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Project Planning

“Plans are nothing. Planning is everything.”

Dwight D. Eisenhower

DISCUSSION

How do you start defining the work to be done in the project?

What steps do you take?

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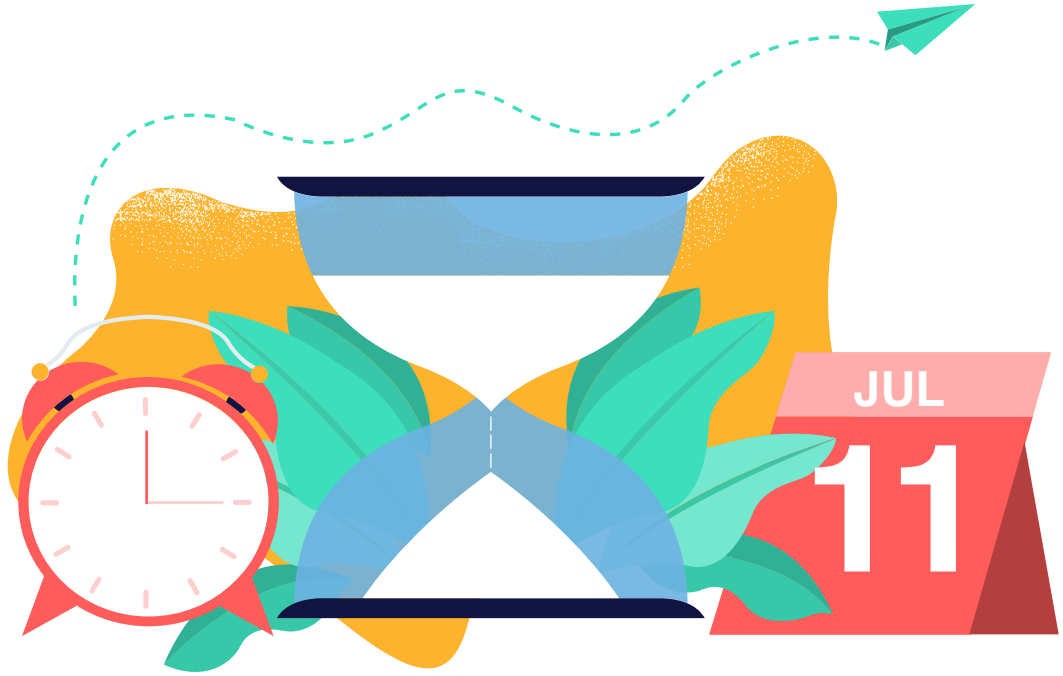
Commander's Intent

Commander's Intent (CI)

Commanders Intent is a clear and concise expression of the operation's purpose and the desired end-state that supports mission command and provides focus to the staff.



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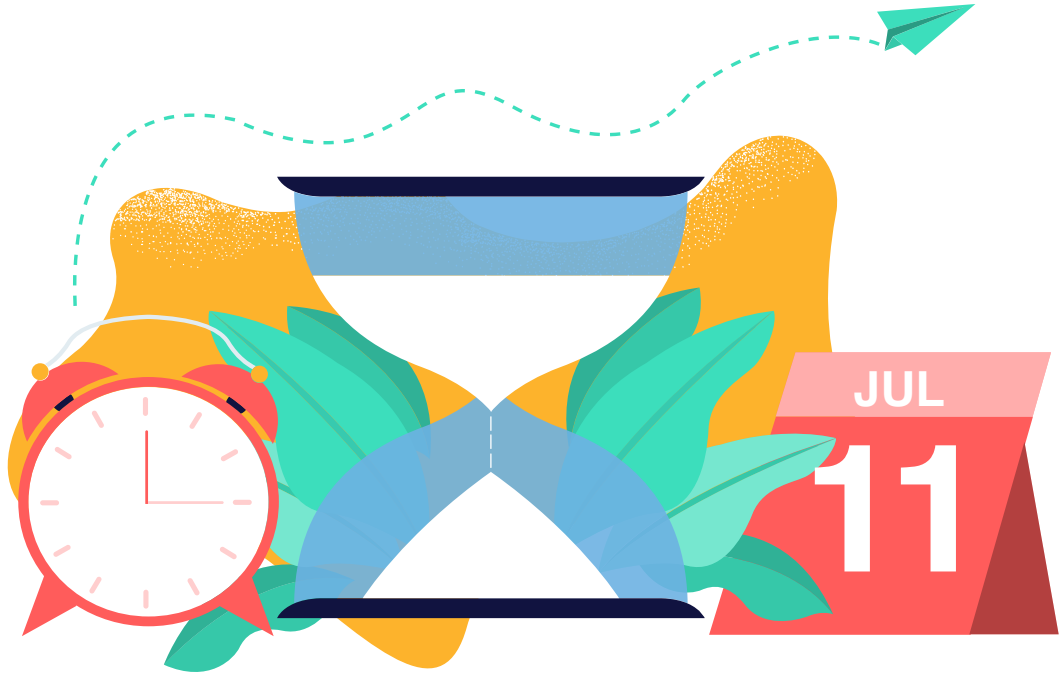
Commander's Intent (CI)

Helps subordinates and supporting commanders act to achieve the commander's desired results without further orders, even when the operation does not unfold as planned.



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Three Essential Components of CI

1: Purpose - Why the assignment matters

2: Task - What the objective or goal entails.

3: End-State - How the result should look

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Sound Familiar?

“Understand the Commander’s Intent and backwards plan.”

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Work Breakdown Structure (WBS)

DISCUSSION

What are some things you normally have to do but forget to task / schedule?

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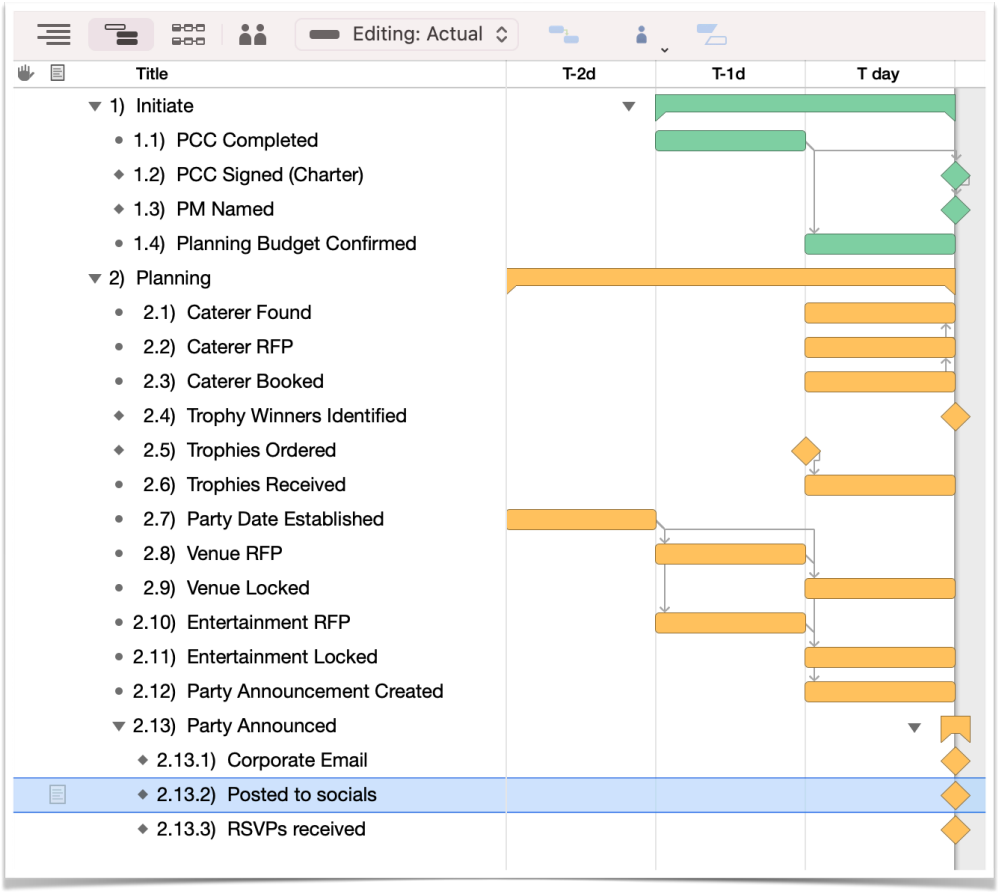
The Work Breakdown Structure (WBS)

A foundational project management tool that breaks a project down into smaller, more manageable components.



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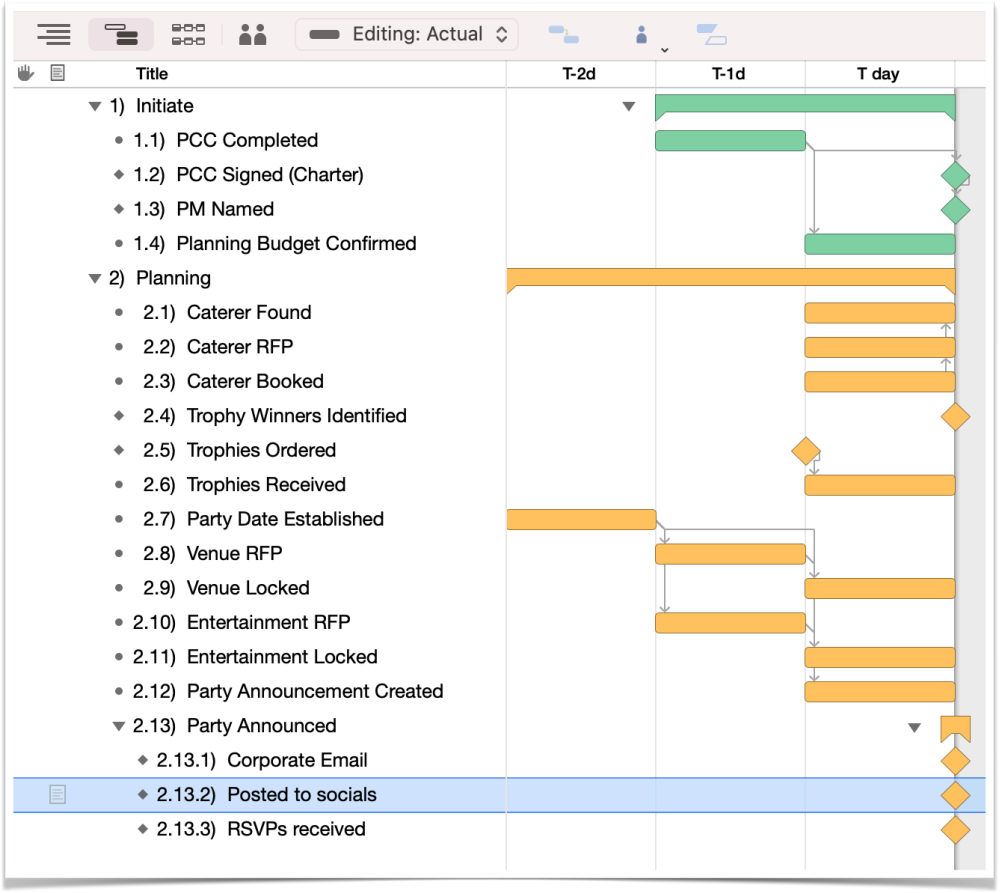
The Work Breakdown Structure (WBS)

It's a visual and hierarchical decomposition of all the work that must be done to complete the project (not just the tasks, but the actual deliverables and outcomes).



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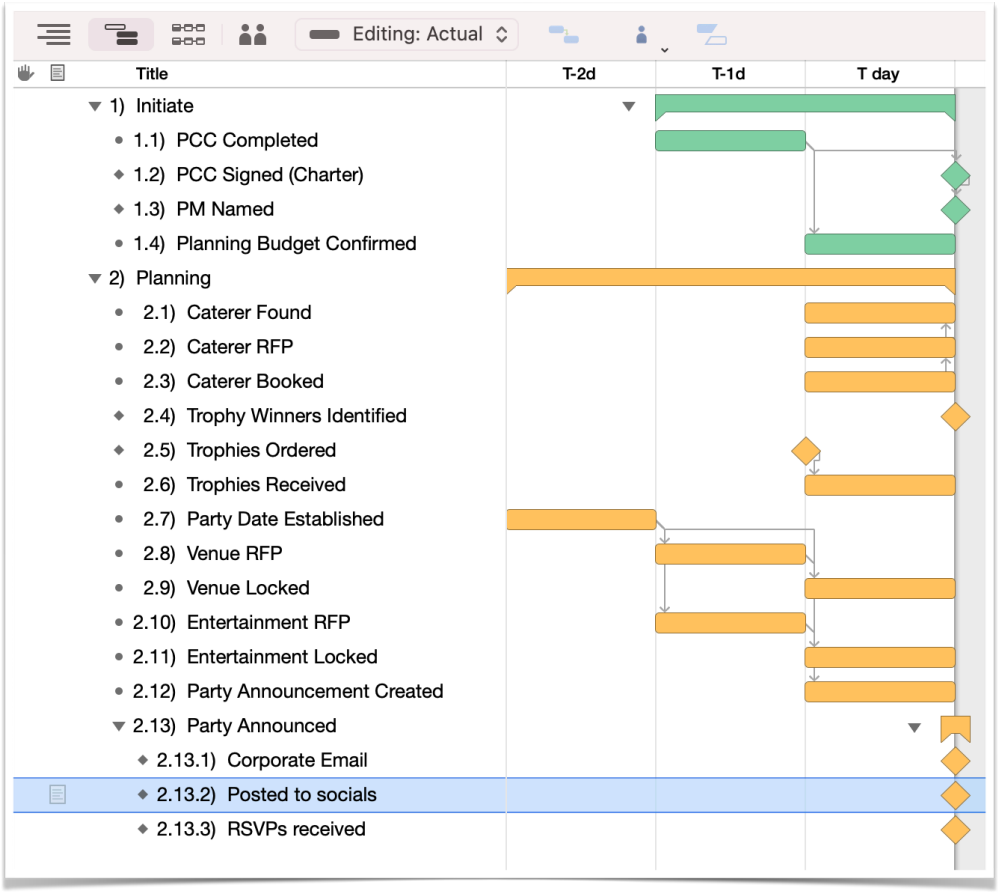
The Work Breakdown Structure (WBS)

A deliverable-oriented structure (not task-based like a to-do list)

Built top-down: from final output -> major components -> subcomponents -> work packages

Used to define scope, assign responsibilities, estimate time/cost and manage risk



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Purpose of a WBS

Define and organize the total scope of work

Create clarity on what's in and what's out

Enable accurate estimation of cost, time and resources

Help with assignment of responsibilities and accountability

Serve as the basis for scheduling and risk management

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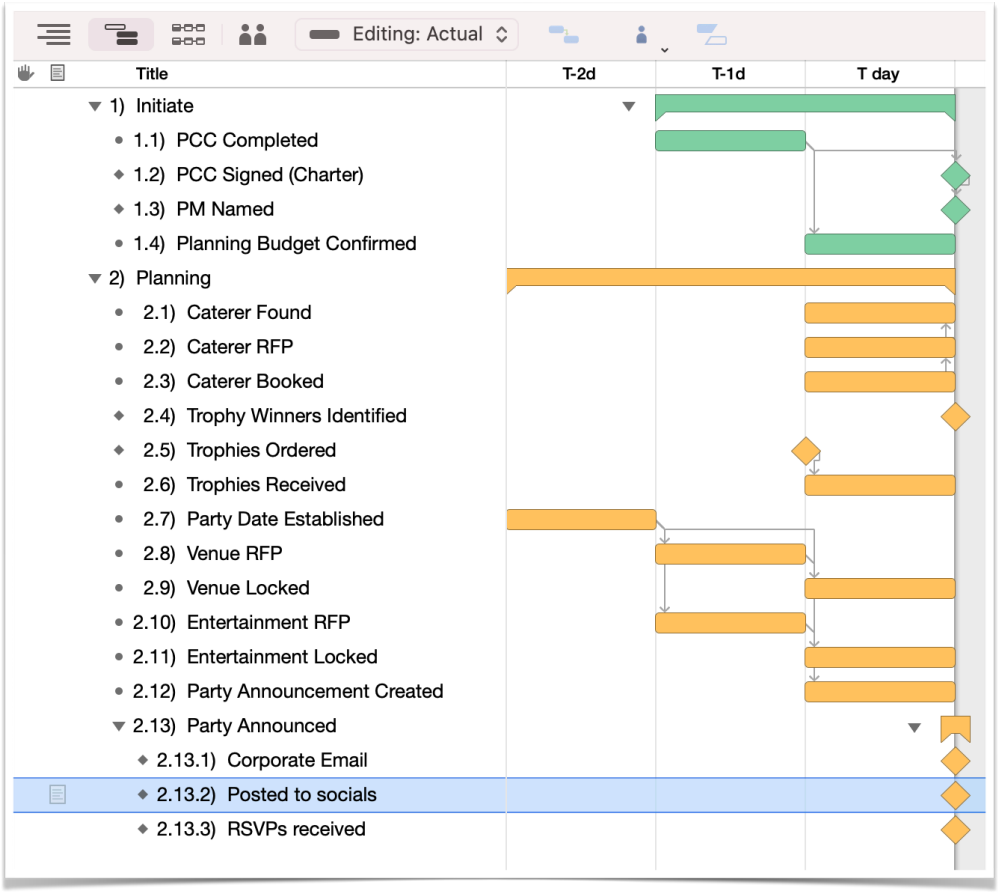
The Work Breakdown Structure (WBS)

Each task on the WBS is unique with a WBS Identifier to allow for proper communication via tasks / activities



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Key Principles of a WBS Design

The 100% Rule: Every level of the WBS must capture 100% of the scope of the level above it. Nothing extra. Nothing missing

Mutually exclusive: No overlap between components. Each element should be clearly distinct to avoid confusion or double-counting.

