planning – What involved?
- Project Management Plans
- Project Management Plan and Project Documents
- Attributes of Project Management Plans
- Scope Planning
- Requirements Gathering
- Creation of Scope Statement
- Work Breakdown Structure

Objectives

- The key learning objectives of this chapter are:
 - Understand how the scope of a project is planned
 - Know the various scope planning artifacts created on a project - requirements document, scope statement, WBS, and WBS Dictionary

Introduction

- Many people have heard the following sayings:
 - *If you fail to plan, you plan to fail.*
 - *If you don't know where you're going, any road will take you there.*
 - *What gets measured gets managed.*
- Successful project managers know how important it is to **develop**, **refine**, and **follow plans** to meet project goals
- People are **more likely** to **perform well** if they **know what** they are **supposed to do** and **when**

What is Project planning?

- **Project planning** is a discipline addressing **how** to complete a project in a **certain timeframe**, usually with **defined stages** and **designated resources**.
- After a project is *initiated*, it goes into the *Planning* stage.
- One view of project *planning* divides the activity into these steps:
 - setting measurable objectives
 - identifying deliverables
 - scheduling
 - planning tasks



Project Planning Should Guide Project Execution

- Planning is often the most difficult and **unappreciated** process in project management
- Often, people do not want to take the time to **plan well**, but **theory** and **practice** show that good planning is crucial to good execution
- *The main purpose of project planning is to guide project execution*, so project plans must be realistic and useful.



Project Planning – What involved?



Project Planning – What involved?



Planning starts with the **scope** where it is decided what needs to be done.



It is followed by **time** planning where we decide how we will deliver the scope and how much time that would take.



Then we estimate the detailed **cost** of the project work which is followed by planning quality, human resource and communication requirements.



The various **risks** on the project are identified and managed



Finally, **procurement** documents are created in case the project requires the purchase of products or services from outside vendors/suppliers/sub-contractors.

Planning Processes and Outputs for Project Integration and Scope Management

Knowledge area	Planning process	Outputs
Project integration management	Develop project management plan	Project management plan
Project scope management	Plan scope management Collect requirements Define scope Create WBS	Scope management plan Requirements management plan Requirements documentation Requirements traceability matrix Project scope statement Project documents updates Scope baseline Project documents updates

Project Integration Management

- Project integration management involves coordinating all the project management knowledge areas throughout a project's life span
- The main planning output is a project management plan

Project Management Plans

- A **project management plan** is a document used to **integrate** and **coordinate** all project planning documents and to help guide a project's **execution**, **monitoring** and **control**, and closure
- Plans created in the other **knowledge areas** are subsidiary parts of the overall project management plan and provide **more detailed** information about that knowledge area
- **Project management plans** facilitate **communication** among **stakeholders** and provide a **baseline** for **progress measurement** and project control
 - A **baseline** is a **starting point**, a **measurement**, or an **observation** that is **documented** so that it can be used for future comparison

Project Management Plan and Project Documents

Project Management Plan		Project Documents	
1.	Scope management plan	1.	Activity attributes
2.	Requirements management plan	2.	Activity list
3.	Schedule management plan	3.	Assumption log
4.	Cost management plan	4.	Basis of estimates
5.	Quality management plan	5.	Change log
6.	Resource management plan	6.	Cost estimates
7.	Communications management plan	7.	Cost forecasts
8.	Risk management plan	8.	Duration estimates
9.	Procurement management plan	9.	Issue log
10.	Stakeholder engagement plan	10.	Lessons learned register
11.	Change management plan	11.	Milestone list
12.	Configuration management plan	12.	Physical resource assignments
13.	Scope baseline	13.	Project calendars
14.	Schedule baseline	14.	Project communications
15.	Cost baseline	15.	Project schedule
16.	Performance measurement baseline	16.	Project schedule network diagram
17.	Project life cycle description	17.	Project scope statement
18.	Development approach	18.	Quality control measurements
		19.	Quality metrics
		1.	Quality report
		2.	Requirements documentation
		3.	Requirements traceability matrix
		4.	Resource assignments
		5.	Resource breakdown structure
		6.	Resource calendars
		7.	Resource requirements
		8.	Risk register
		9.	Risk report
		10.	Schedule data
		11.	Schedule forecasts
		12.	Stakeholder register
		13.	Team charter
		14.	Team resource assignments
		15.	Test and evaluation documents

Source: Project Management Institute, Inc., *A Guide to the Project Management Body of Knowledge (PMBOK® Guide) – Sixth Edition* (2017).

Attributes of Project Management Plans

- Project management plans should be **dynamic**, **flexible**, and **receptive to change** when the environment or project changes
- Just as projects are **unique**, so are project plans.
 - For a small project involving a few people over a couple of months, a **project charter**, **team contract**, **scope statement**, and **Gantt chart** might be the only project planning documents needed; *there would not be a need for a **separate project management plan***
 - A large project involving 100 people over three years would benefit from having a **detailed project management plan** and **separate plans** for each knowledge area
- It is important to **tailor** *all* planning documentation to fit the needs of specific projects

Common Elements in Project Management Plans

- Introduction/overview of the project
- **Project organisation**
- Management and technical **processes** (including **project lifecycle** description and **development** approach, as applicable)
- Work to be performed (**scope**)
- **Schedule** information
- **Budget** information
- References to other project planning documents

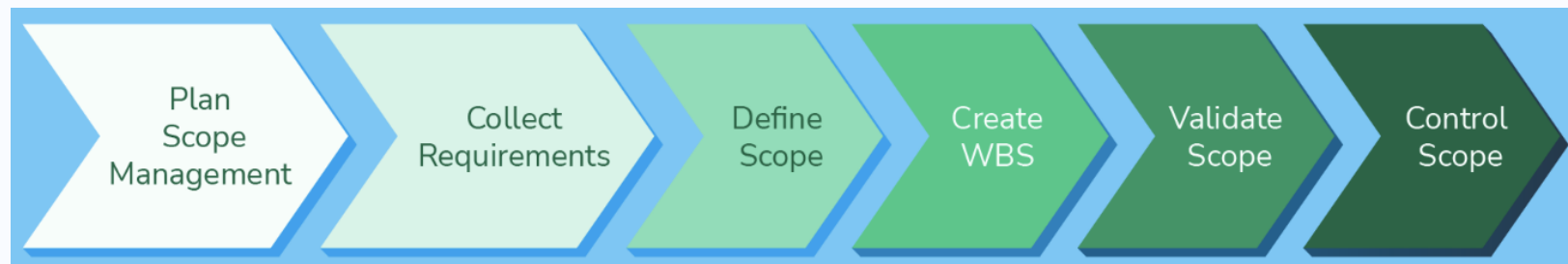
Planning Processes and Outputs for Project Integration and Scope Management

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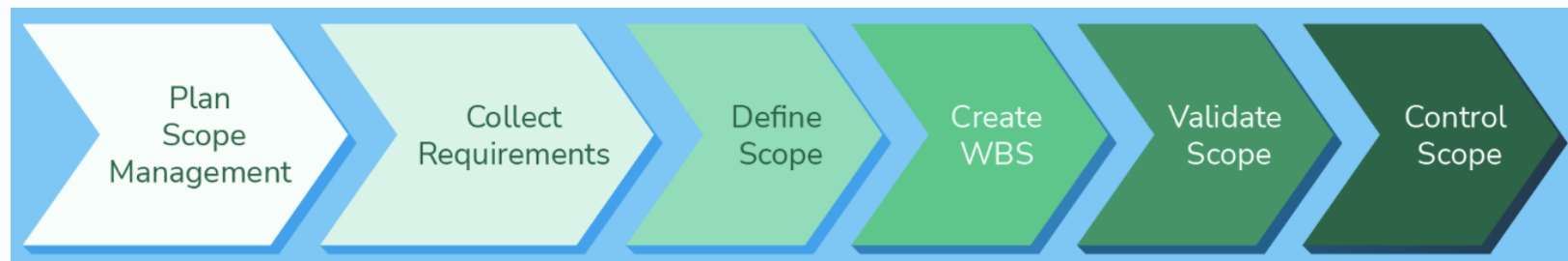
Scope Planning

- In order for us to deliver a project, the **first** and the **most important** thing to know is what the **scope** of the product is.
- The **product scope** includes the **features** and **characteristics** of the product.
- Scope Planning is one of the **most critical** areas because all the other aspects of planning **depend** on it.
 - If some scope is **missed out** or **defined incorrectly** or **ambiguously**, then the **entire plan** could be **incorrect** and may have to be **redone** later on.
 - This could lead to huge **time** and **cost overruns** in the project.



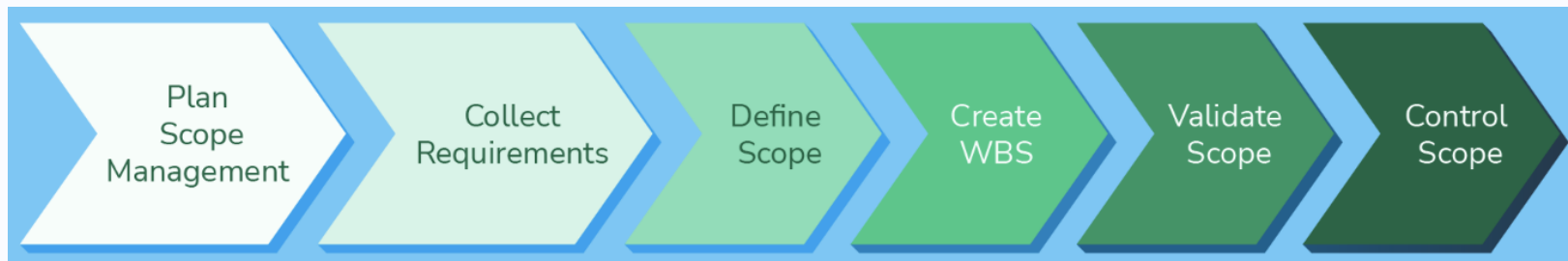
Scope Planning – Project Context

- Scope planning is one area that might work **differently** for different kinds of projects.
 - Some projects are simply given a **business case** or a **project charter** with **high-level requirements** and the **detailed scope** is planned later.
 - Some other projects are won through **competitive bidding**. In such projects, the **detailed scope** is already produced before the project is given to a contractor.
 - In IT project the customer usually issues an overview of the project and expects the **solution provider** to do the entire scope planning.