Level of detail: Go deep enough to estimate, assign and control, but not so deep you're managing individual keystrokes

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WBS vs Task List

WBS	TASK LIST
Focuses on deliverables	Focuses on actions
Hierarchical Structure	Flat or chronological
Drives cost/time/resource planning	Drives day-to-day execution
Basis for scope management	Basis for schedule management

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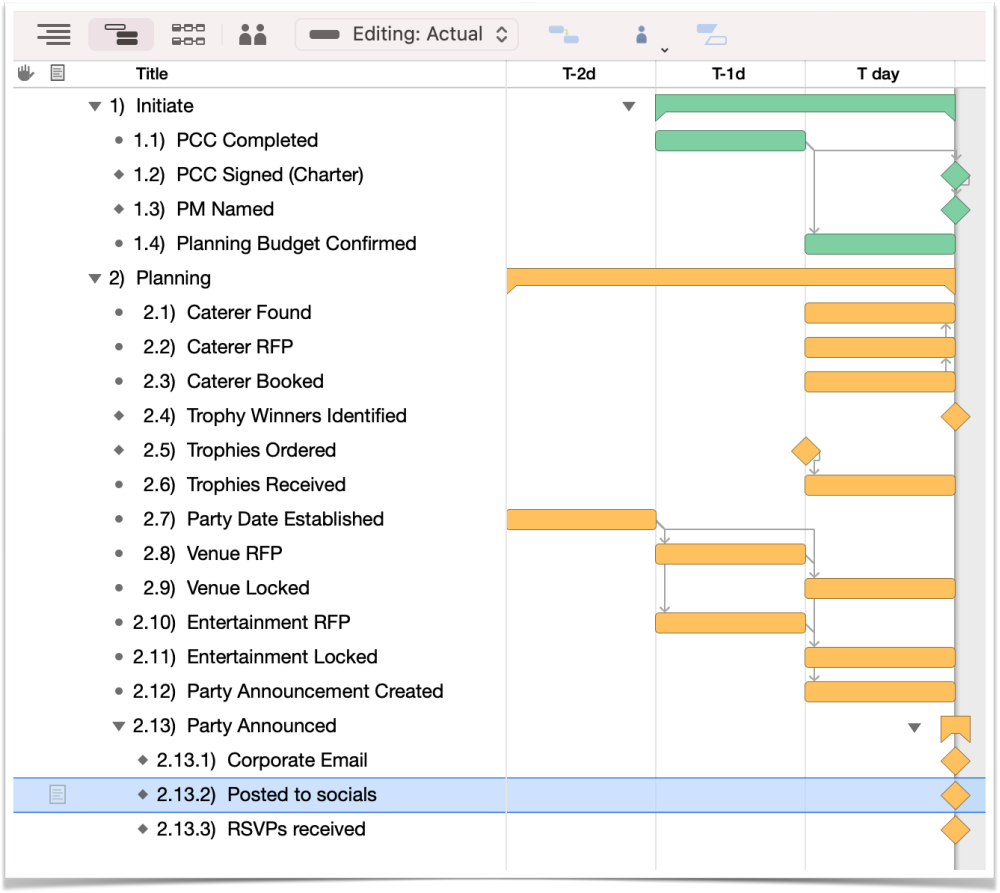
Tips for The WBS

Use Verbs for naming tasks

Create tasks to which you can assign **Effort, Duration and/or Cost**

Understand and use **Milestone Tasks**



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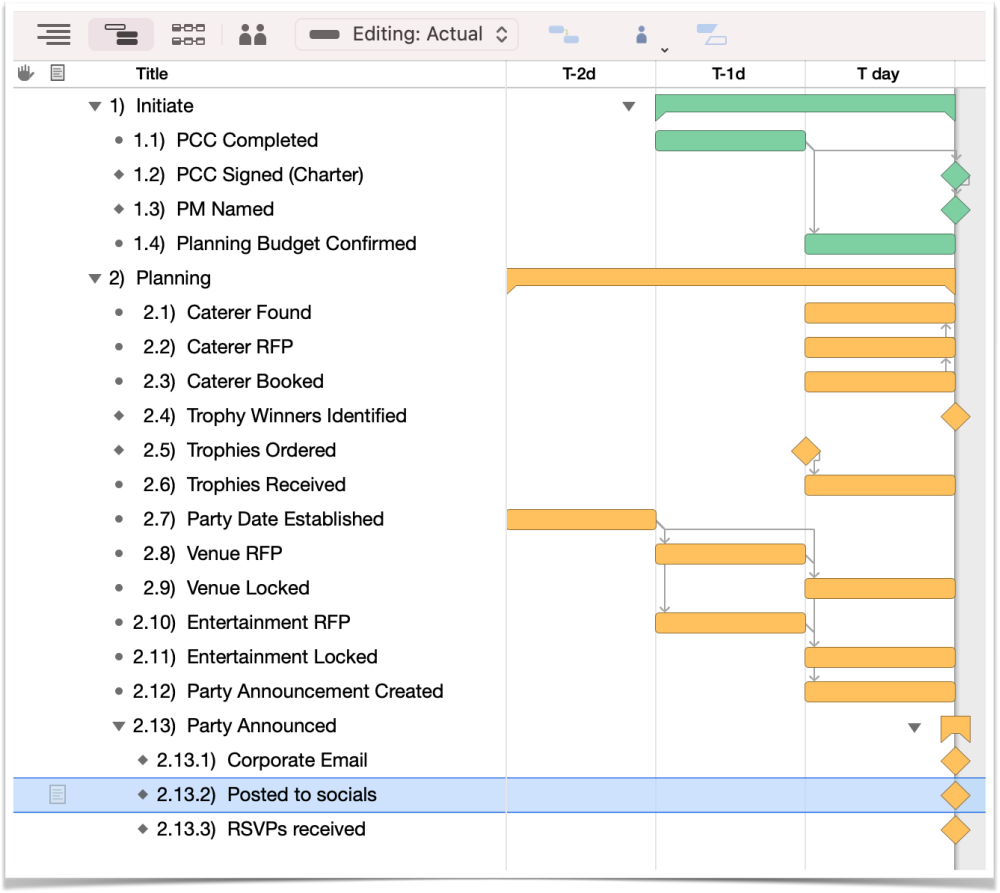
Tips for The WBS

A WBS isn't a schedule - it's a blueprint.

You build your Gantt chart, cost plan, and resource assignments from your WBS.

If your WBS is unclear, the rest of your project will be too.



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DISCUSSION

How far do you need to break down each task in your WBS?

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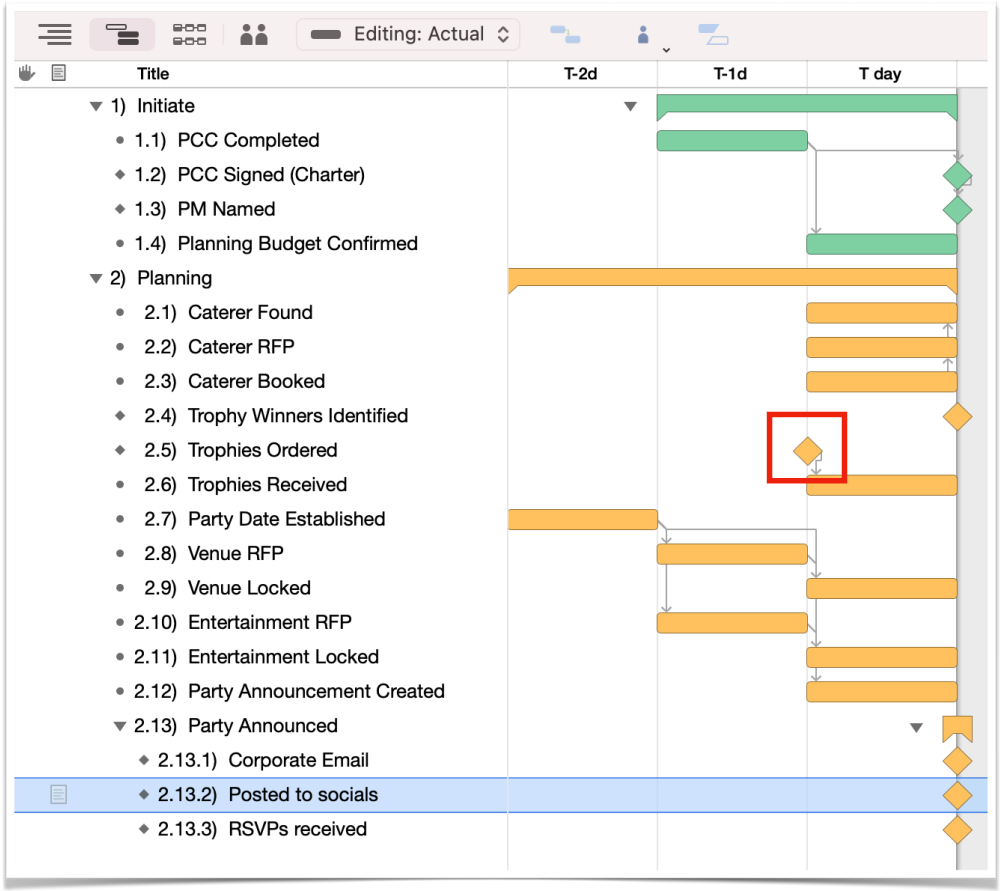
Milestone Tasks

Key events or checkpoints that indicate significant progress in a project.

Unlike regular work packages, milestones don't represent work to be done, but a moment in time when a meaningful deliverable, decision, or phase has been completed.



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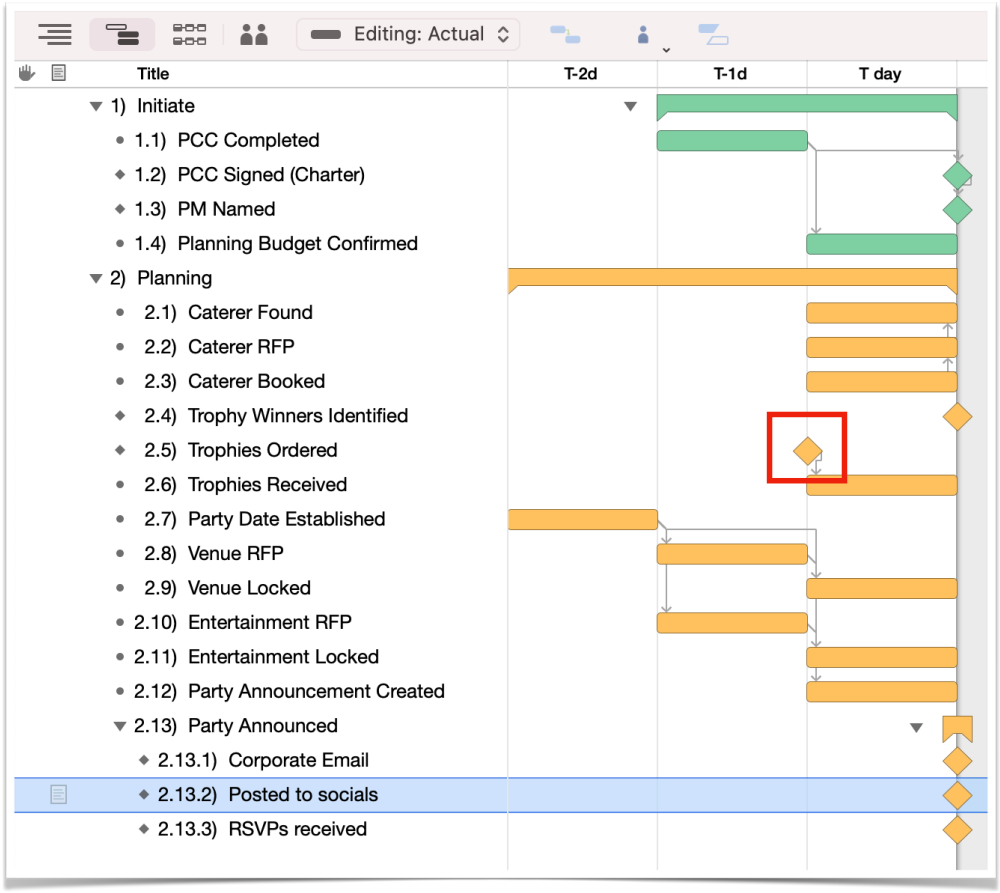
Milestone Tasks

They help answer the question:

Are we where we are supposd to be by now?



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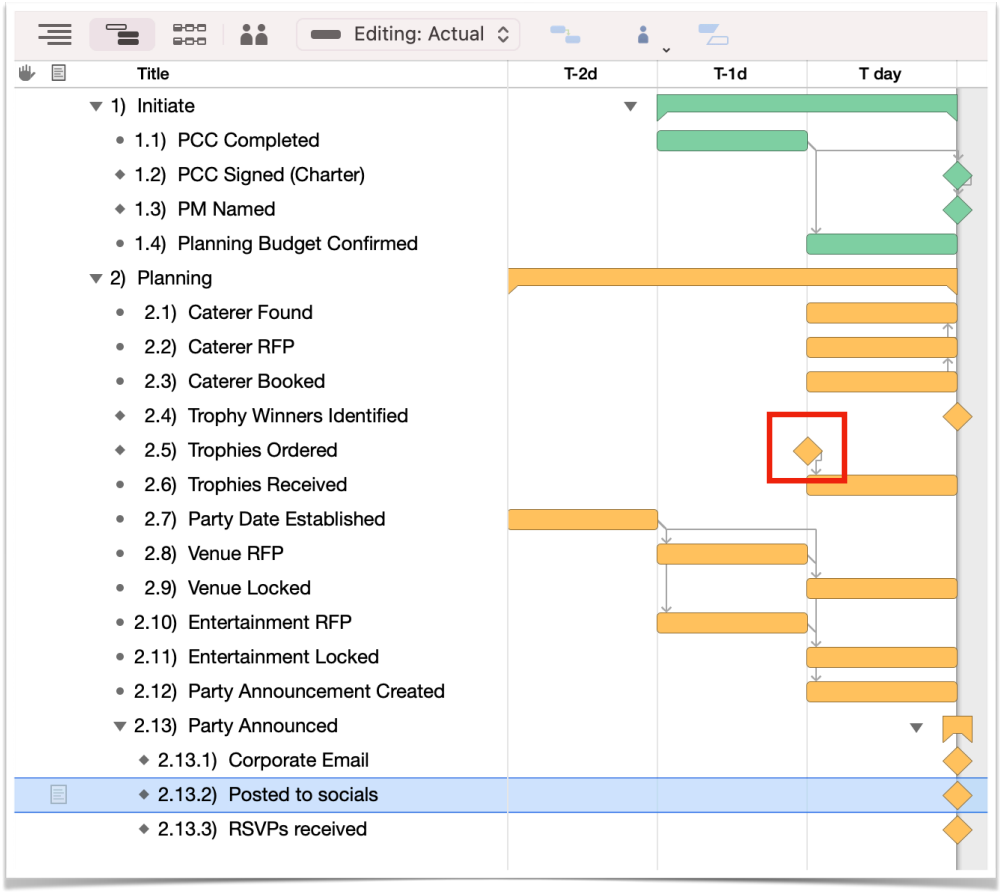
Milestone Tasks

It is a zero-duration task that marks achievement (not effort)

Typically aligns with phase completions, approval points, or external commitments.

Often used as anchors in your schedule, reports, and status updates.



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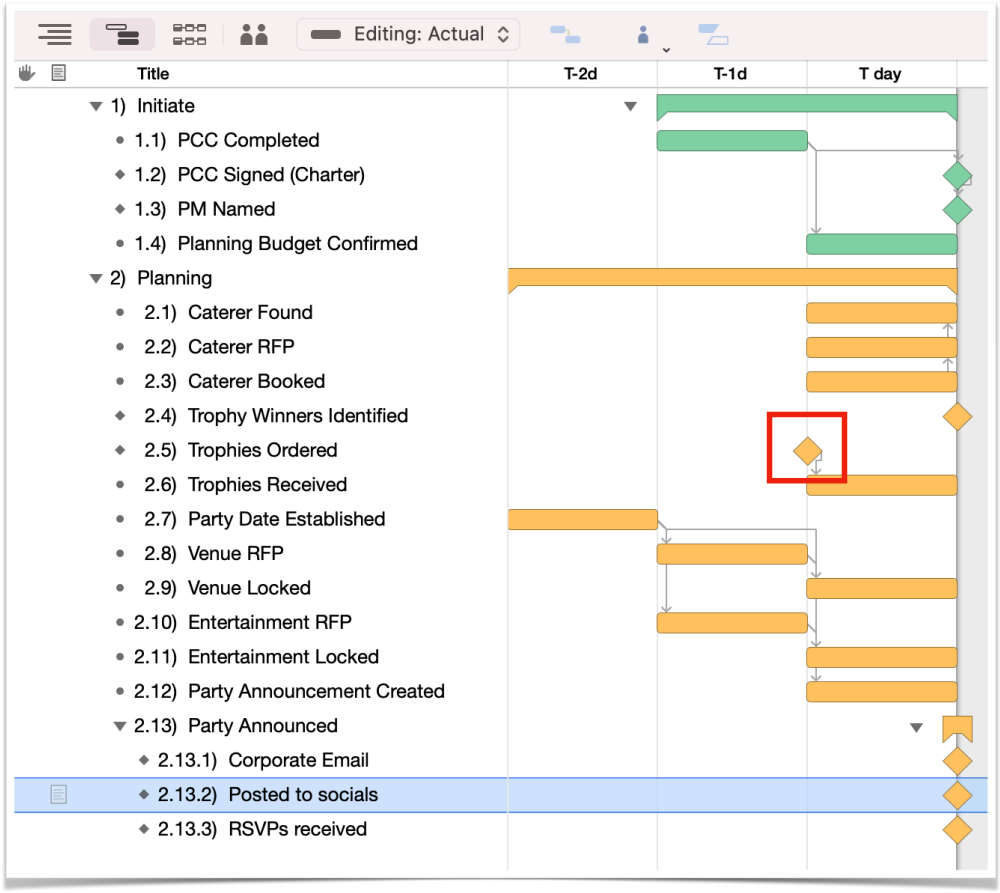
Purpose of Milestone Tasks

Provide clear status indicators for stakeholders

Trigger reviews, sign-offs, or funding releases

Drive visibility across phases or dependencies

Help manage time-sensitive goals



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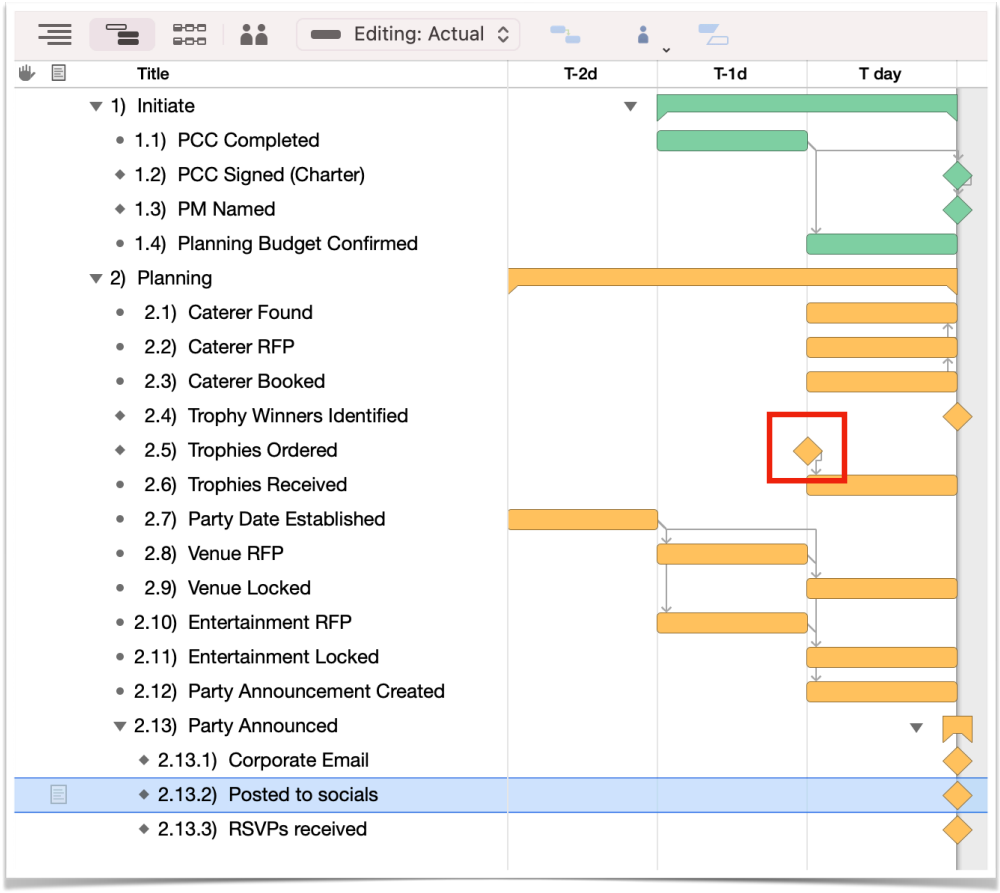
Milestone Tasks

Whereas tasks / activities / work packages have start and end dates, Milestones are a single date upon which a deliverable gets completed.