Requirements Gathering

- Once the **project charter** has been issued and **stakeholders** have been identified, the next step is **gathering of requirements**.
- **Requirements** may be gathered either by **visiting the customer** premises, over **emails**, over **phone**, or various other means.
 - This will obviously require project **resources**.
- How the requirements will be gathered, and which templates will be used is defined in the **project plan**.



Requirements Template – An Example

Req ID	DESCRIPTION	Type	Acceptance Criteria	Requester Information			Priority	Included	Phase
				Name	Role	Stake holder ID			

A Partial Requirements Document

Req ID	Description	Type	Acceptance Criteria	Requester Information			Priority	Included	Phase
				Name	Role	Stakeholder ID			
Req1	The home page of the website would show a graphic of the company's vision and achievements	Functional	Home page opens in IE 6.0, Mozilla 11.0 showing the video	Cust1	Customer	1	High	Yes	1
2	The "About Us" page will allow users to browse company information	Functional	Company information opens in above browsers and shows names of directors, their background, company address and phone numbers	Cust2	Customer	2	High	Yes	1
3	The "Login" page will allow users to create a login and use it to view additional information about the company	Functional	Users should be able to create their own login-id and password which are stored in the application so they can login later on. Once logged-in users can view financial results of the company and it's product details.	User1	End-user	5	Medium	Yes	2
4	Each webpage will open within 5 secs	Non-functional	Every page opens within 5 secs of clicking	User1	End-user	4	High	Yes	1

Creation of Scope Statement

- Once the **requirements** have been collected and documented we need to **finalize** the scope.
 - This is done using a **scope statement**.
- A project **scope statement** describes product **characteristics** and **requirements**, user **acceptance criteria**, and **deliverables**.
- Work that is not included in the scope statement **should not be done**, and you can **explicitly state** what is out of scope for the project under a section called ***project exclusions***.

Project Scope Statement – Structure

- **Product Scope Description**
 - Detailed **description** of the **characteristics** of the product of the project
- **Product Acceptance Criteria**
 - The measurable characteristics/tests that need to be fulfilled/passed in order to **accept the product** of the project
- **Project Deliverables**
 - Detailed list of the various things that the project will **deliver**
- **Project Exclusions**
 - List of items **not included** in the project scope (for purposes of clarity)

Project Scope Statement Structure – Cont.

- **Project Constraints**
 - Detailed list of **constraints** that need to be kept in mind while managing the project
 - Includes **schedule, cost, resources, technology, quality** and other expectations that limit the project manager's options
- **Project Assumptions**
 - All **assumptions** made during **scope planning** that need to be shared with all **stakeholders** to get them on the same page and for their buy-in

Project Scope Statement – A Website Example

- Product Description

- The product of the project is a website that provides access to potential and existing customers. It gives company details, description of the company's products and services etc.

- Project Deliverables

1. Website opening with the Home Page showing a video file
2. "About Us" page
3. Login functions - Create, login, logout, view/edit profile
4. Pages showing additional information about the company after login

Project Scope Statement – An Example

- **Product Acceptance Criteria**

1. All pages of the website should open without any error in all modern Browsers.
2. Some pages that require login should only open after user logs in.
3. Users should be able to manage their login online - creation, update.
4. All pages should open within 5 seconds of clicking on the hyperlink for the page.
5. The website should be able to support at least 1000 concurrent users.
6. The website up time is guaranteed to be at least 99.9%. This will be verified over a 1 week period by giving it maximum load.

Project Scope Statement – An Example

- Project Exclusions

1. This project will only provide the **development** of the new website.
2. **Regular maintenance** work of the website is **not included** in this scope.
3. **No ongoing support** would be provided within the scope of the project once the project has been signed-off.
4. All **hardware and software procurements** are out of scope of this project. They are to be provided separately by the customer on their premises

Project Scope Statement – An Example

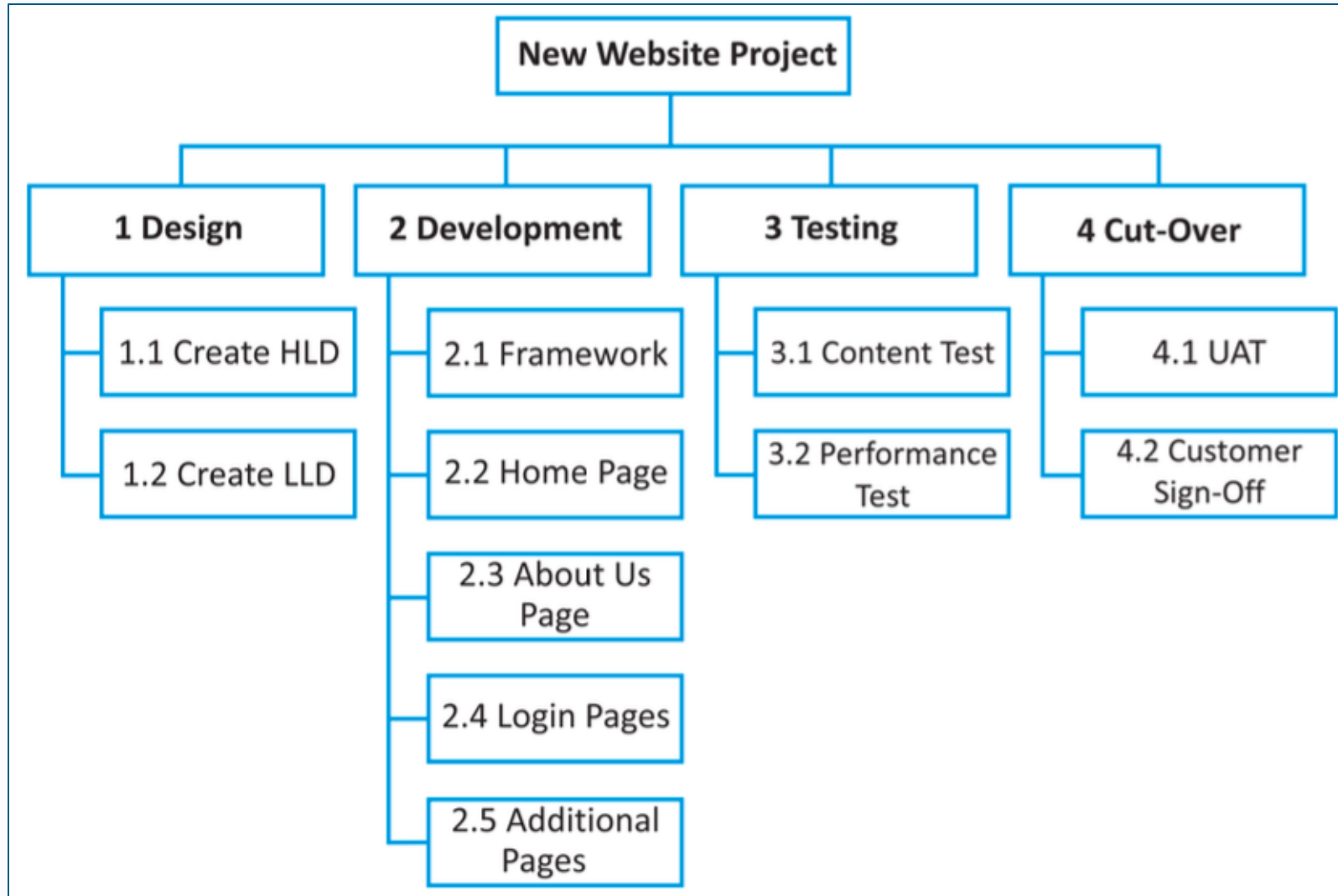
- Project Assumptions & Constraints

1. Customer will provide all **required hardware** and software licenses to develop and host the website.
2. The project will use **open-source software**, wherever possible, in order to keep the total development and operational cost low.
3. **No automated load testing** will be performed. The customer agrees to provide several users for **manual load testing**.

Work Breakdown Structure

- Once the **scope** has been **finalised** in the scope statement, it then needs to be well understood, **estimated**, **allocated**, and **monitored** by the **project team**.
 - This can only be done by **breaking** it down into **smaller**, more **manageable** pieces of work.
 - Such a process of **decomposing scope** creates a **hierarchical structure** called **Work Breakdown Structure (WBS)**.
- The **WBS** is a document that breaks all the work required for the project into **discrete deliverables**, also called **work packages** and **groups** them into a **logical hierarchy**, such as **tasks** and **sub-tasks**.

WBS for the Website Development.



How to create a work breakdown structure

1. Define the **scope** and **objectives**. Record the **overarching objective** you are trying to accomplish.
 - This **objective** could be anything from developing a **new software feature** to building a complex **product**.
 - **Document** these details in your **project charter**. This will be your guiding reference.