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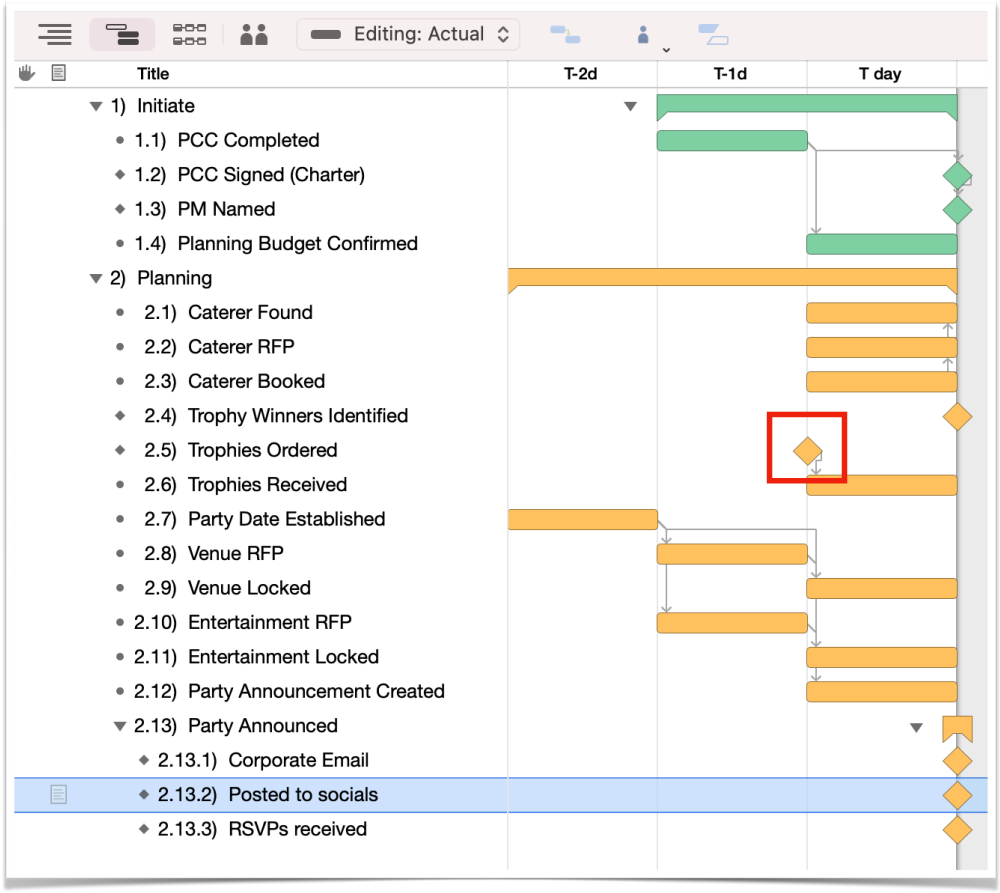
Milestone Tasks

Milestone tasks are represented by a **diamond** on Gantt charts.



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Most Commonly Forgotten WBS Tasks

Stakeholder Engagement Planning: "We just assumed everyone would stay informed."

Change Management Activities: "We delivered the system, but no one uses it."

Requirements Validation: "We gathered requirements, but never confirmed them."

Quality Assurance Planning: "We didn't define how we'll measure quality."

Risk Review and Updating: "We did a risk log once. That was enough, right?"

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Most Commonly Forgotten WBS Tasks

Lesson Learned Documentation: "We finished, now let's move on."

Legal/Compliance Checks: "We didn't involve legal until it was too late."

Procurement and Vendor Coordination: "We forgot how long it takes to get a contract signed."

User Testing or User Acceptance Testing (UAT) Planning: "We assumed they test it when it went live."

Project Communications and Reporting: "We didn't plan for status reports, we just did the work."

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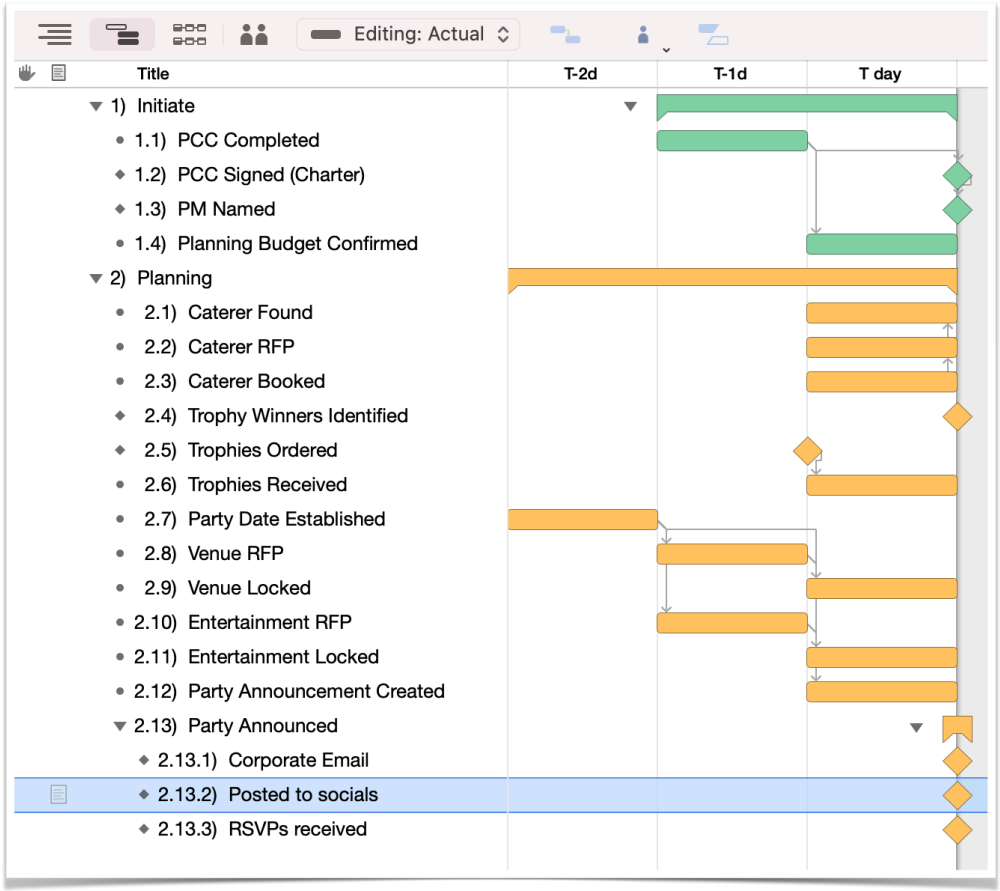
Commonly Forgotten WBS Tasks

The WBS also assists with
Effective Stakeholder Engagement



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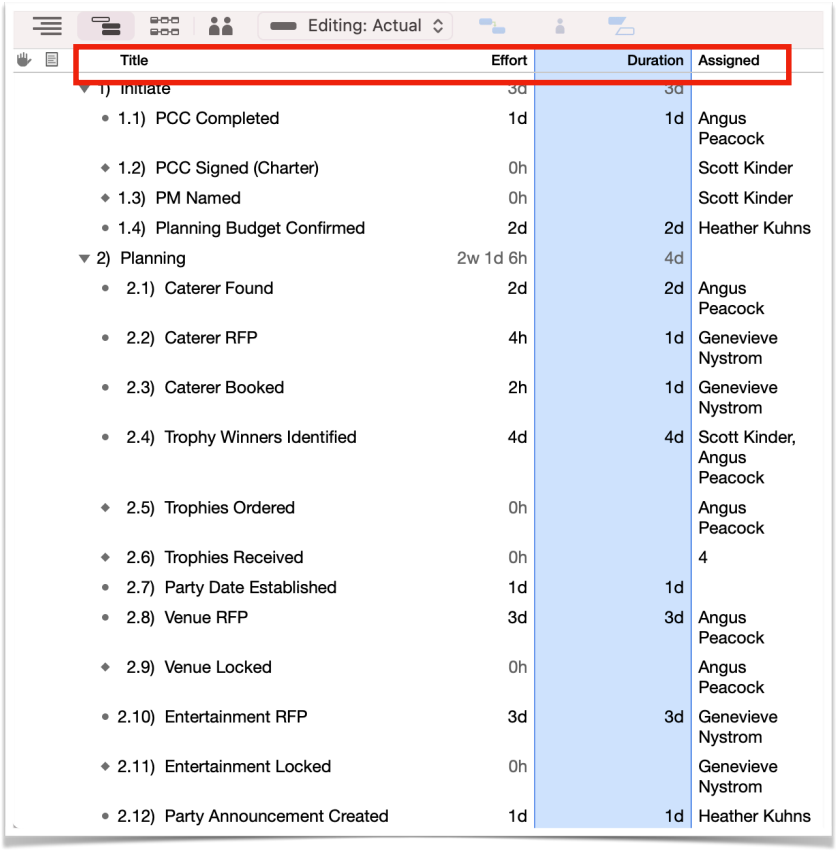
Pro Tips To Start Your WBS

As you start to organize your tasks / activities add 3 columns to the WBS

EFFORT

DURATION

ASSIGNED / RESOURCES



Title	Effort	Duration	Assigned
1) Initiate	3d	3d	
1.1) PCC Completed	1d	1d	Angus Peacock
1.2) PCC Signed (Charter)	0h		Scott Kinder
1.3) PM Named	0h		Scott Kinder
1.4) Planning Budget Confirmed	2d	2d	Heather Kuhns
2) Planning	2w 1d 6h	4d	
2.1) Caterer Found	2d	2d	Angus Peacock
2.2) Caterer RFP	4h	1d	Genevieve Nystrom
2.3) Caterer Booked	2h	1d	Genevieve Nystrom
2.4) Trophy Winners Identified	4d	4d	Scott Kinder, Angus Peacock
2.5) Trophies Ordered	0h		Angus Peacock
2.6) Trophies Received	0h		4
2.7) Party Date Established	1d	1d	
2.8) Venue RFP	3d	3d	Angus Peacock
2.9) Venue Locked	0h		Angus Peacock
2.10) Entertainment RFP	3d	3d	Genevieve Nystrom
2.11) Entertainment Locked	0h		Genevieve Nystrom
2.12) Party Announcement Created	1d	1d	Heather Kuhns

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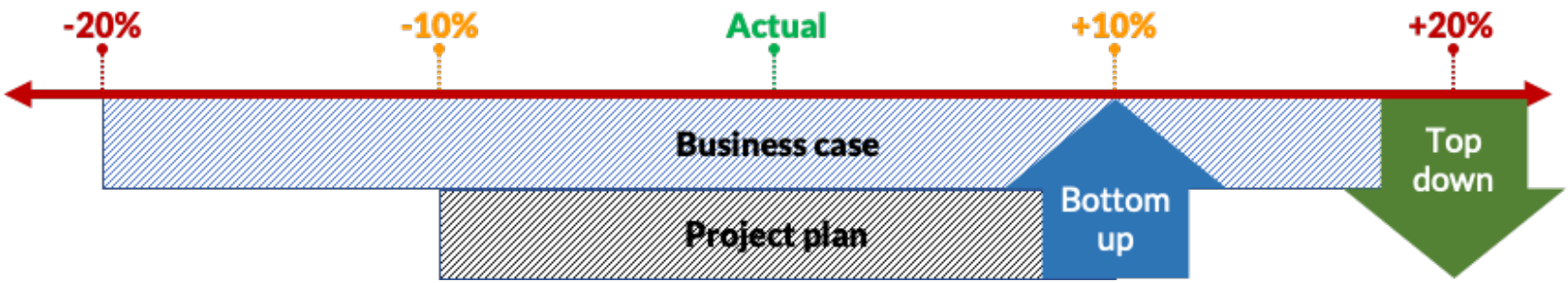
Project Budgeting

The Project Budget



The cost of resources required to complete the project tasks

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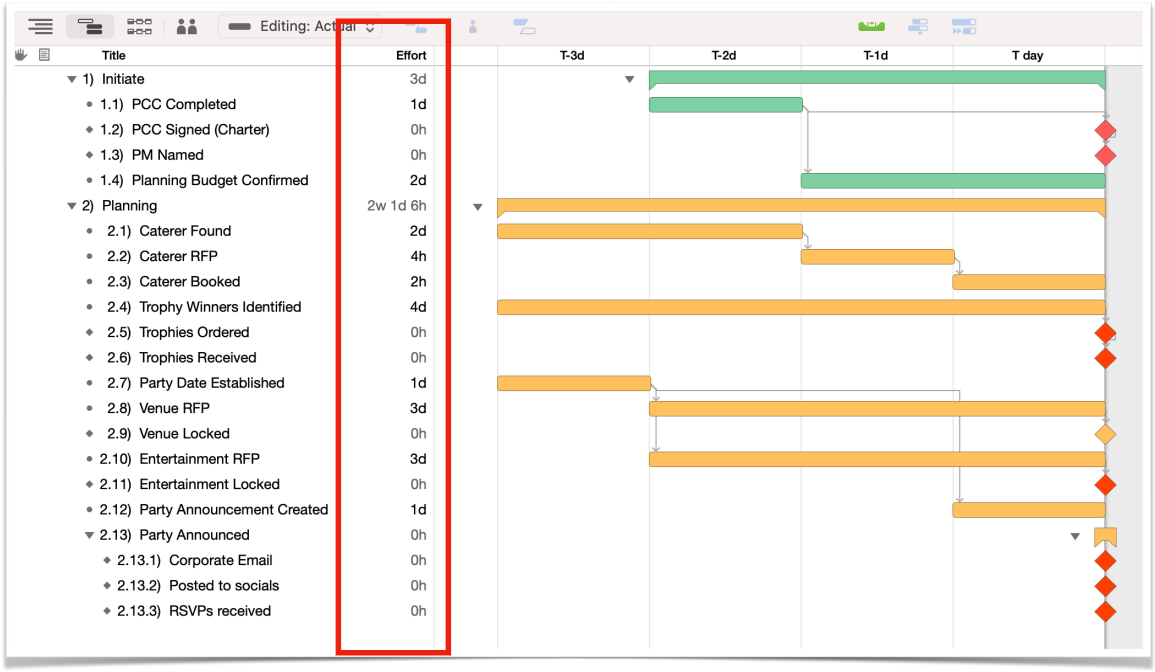
Task Effort

The hours of work needed to complete each task.

Used to create the labor budget for the project

Example:

30 hours of effort @ $50 p/h= $1,500



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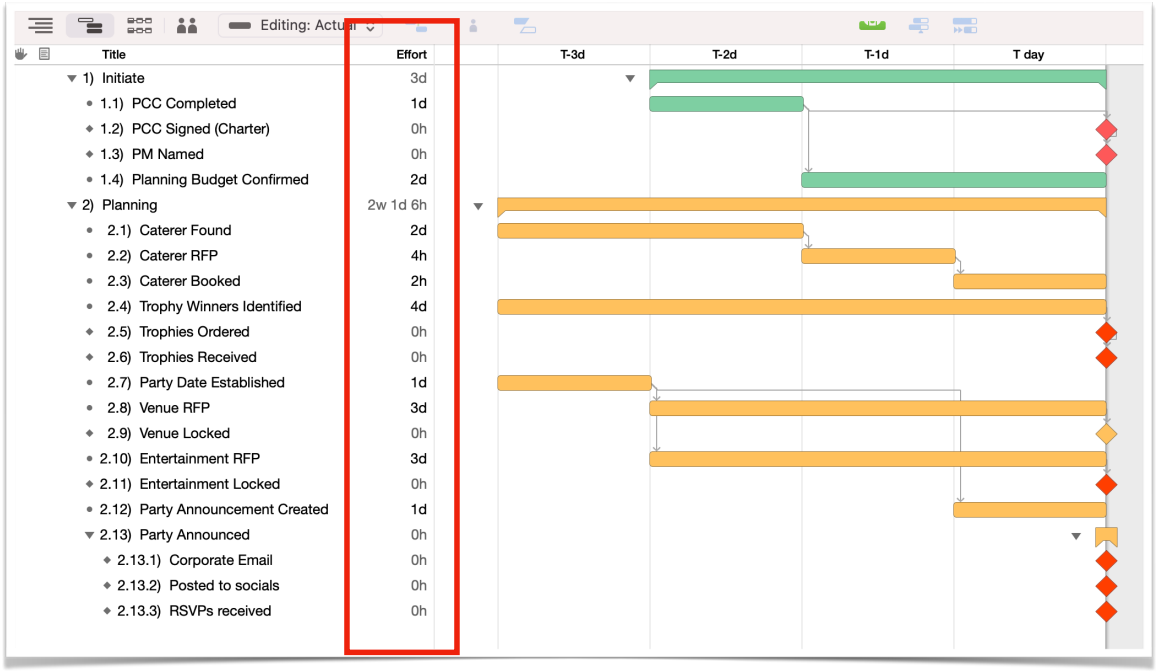
Task Effort

Task Effort Drives the Labor Budget

DO NOT CONFUSE IT WITH TASK DURATION!!