How to create a work breakdown structure

2. Break it down into key **phases** and **deliverables**.

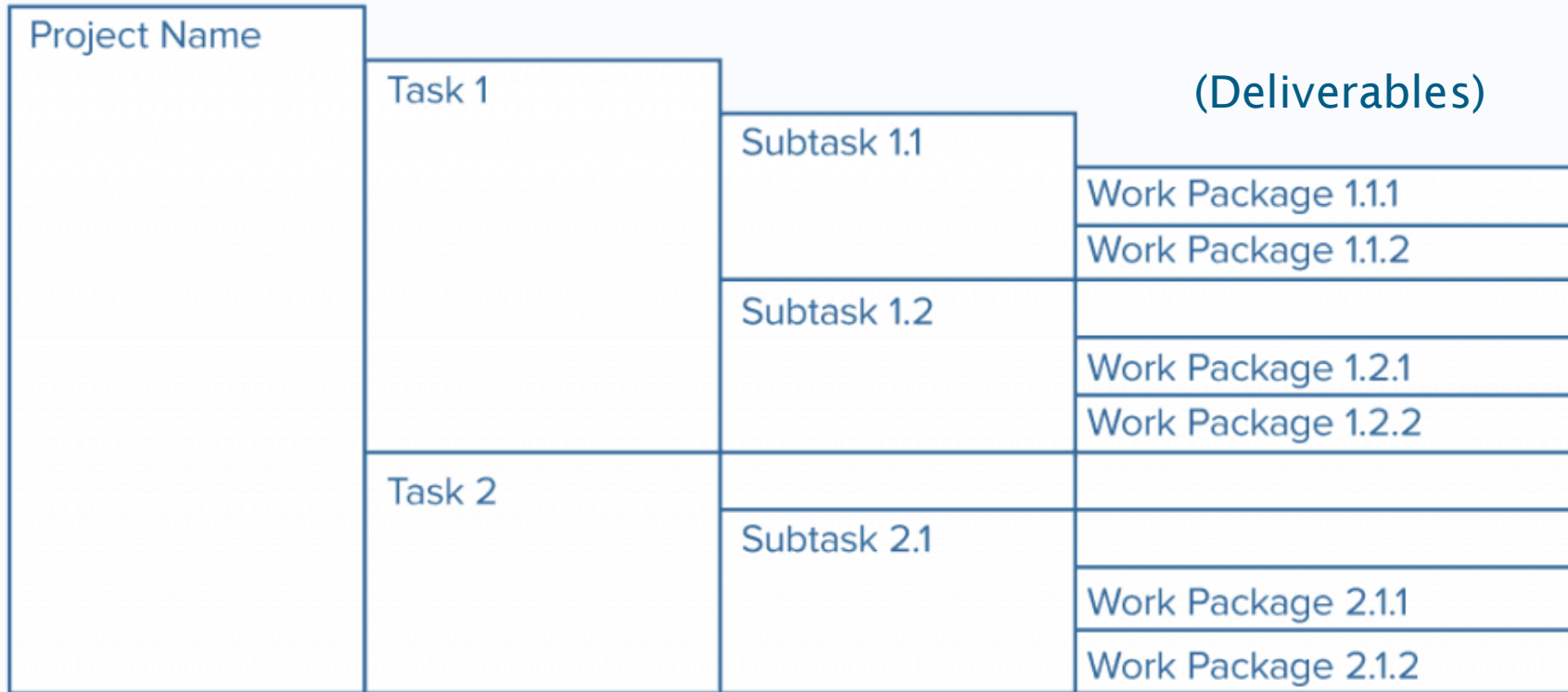
- Depending on the nature of your project, start dividing by **project phases**, specific **large deliverables**, or **sub-tasks**.
- Divide the overarching project into smaller and smaller pieces but **stop before** you get to the point of listing out every action that must be taken.
- Remember to focus on **concrete deliverables** rather than **actions**.

How to create a work breakdown structure

3. Organise deliverables into work packages.

- Break down each major deliverable into all the tasks and sub-tasks required to complete them.
- Organise the sub-tasks into work packages. Work packages, sometimes are called Deliverables.
 - These work packages/deliverables are the lowest level of the breakdown and should define the work, duration, and costs for each task, as well task owners.
- Each work package should provide assignments that can be completed within a reporting period.

WBS Hierarchy



WBS is an outcome-focused tool for determining all **deliverables** and **tasks** required for a project.

Tips for making a work breakdown structure

- As you make a work breakdown structure, use the following rules for best results:
 1. **The 100% rule** – The work represented by your WBS must include 100% of the **work necessary to complete** the overarching goal without including any extraneous or unrelated work.
 - Also, child tasks on any level must account for all of the work necessary to complete the parent task.
 2. **Mutually exclusive** – Do not include a sub-task twice or account for any amount of work twice.
 - Doing so would violate the 100% rule and will result in miscalculations as you try to determine the resources necessary to complete a project.