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DISCUSSION

How do you gather project effort needed to complete project tasks?

Costs add up quickly.

Sarah

Responsible for coordinate the venue and finding/booking the band

Hourly Rate: $30 p/h

Project Hours Needed: 20

Sarah's Cost: $600

Mike

Responsible for selecting the PMs who shall receive awards and trophies

Hourly Rate: $30 p/h

Project Hours Needed: 30

Mike's Cost: $900

Jenny

Responsible for selecting and purchasing the awards to be given

Hourly Rate: $25 p/h

Project Hours Needed: 15

Jenny's Cost: $375

Paul

Responsible for making sure the whole thing comes together

Hourly Rate: $49 p/h

Project Hours Needed: 80

Paul's Cost: $3,920

Our Resource Cost: $5,795

Direct Project (Output) Costs

How much will we spend to deliver each project task?

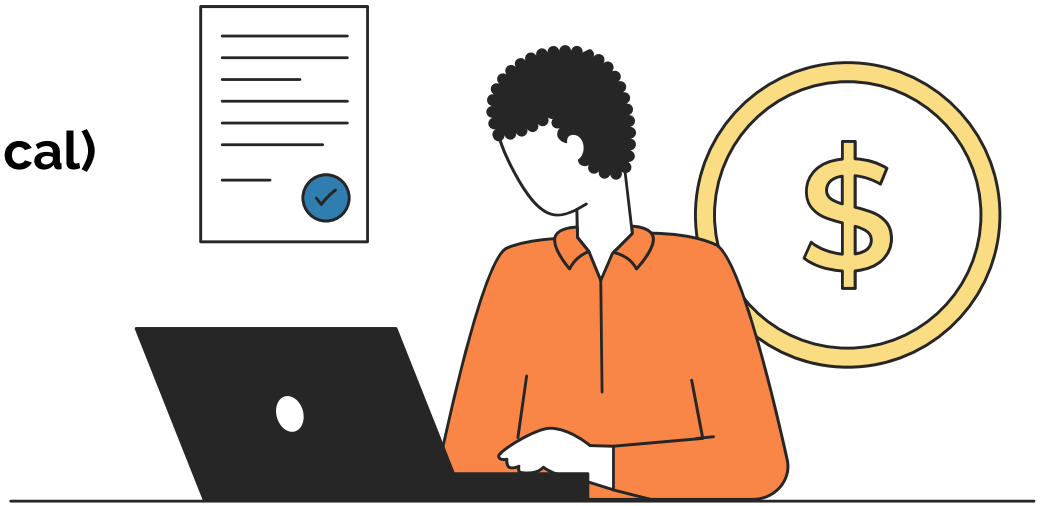
Resources (Human, Financial, Technical)

Equipment (assets)

Acquisition / depreciation**

Materials & Labor

Contractors / consultants



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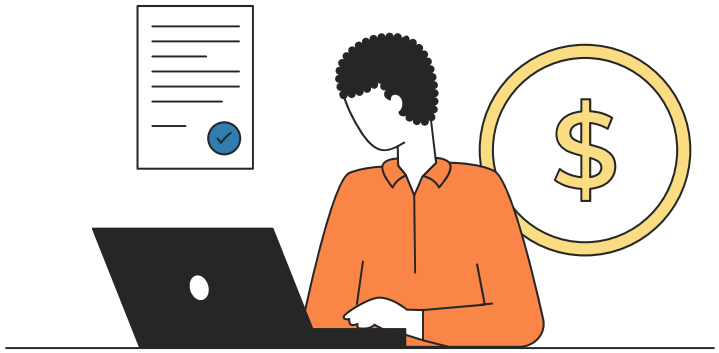
Direct Project (Output) Costs

The explicit, traceable expenses associated with producing the actual deliverables or outputs of a project.

These costs are incurred solely because the project exists and would disappear if the project were cancelled.



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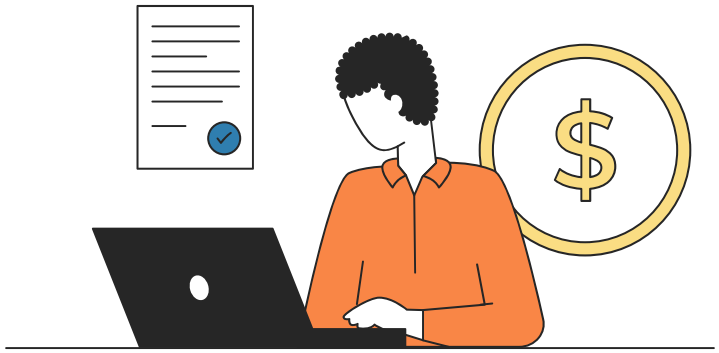
Direct Project (Output) Costs

They are essential for accurate budgeting, pricing, cost-benefit analysis and measuring project efficiency.



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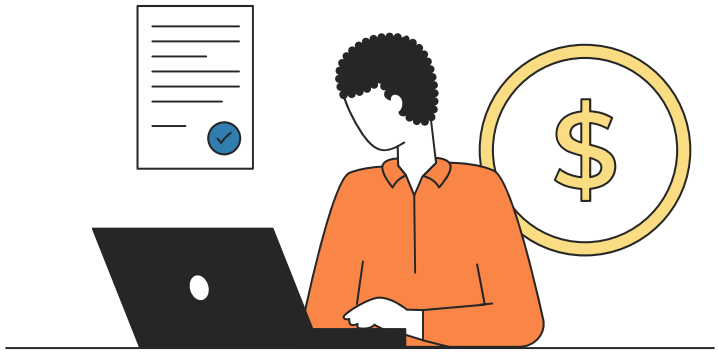
Direct Project (Output) Costs

Include any cost that directly contributes to the creation, completion, or delivery or a project's defined outputs (products, services, systems, documents, etc)



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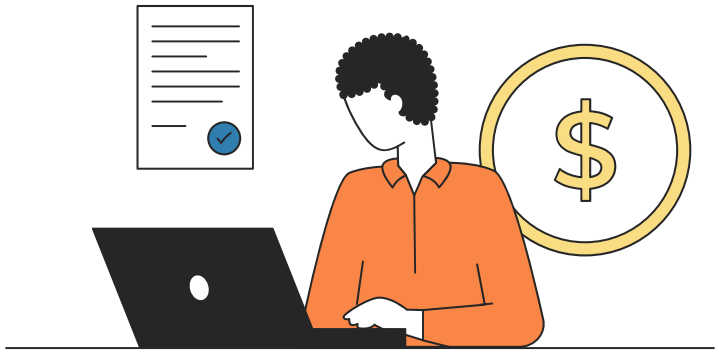
Direct Project (Output) Costs

These costs are usually:

Assigned directly to a specific work package or deliverable.

Quantifiable and invoiceable

Included in your cost baseline and often visible to the sponsor or clients.



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Categories of Direct Project (Output) Costs

Labor:

Wages, salaries, or contractor fees tied to deliverable creation

Time logged specifically for design, development, testing, or production.

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Categories of Direct Project (Output) Costs

Materials and Supplies:

Physical items or consumables needed to create the output.

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Categories of Direct Project (Output) Costs

Software and Tools:

Licenses or subscriptions used exclusively for this project's output

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Categories of Direct Project (Output) Costs

Equipment Rental or Depreciation

Temporary use of machinery or gear required for output production.

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Categories of Direct Project (Output) Costs

Subcontractors or Vendors:

Payments made to third parties for specialized work on the output

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Categories of Direct Project (Output) Costs

Testing QA and Certification:

Output-specific verification, inspections or audits.

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Direct Project (Output) Costs ARE NOT

Project Managment Salaries (unless managing a specific deliverable)

Overhead or office rent

HR or Legal support not tied to specific outputs

General tools used across multiple projects.

(These all fall under INDIRECT COSTS)

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Indirect Project (output) costs

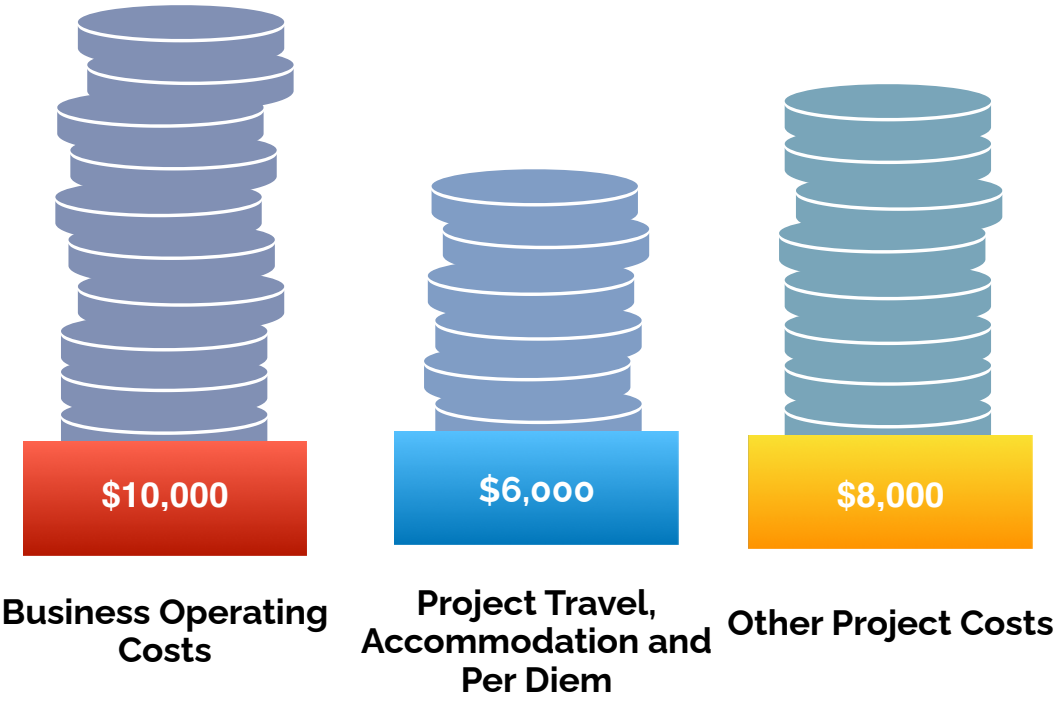
How will the business subsidize project delivery?

Project Management Office (PMO) costs
Management Costs
Shared infrastructure
Lessons Learned
Office supplies

Communications

Travel & accommodation

Insurances / taxes



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Operating Outcome Costs (On Going)

Costs required for the maintenance and administration of your business. Also know as operating expenses (OPEX).

A primary piece of OPEX is Cost of Good Sold (COGS) but will also consider:

- Infrastructure
  - Rent
  - Power
  - Telecoms
  - Water
- Labor and materials
- Routine maintenance
- Interfaces and licenses
- Compliance and insurance

Project name:	
OPTION 1:	<TITLE>

		$ Amount
OUTPUT COSTS	Capital Materials Labor Contractors / Consultants Transfers Other	
	TOTAL	

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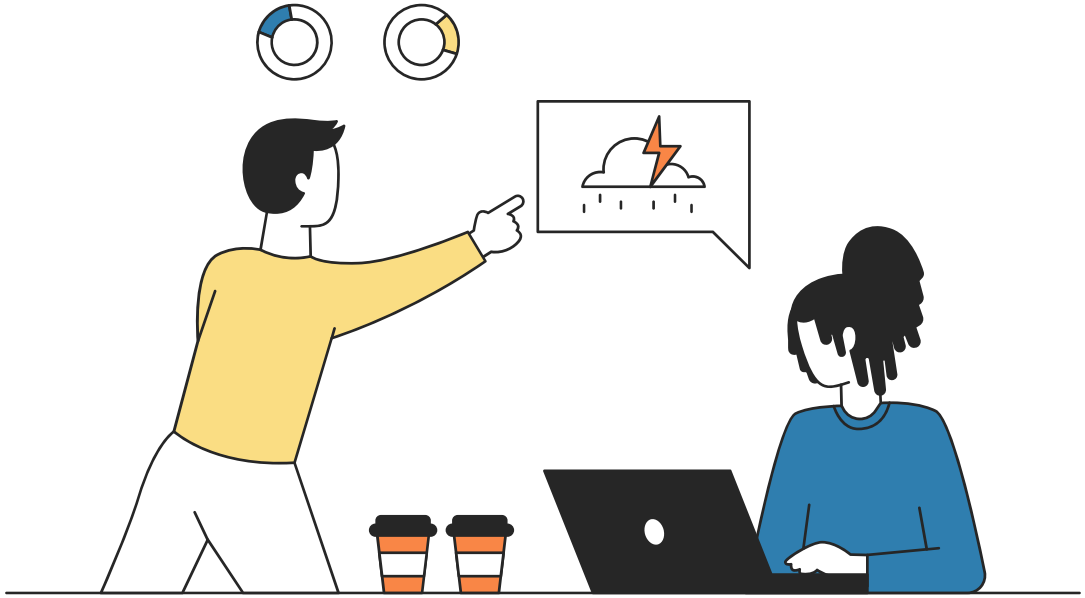
Operating Outcome Costs (Occasional)

New hires and recruiting
New user training
Major repairs
Upgrades
Decommissioning

Remember the Total Cost of Ownership (TCO)!



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Total Cost of Ownership (TCO)

SUNK COST

Research and Development, Tooling, Equipment, Evaluation, Bid and Award, Supplier Certification

OVERHEAD COST

Working Capital, Internal Support, Quality, Incoming Inspection, Interest Expense, Prototyping, Order Processing, Accounts Receivable, Engineering Build, Process Validation, Licensing, Vendor Tracking, Storage and Distribution, Inventory Management

PURCHASE COST

Purchase Price, Shipping, Packaging, Duties, Tariffs, Taxes, Supplier Profit

UTILIZATION COST

Installation, Labor and Benefits, Training, Operating, Supplies and Consumables, Performance, Maintenance, Labor, Spoilage, Learning Curve, Regulatory, Environmental, Obsolescence, Upgrade, Efficiency

LIFE CYCLE COST

Spare Parts, Service, Disposal, Warranty

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Total Cost of Ownership (TCO)

Know your numbers and how they will impact your project!

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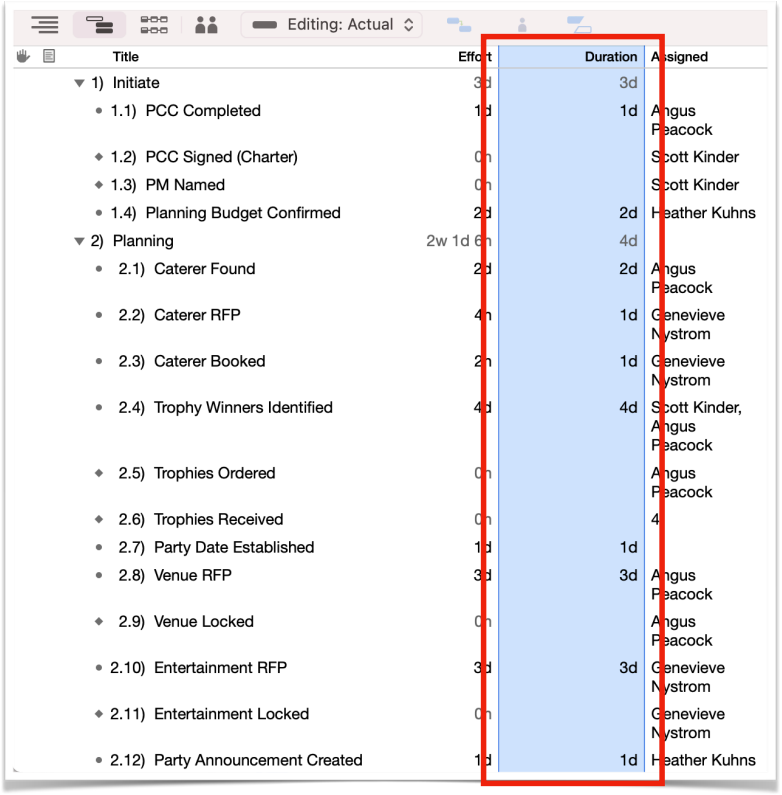
Project Scheduling

Task Duration

How long it will take to complete a task FROM START TO FINISH

Used to create the PROJECT SCHEDULE



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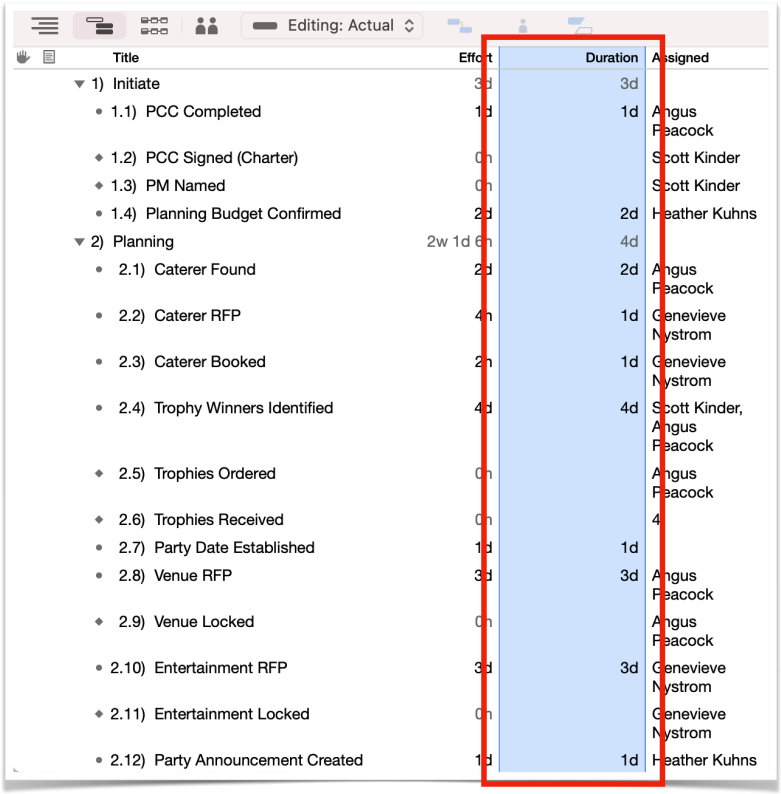
Task Duration

Many project managers really mess this up as the fail to account for RESOURCE AVAILABILITY



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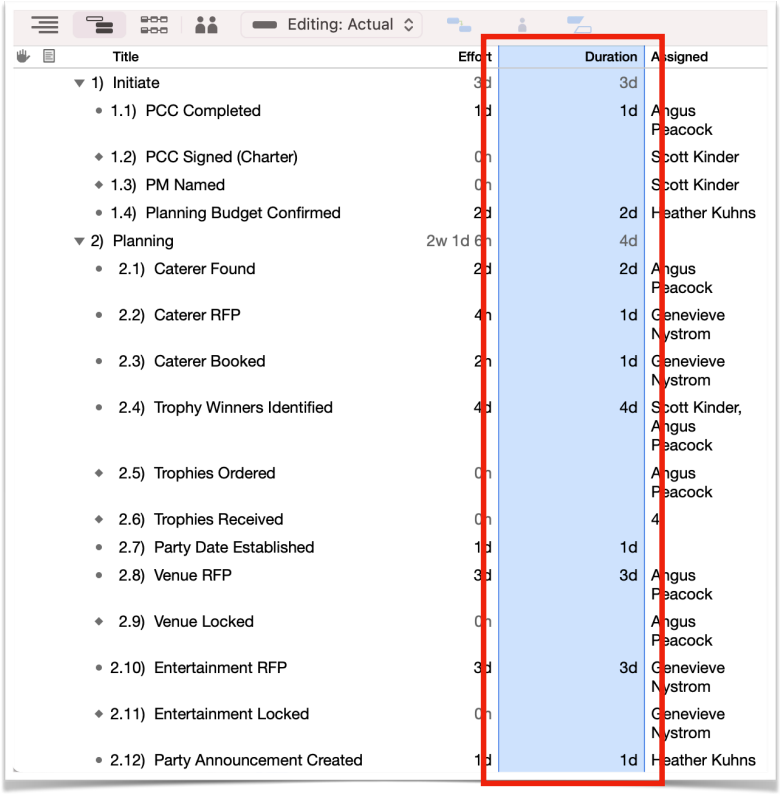
Task Duration

Just because a task has an effort of 8 hours - does NOT mean it will always be done in only one day...



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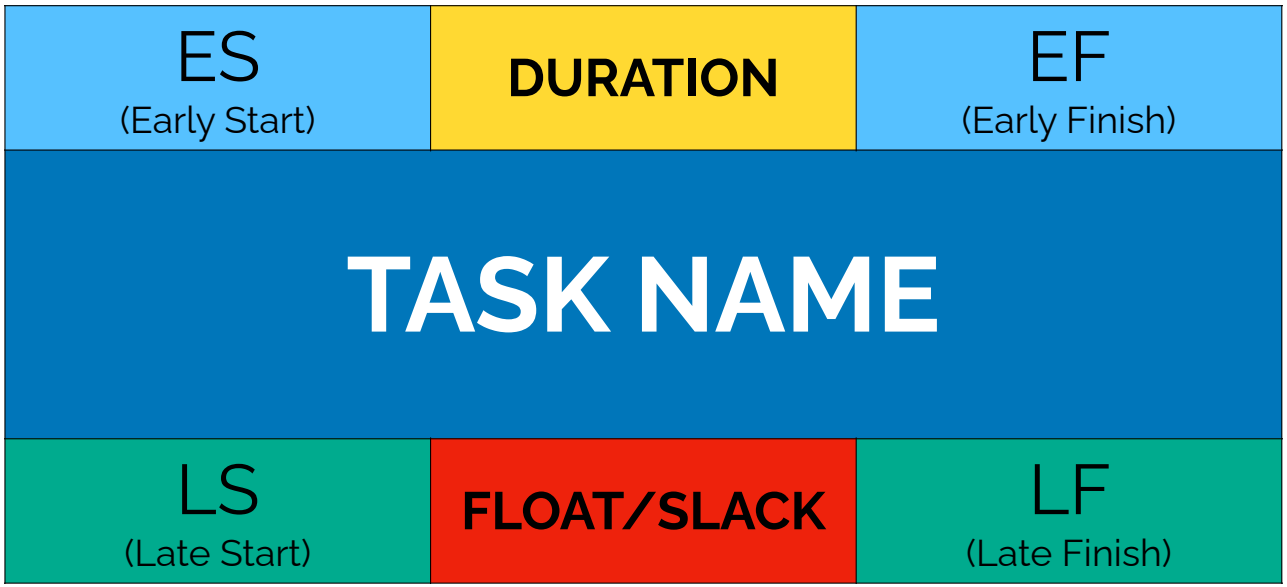
Understanding Project Tasks



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Understanding Project Tasks

Dependencies are the logical, operational, or resource-based relationships between tasks that determine the order in which they must be executed.

They help you sequence work, manage timelines, and avoid delays caused by overlooked constraints.

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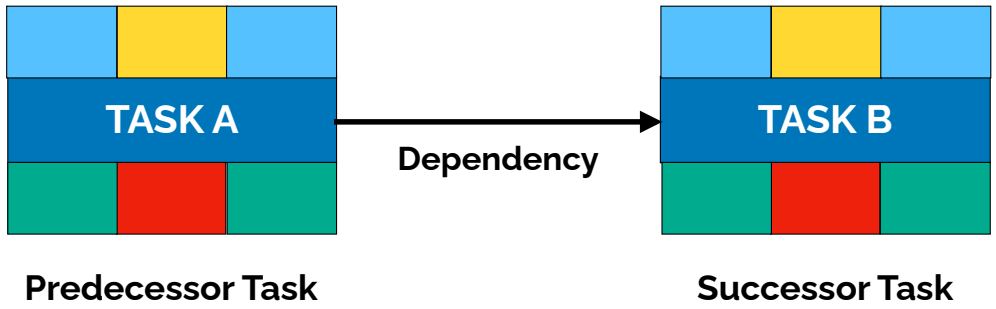
Understanding Project Tasks

Dependencies are the relationships among project tasks which determine the order in which schedule activities need be performed.



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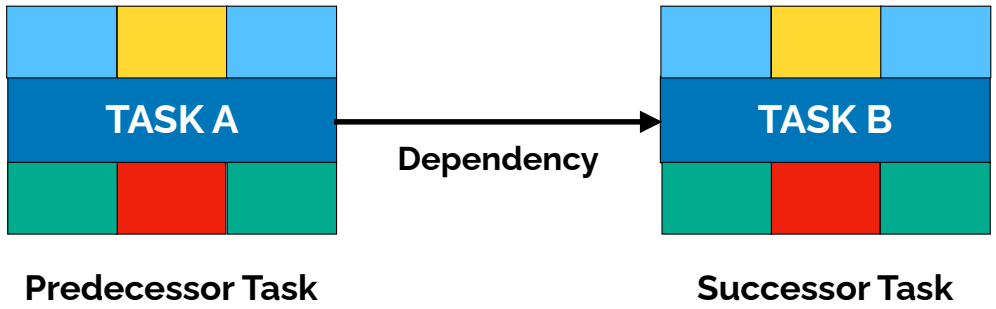
Understanding Project Tasks

There are four types of dependency relationships

- Finish to Start (FS)
- Start to Start (SS)
- Finish to Finish (FF)
- Start to Finish (SF)



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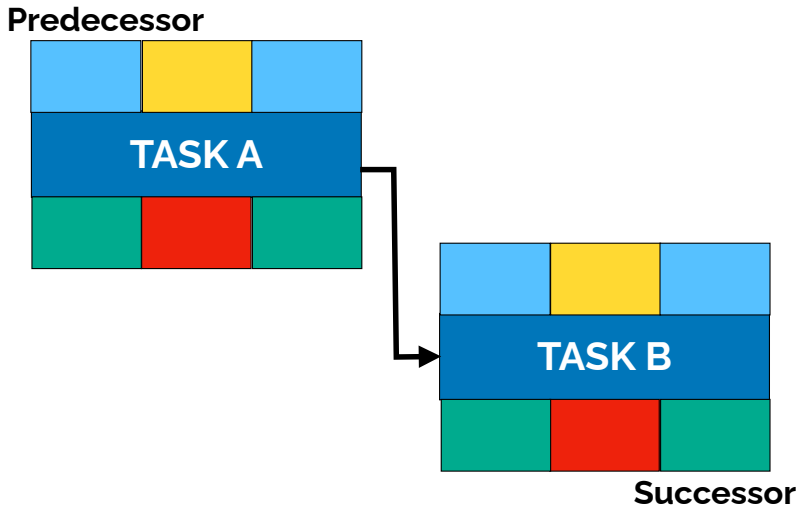
Finish to Start

Predecessor must finish before Successor can start

Most common dependency in projects.

Example:
You must pour the concrete foundation before you can build the walls.

You must complete the UI design before coding the front end.



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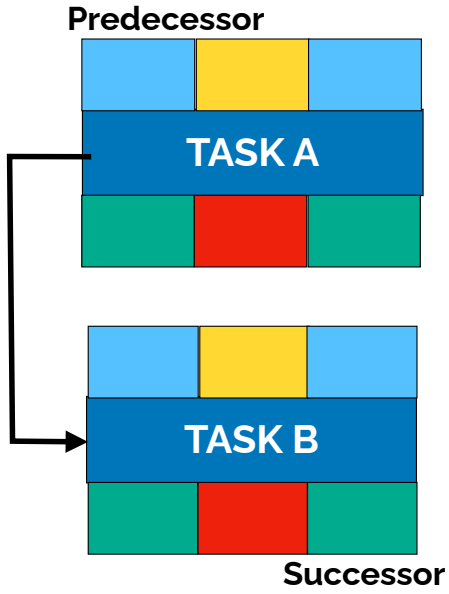
Start to Start

Predecessor must start before Successor can start.

Example:

You must start mixing cement (task A) before you start pouring it (task B)

You must start system integration before you can start system testing.



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Finish to Finish

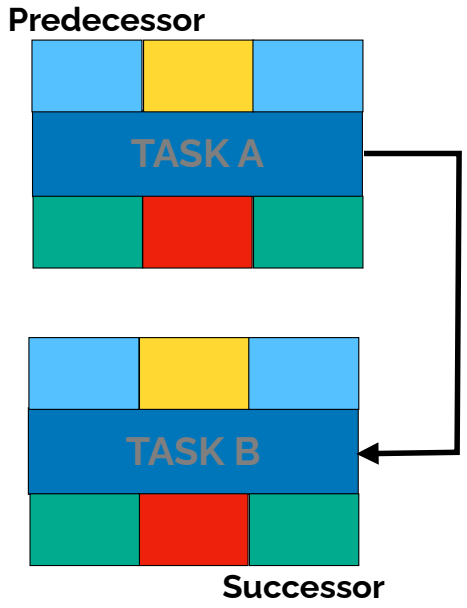
Predecessor must finish before Successor can finish.

Used for coordinating concurrent wrap-ups.

Example:

Final editing (task A) must finish before publishing a report (task B) can finish.

Testing code must finish before documenting test results can finish.



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Start to Finish

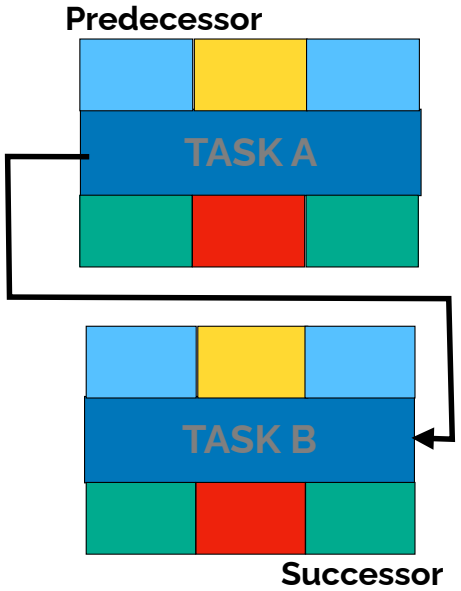
Predecessor must start before Successor can finish.

Rare in practice and is typically used for handovers or shift-work

Examples:

The new support team shift (task A) must begin before the current shift (task B) can end.

Data migration must start before the legacy system can be shut down.



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Dependencies and Project Constraints

Discretionary Dependency

Also known as “preferential” and are guided by organizational best-practice

Resource Dependency

Driven by constraints within your project.

External Dependency

Dependencies in which you have no organizational control.

Logical Dependency

Dependencies which can’t be avoided during your project.

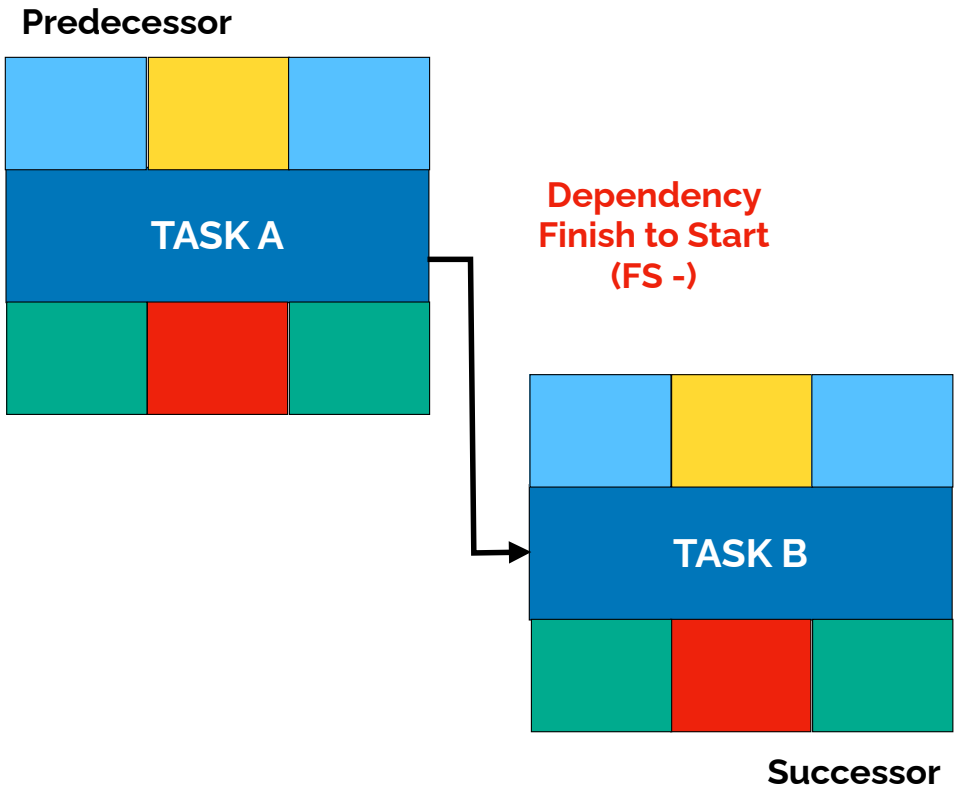
SOFPM

Leads

Leads are used to accelerate a successor activity.

A Lead can only be applied to tasks that have a DISCRETIONARY Finish -> Start relationship.

Usually demonstrated as (FS - #days)



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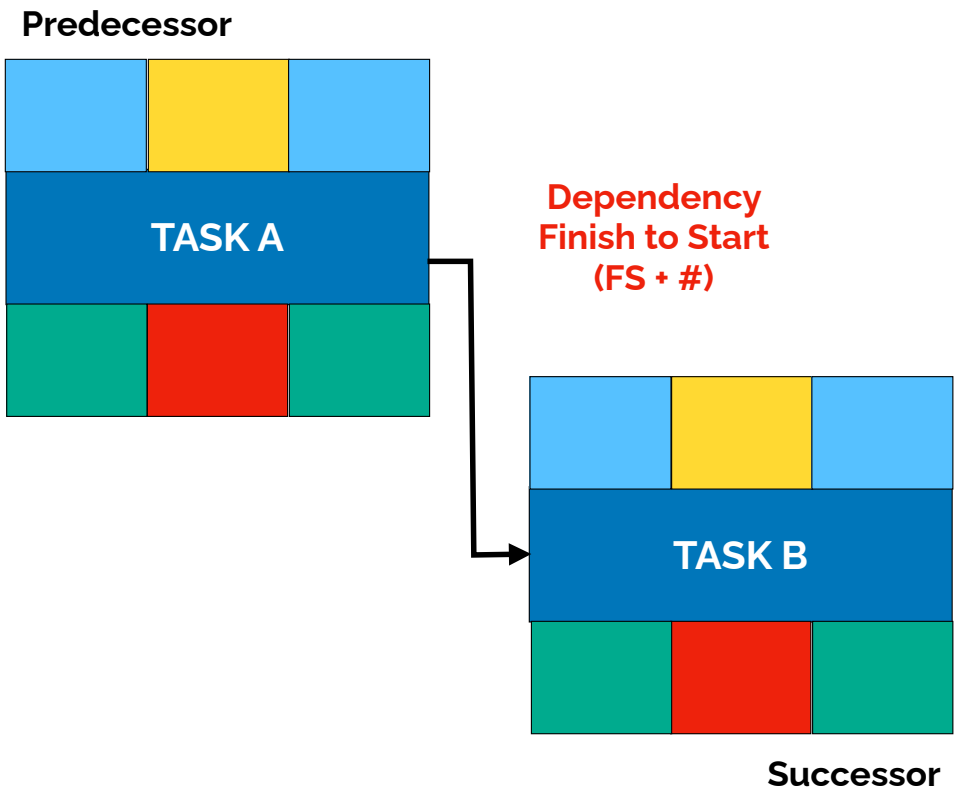
Lags

Lags are used to delay a successor activity and is an amount of time that must pass before the second activity can begin.