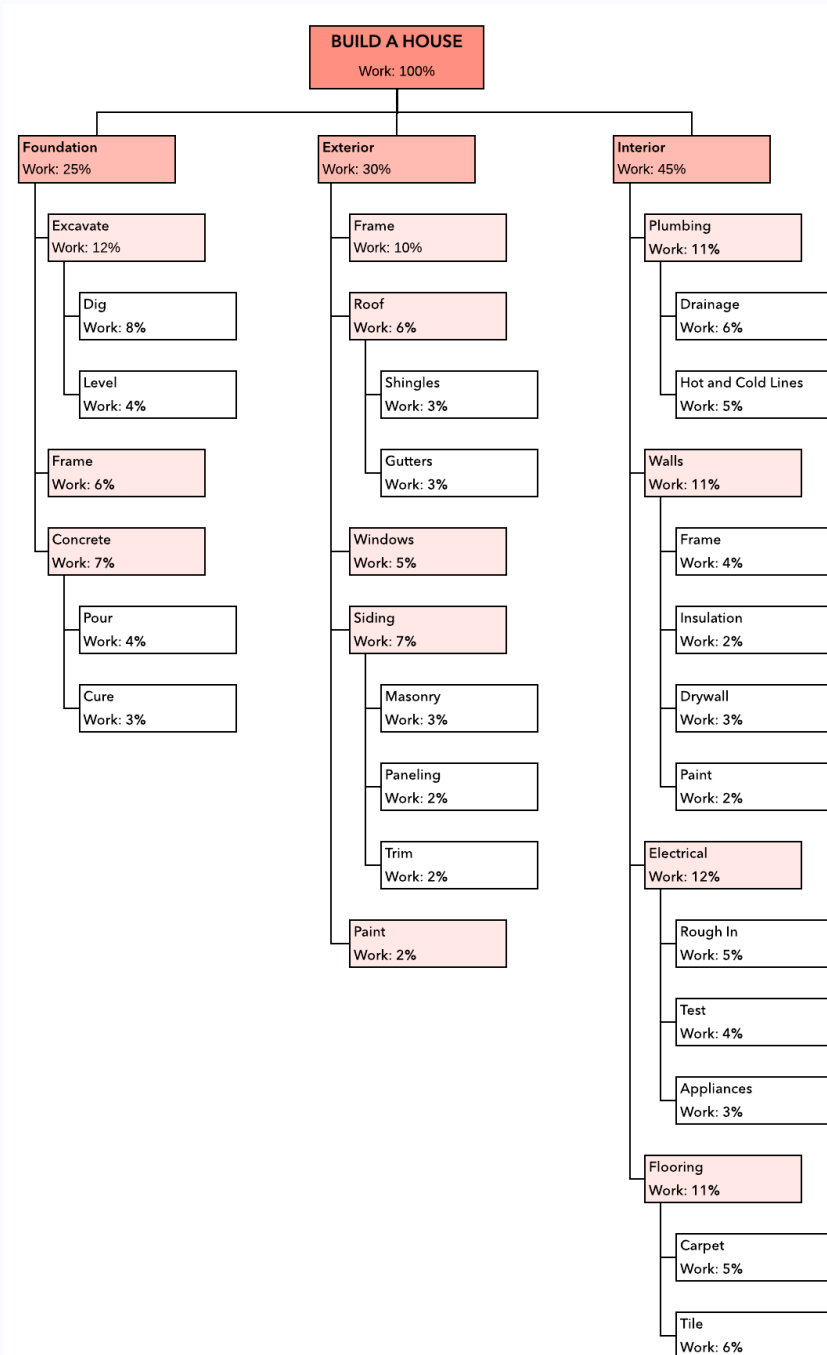
Tips for making a work breakdown structure

3. **Outcomes, not actions** – Remember to focus on **deliverables** and **outcomes** rather than **actions**.
 - For example, if you were building a bike, a deliverable might be “the braking system” while actions would include “**calibrate the brake pads**”.
4. **The 8/80 rule** – There are several ways to decide when a work package is small enough without being too small.
 - This rule is one of the most common suggestions—a work package should take no less than **eight hours** of effort, but no more than **80**.
 - Other rules suggest no more than a **standard reporting period**. In other words, if you report on your work **every month**, a work package should take no more than a month to complete.
 - When in doubt, apply the “**if it makes sense**” rule and use your best judgment