Usually demonstrated as (FS+ #days)



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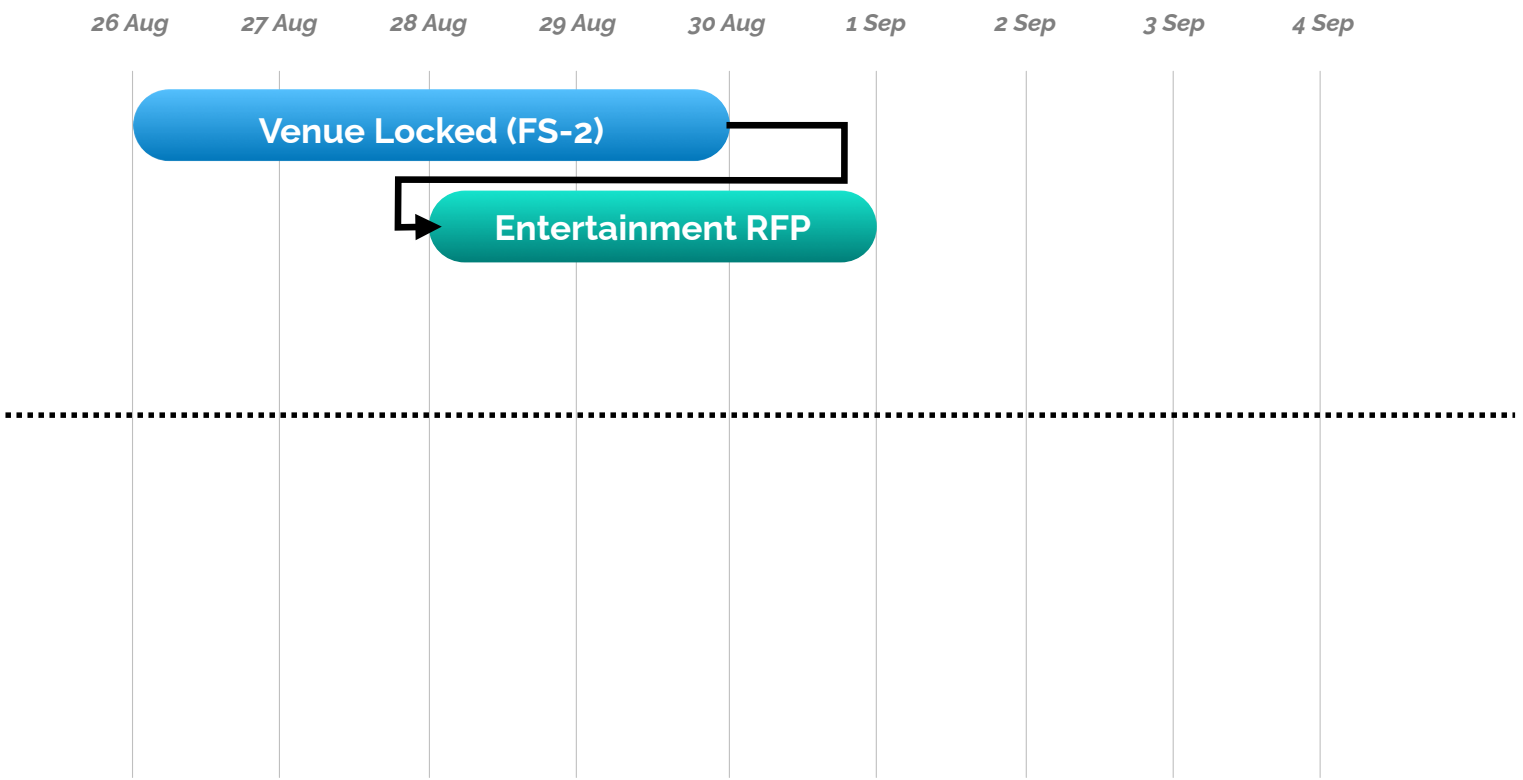
Leads and Lags

LEAD



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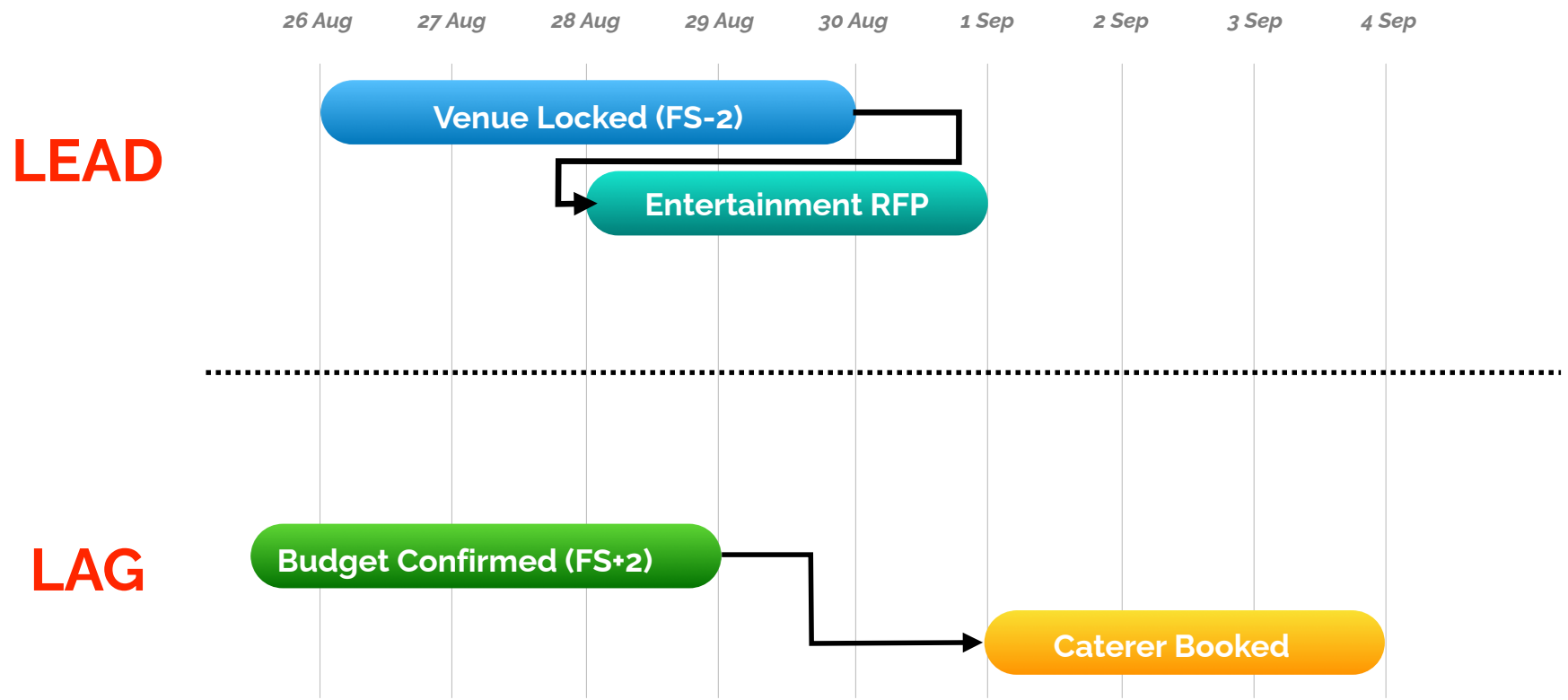
Leads and Lags



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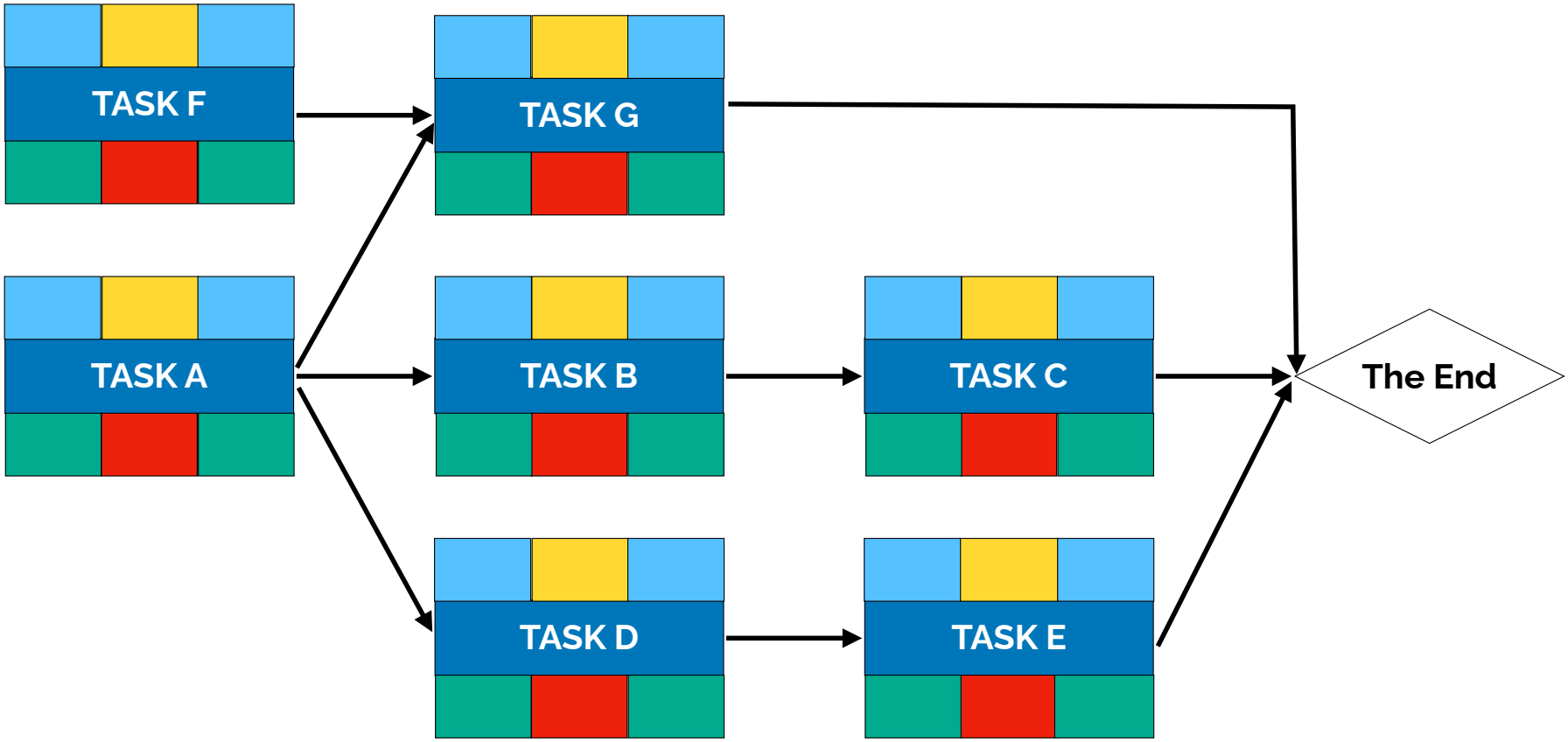
How your project management software does it



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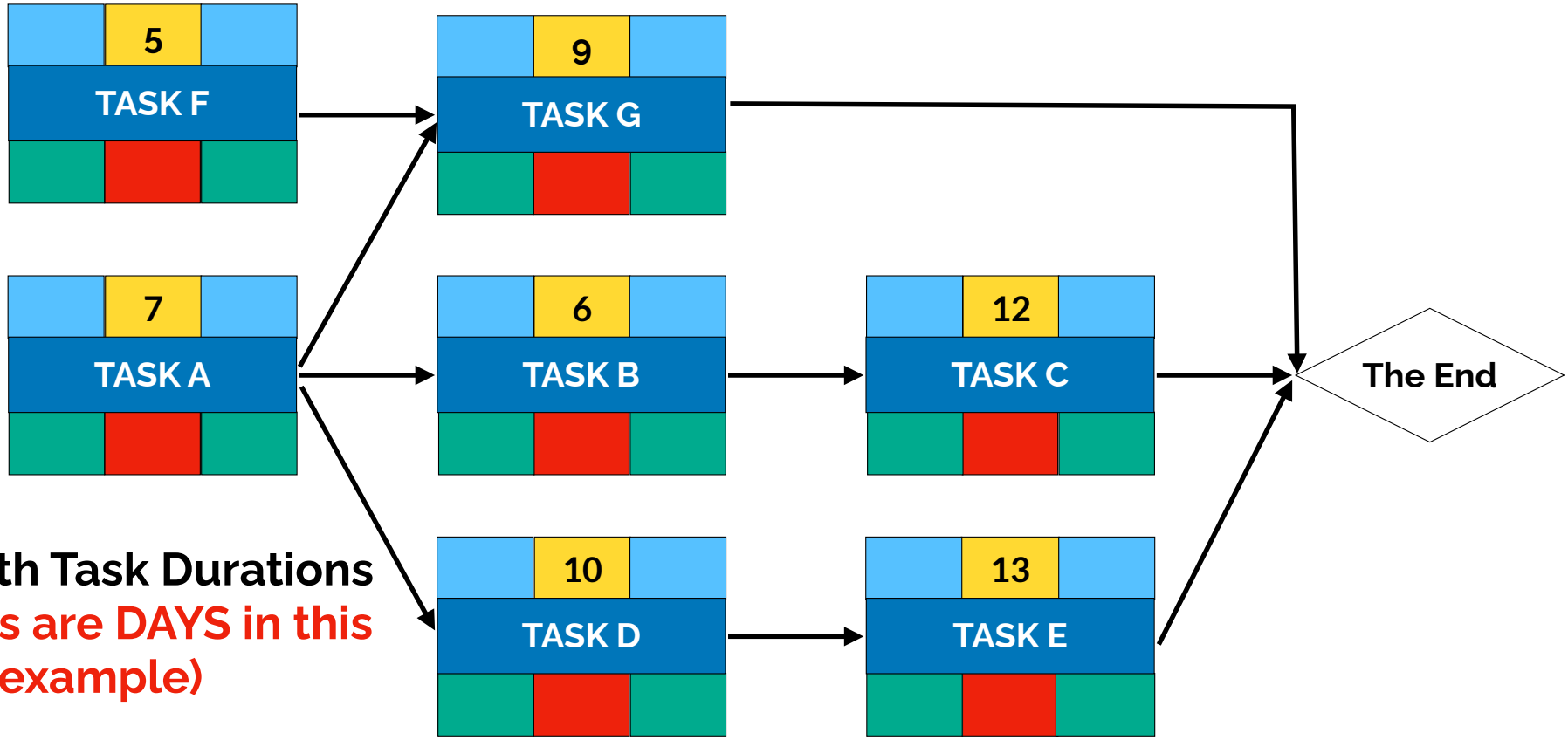
Task Durations



Start with Task Durations
(All units are DAYS in this example)

Your PM software typically defines a day as 8 hours.

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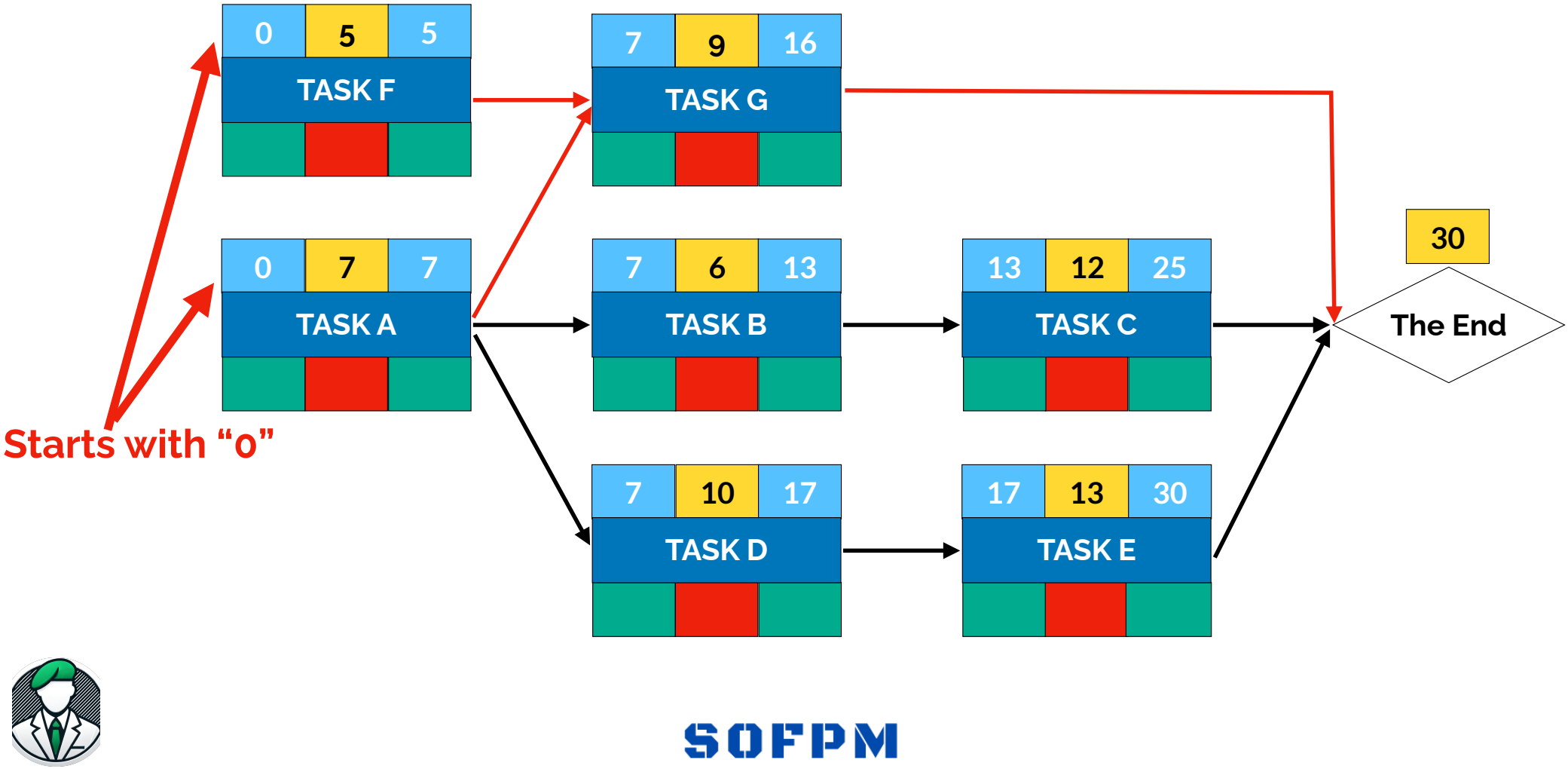
The Forward Pass