Tips for making a work breakdown structure

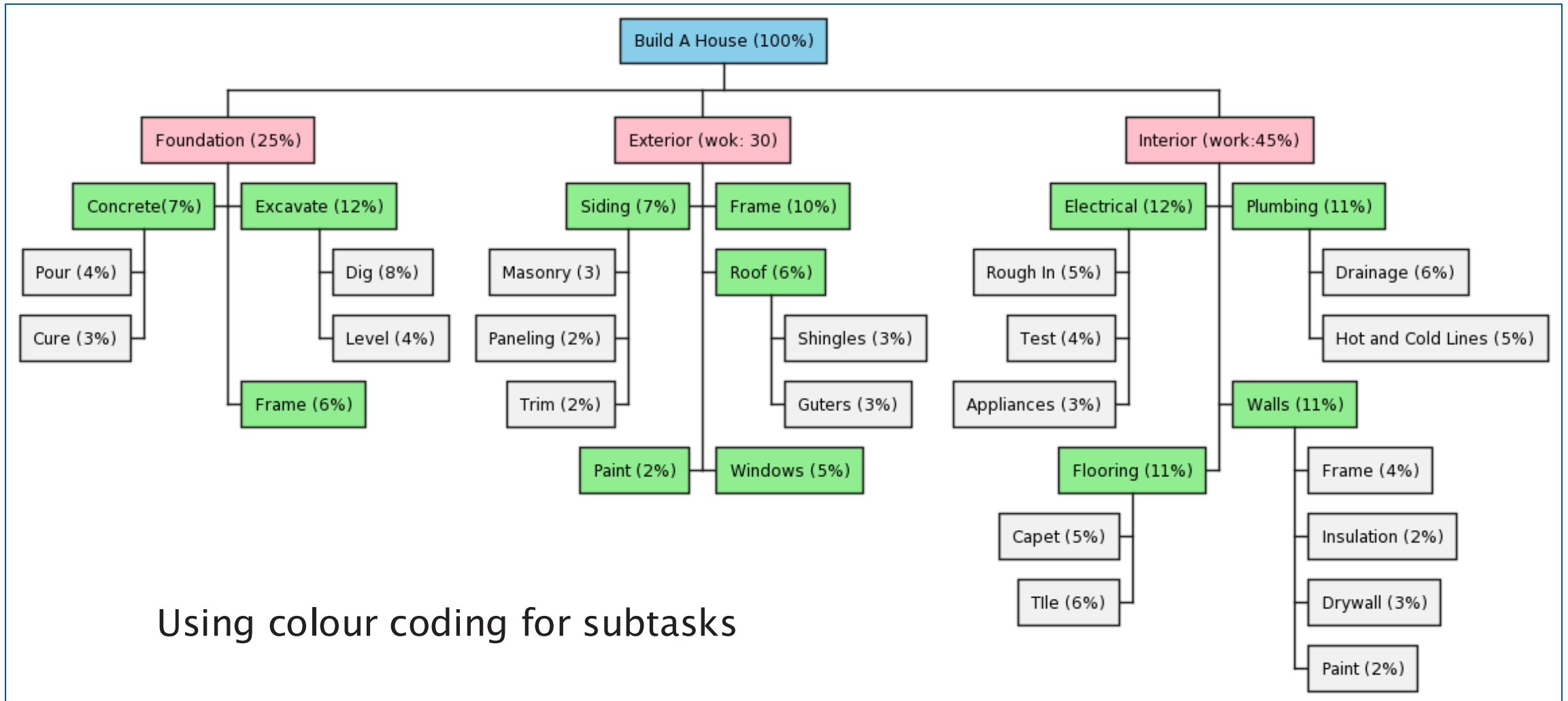
5. **Three levels** – Generally speaking, a WBS should include about three levels of detail.
 - Some branches of the WBS will be **more subdivided** than others, but if most branches have about **three levels**, the scope of your project and the level of detail in your WBS are about right.
6. **Make assignments** – Every work package should be assigned to a **specific team or individual**.
 - If you have made your WBS well, there will be no **work overlap** so responsibilities will be clear.

Work breakdown structure for building a house



<https://www.lucidchart.com/blog/how-to-create-a-work-breakdown-structure-and-why-you-should>

Work breakdown structure for building a house



WBS - Best Practice

- If you look closely at the WBS examples shown you will notice that there are no **verbs**, as verbs represent **action**, and a *WBS is not about action*, but rather about **deliverables**.
 - As the definition of a WBS has fluctuated over the decades, sometimes you may still come across a definition that shows **activities** on the WBS.
- However, it is **incorrect** to **show activities** on the WBS, according to PMI, so try to **consistently** use **deliverables** on your WBS.
 - Activities should be shown on the **schedule** and not on the WBS itself.

Creating a Good WBS

- It is difficult to create a good WBS
- The **project manager** and the project **team** must decide as a group how to **organise** the work and **how many levels** to include in the WBS
- It is often better to focus on getting the **top levels** of the WBS done well to avoid being distracted by too much detail
- Many people confuse **tasks** on a WBS with **specifications** or think it must reflect a **sequential list** of steps
- You should focus on ***what work needs to be delivered***, not ***when*** or exactly ***how*** it will be done

Why is a WBS important in project management?

- **Project schedule:** The WBS is the foundation of the project schedule and budget. Once you know all the deliverables required to complete the project and their hierarchical relationships, it will be much easier to assign resources and set deadlines.
- **Accountability:** Since all elements in a WBS are mutually exclusive, it helps create accountability. A team assigned to a single work package is wholly accountable for its completion, reducing overlaps in responsibility.
- **Commitment:** The WBS gives teams a very high-level overview of their responsibilities. Since each team is responsible for a specific component at a time, it helps make them more committed to completing their assigned tasks.
- **Reduces ambiguities:** The process of developing the WBS involves the project manager, project team, and all relevant stakeholders. This encourages dialog and helps everyone involved flesh out their responsibilities.

WBS – Some Examples

- [Work Breakdown Structure Examples](#)
- [Work Breakdown Structure Examples \(Software, Construction\)](#)
- [22 Work Breakdown Structures \(WBS\) - download FREE in PDF & Visio](#)

WBS dictionary

- At the bottom-most level of the WBS we have **work packages**.
- A project usually has **several work packages**, and, hence, it might be difficult to remember the **description** of each work package for future reference.
 - Hence, a **one-page document** is generally maintained in order to capture the **description** of each work package.
- This is called a **WBS dictionary**.
- It may contain anything the project manager wishes to document about each work package.