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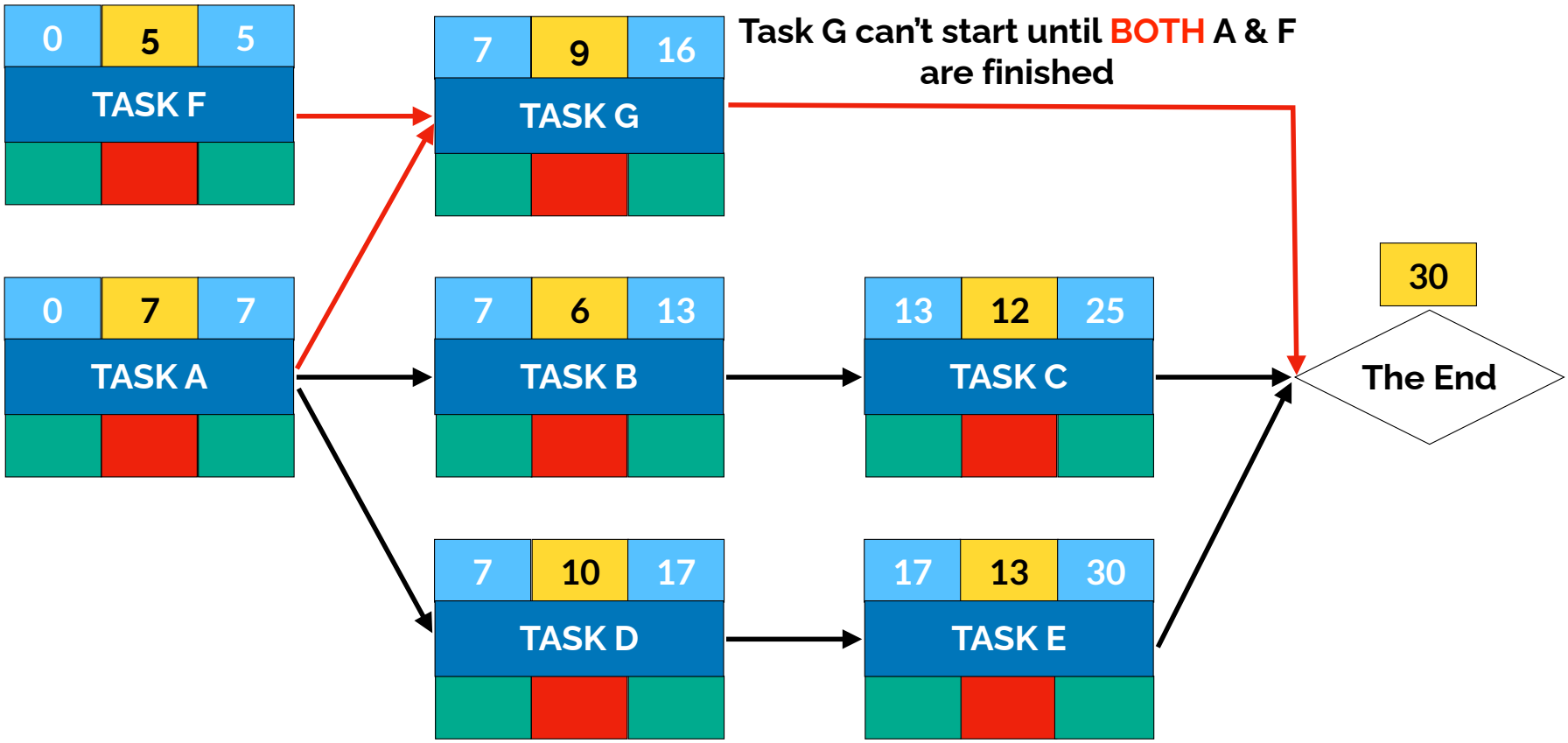
The Forward Pass



Calculates EARLY START and EARLY FINISH

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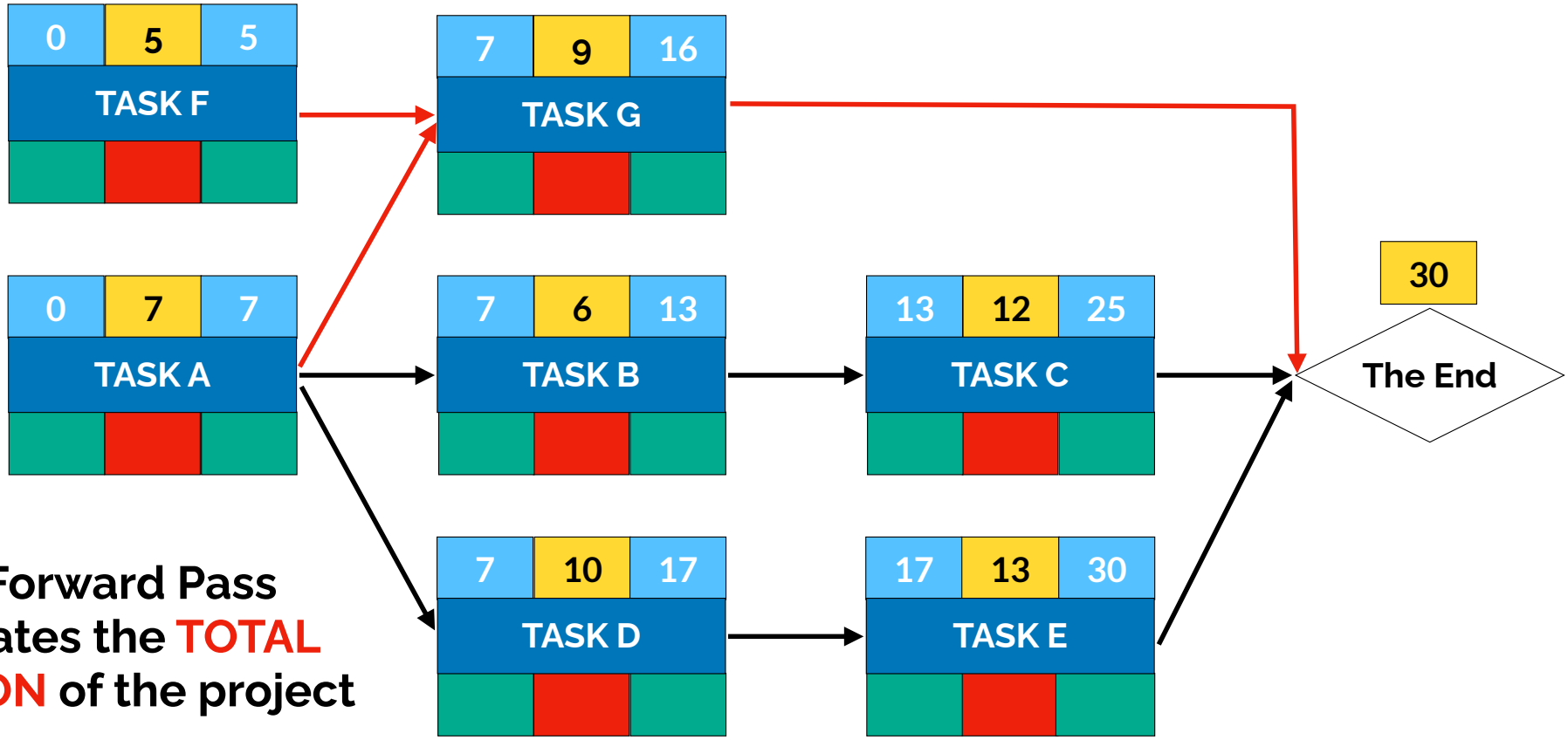
The Forward Pass



The Forward Pass Calculates the TOTAL DURATION of the project

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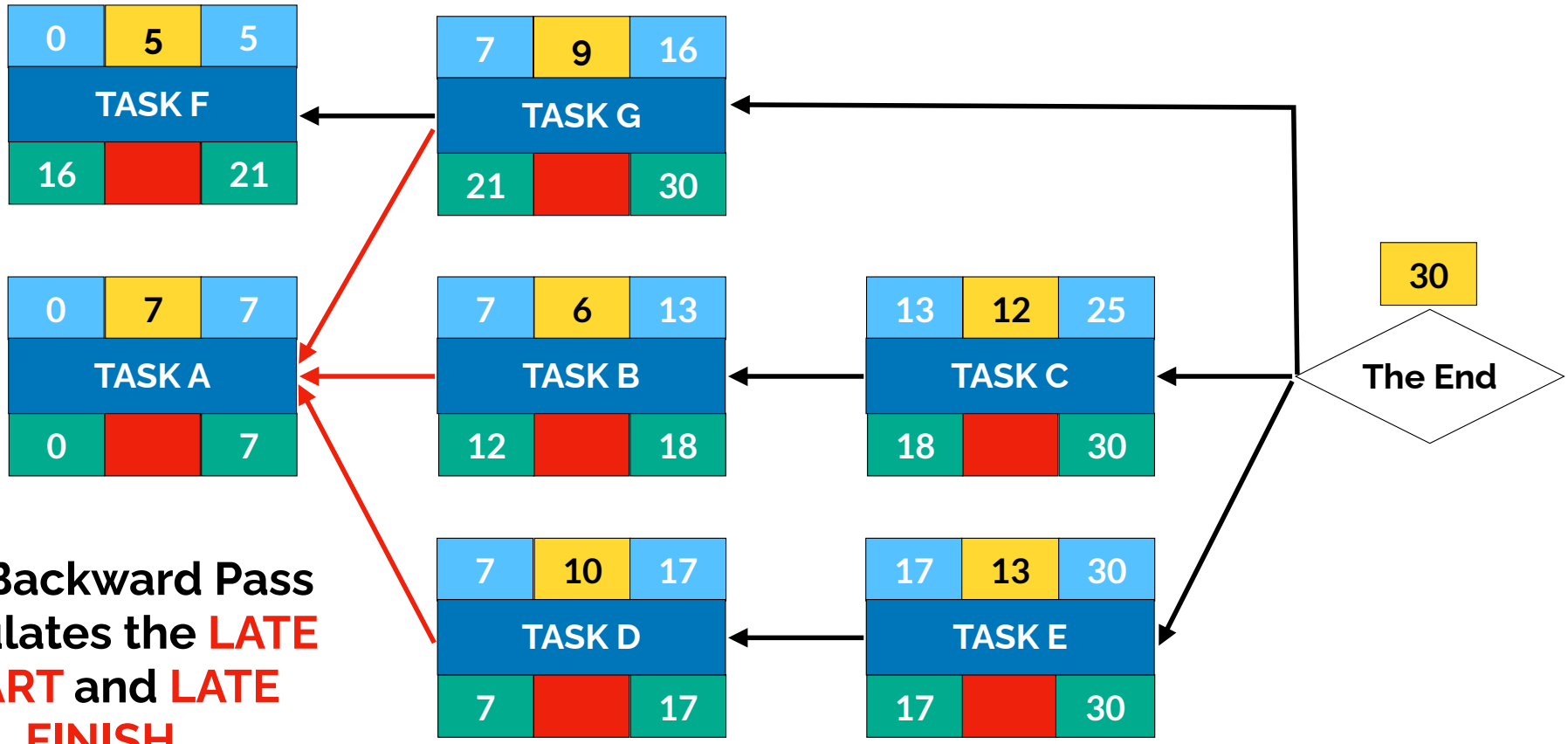
The Backward Pass



The Backward Pass calculates the LATE START and LATE FINISH

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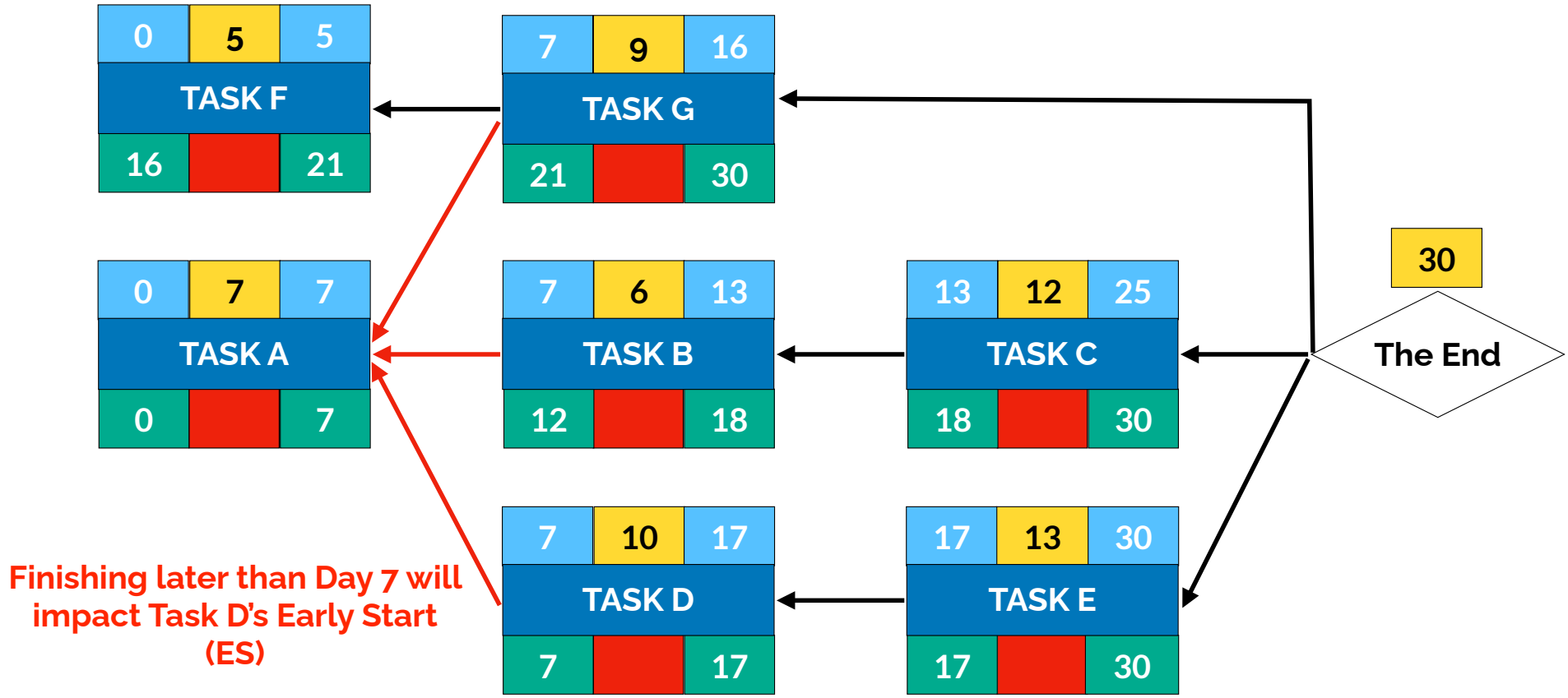
The Backward Pass



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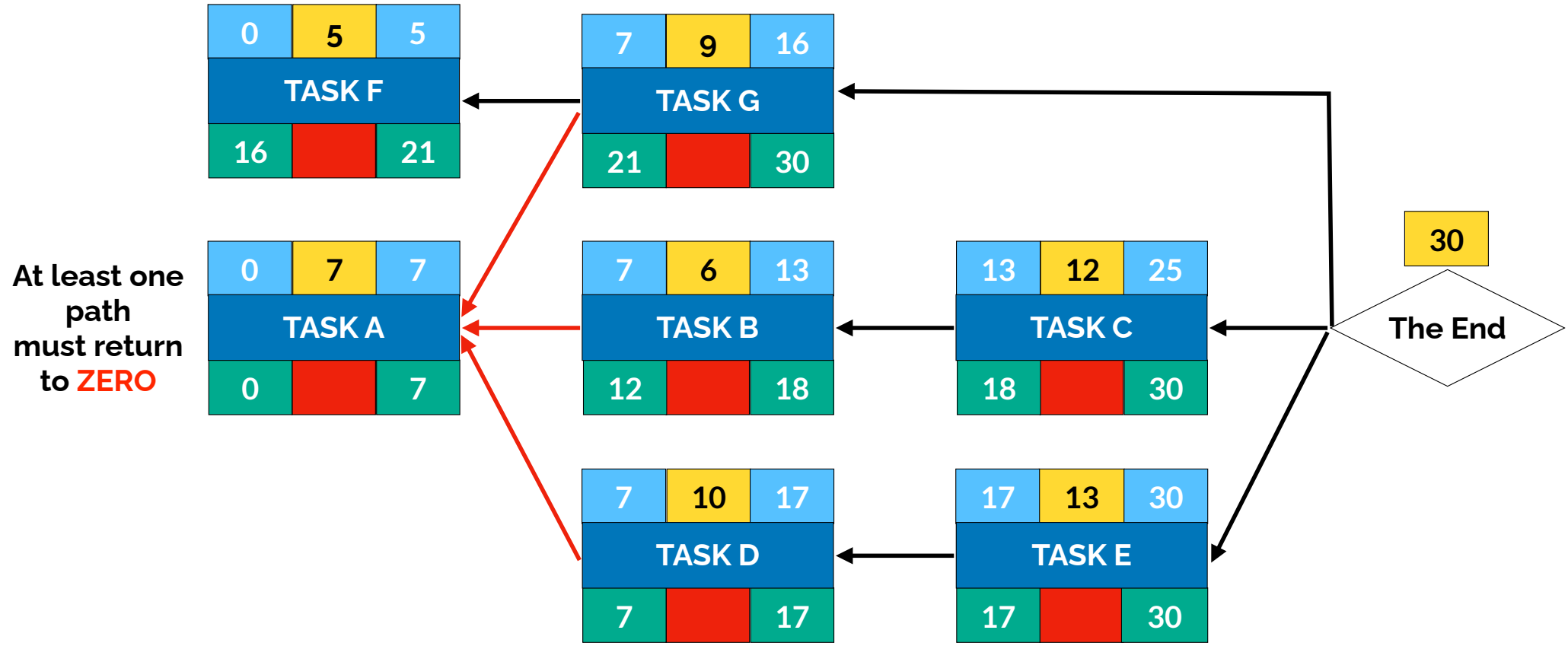
The Backward Pass