WBS Dictionary – A Template

Work Package #	Date of Update	Responsible Organization / Person
Work Package Description		
Acceptance Criteria		
Deliverables		
Assumptions		
Resources		
Duration		
Planned Cost		
Schedule Start Date		Schedule Finish Date

Sample WBS Dictionary Template –Some Notes

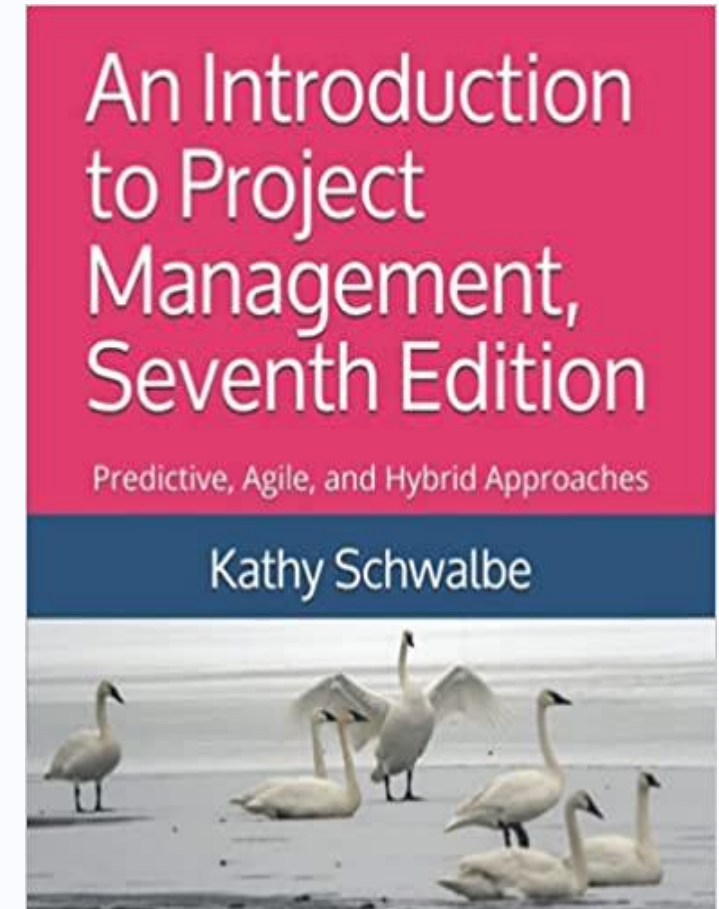
- At this point of time in the **planning process** we haven't decided on **resources** working on each **work package**, nor have we **estimated** the **time** and **cost** of each work package.
- Hence, the above WBS Dictionary would only be **partially filled** at this point of time and **revisited** later during the **planning process** to **fill in** the **other details**.

WBS Dictionary – Some Resources

- [WBS Dictionary: A Quick Guide with Examples](#)
- [WBS Dictionary: A Guide with Examples and Templates](#)
- [Project Management Templates | FREE Downloads Word, Excel, PDF, Visio](#)

Reference

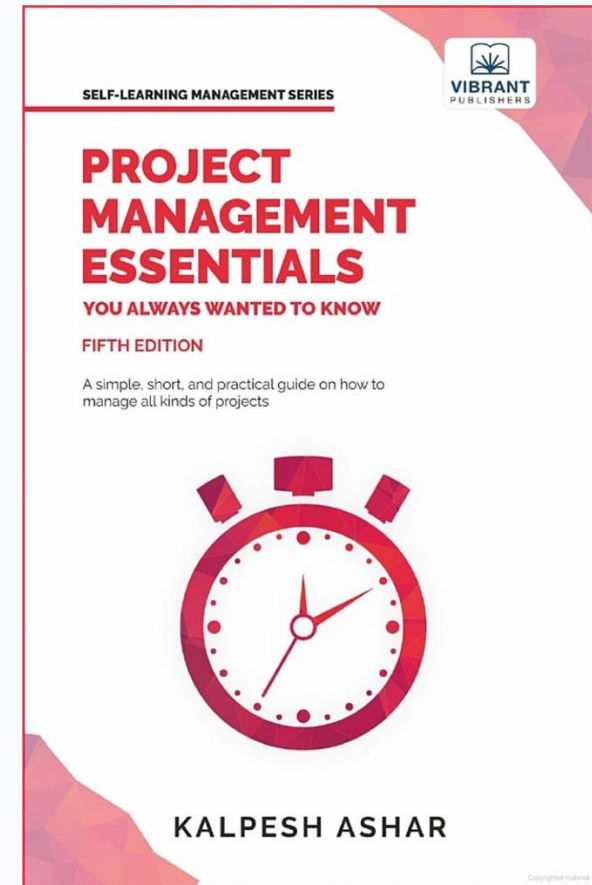
- An Introduction to Project Management, Seventh Edition: Predictive, Agile, and Hybrid Approaches
- **Chapter 4** : Planning Projects, Part 1 (Integration and Scope Management)



Reference

Chapter 3 of:

Project Management Essentials You Always Wanted To
Know, 5ed



YOUR QUESTIONS