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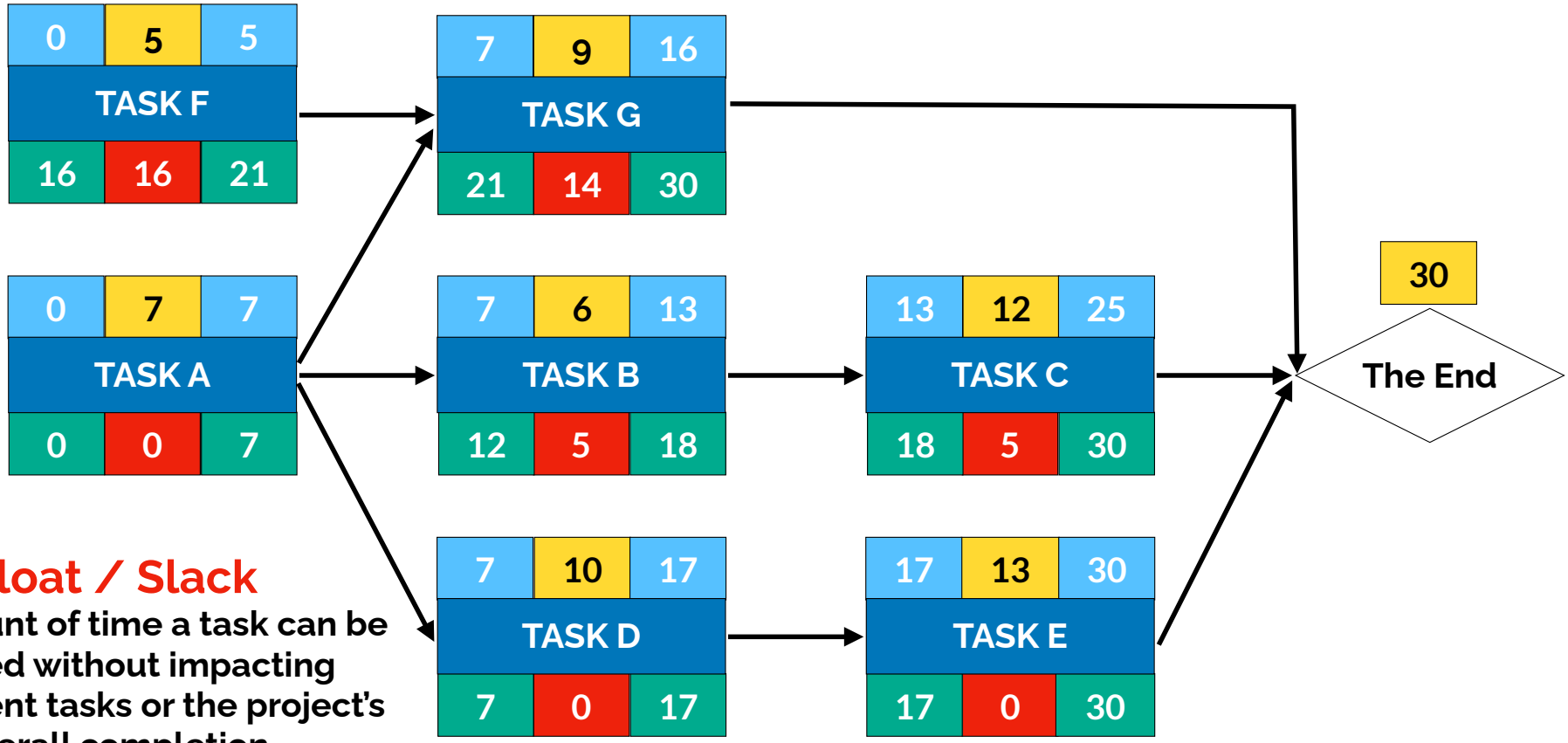
Float / Slack



Float / Slack

The amount of time a task can be delayed without impacting subsequent tasks or the project's overall completion

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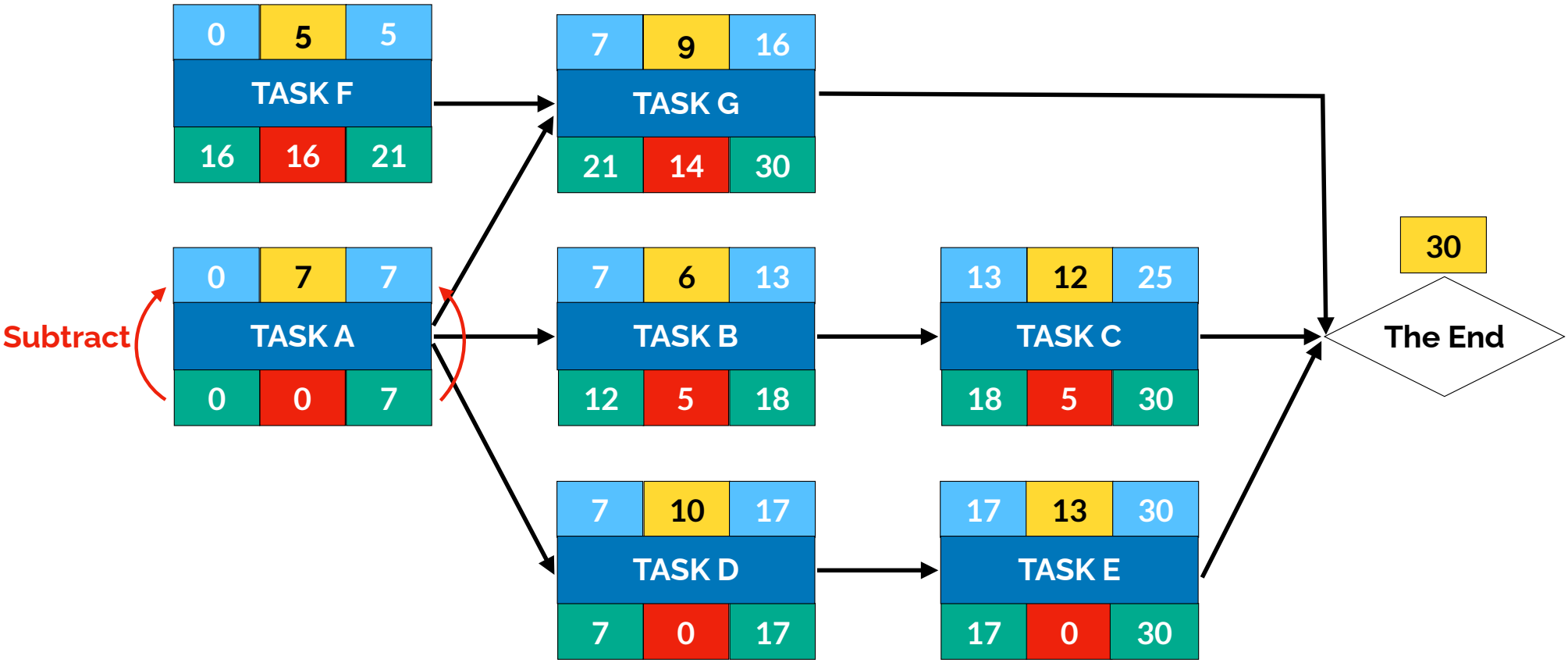
Float / Slack



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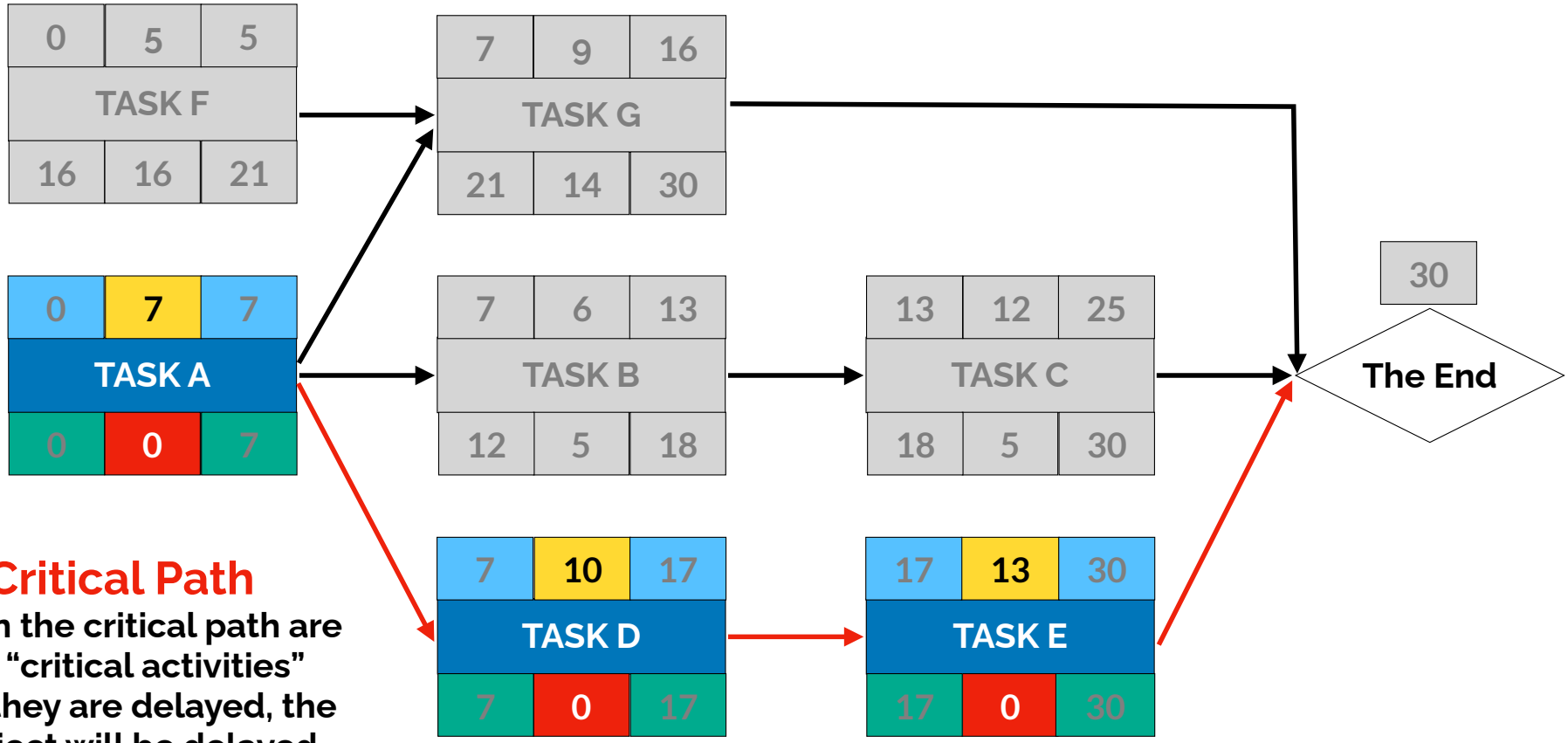
The Critical Path



The Critical Path

The tasks on the critical path are known as "critical activities" because if they are delayed, the whole project will be delayed

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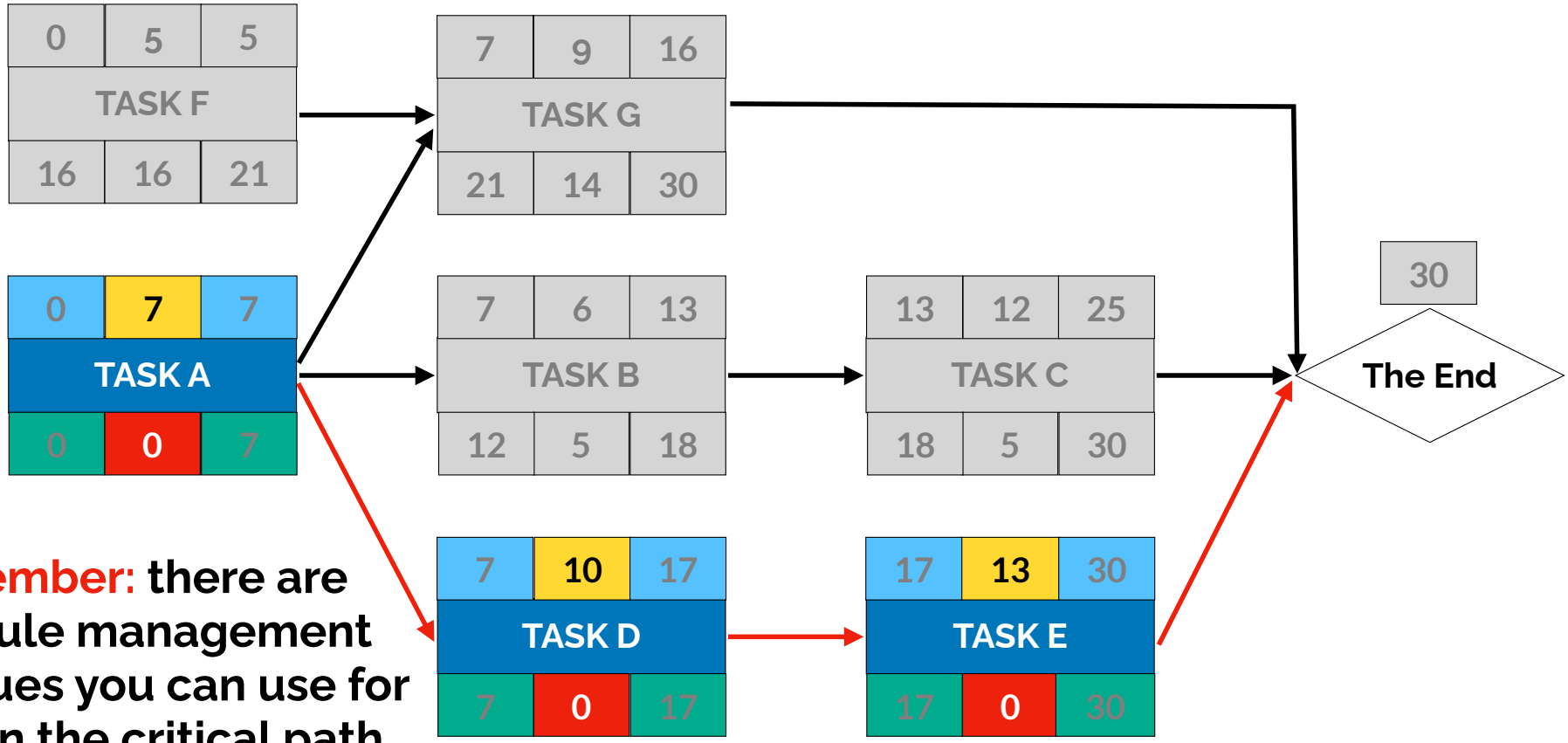
The Critical Path



Remember: there are Schedule management techniques you can use for tasks on the critical path

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Gantt charts

Gantt charts

One of the first recorded uses of Gantt charts was for the scheduling of ordnance projects back in the First World War.

The use of this technique was then popularized on large construction projects in the US like the Hoover Dam, started in 1931, and the interstate highway network which started in 1956.

Now Gantt charts are ubiquitous with waterfall project management scheduling.

Karol Adamiecki (1866-1933)

Henry Laurence Gantt (1861-1919)

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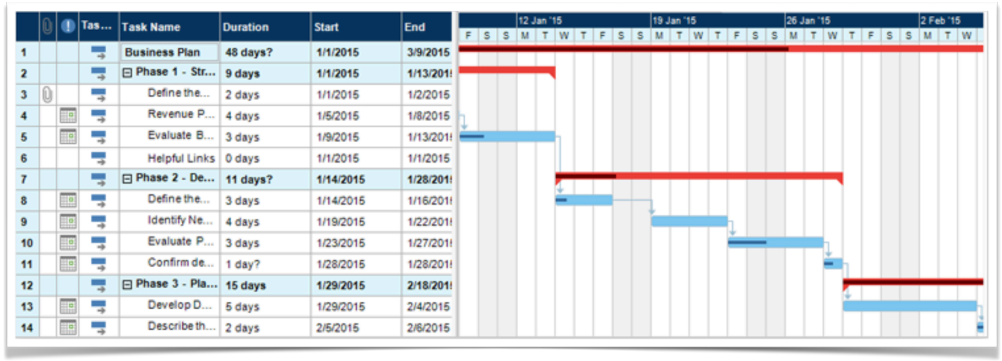
Gantt charts

One of the most popular and useful ways of showing activities (tasks or events) displayed against time.

On the left of the chart is a list of the activities and along the top is a suitable time scale.



	Tas...	Task Name	Duration	Start	End
1		Business Plan	48 days?	1/1/2015	3/9/2015
2		⊟ Phase 1 - Str...	9 days	1/1/2015	1/13/201
3		Define the...	2 days	1/1/2015	1/2/2015
4		Revenue P...	4 days	1/5/2015	1/8/2015
5		Evaluate B...	3 days	1/9/2015	1/13/201
6		Helpful Links	0 days	1/1/2015	1/1/2015
7		⊟ Phase 2 - De...	11 days?	1/14/2015	1/28/201
8		Define the...	3 days	1/14/2015	1/16/201
9		Identify Ne...	4 days	1/19/2015	1/22/201
10		Evaluate P...	3 days	1/23/2015	1/27/201
11		Confirm de...	1 day?	1/28/2015	1/28/201
12		⊟ Phase 3 - Pla...	15 days	1/29/2015	2/18/201
13		Develop D...	5 days	1/29/2015	2/4/2015
14		Describe th...	2 days	2/5/2015	2/6/2015

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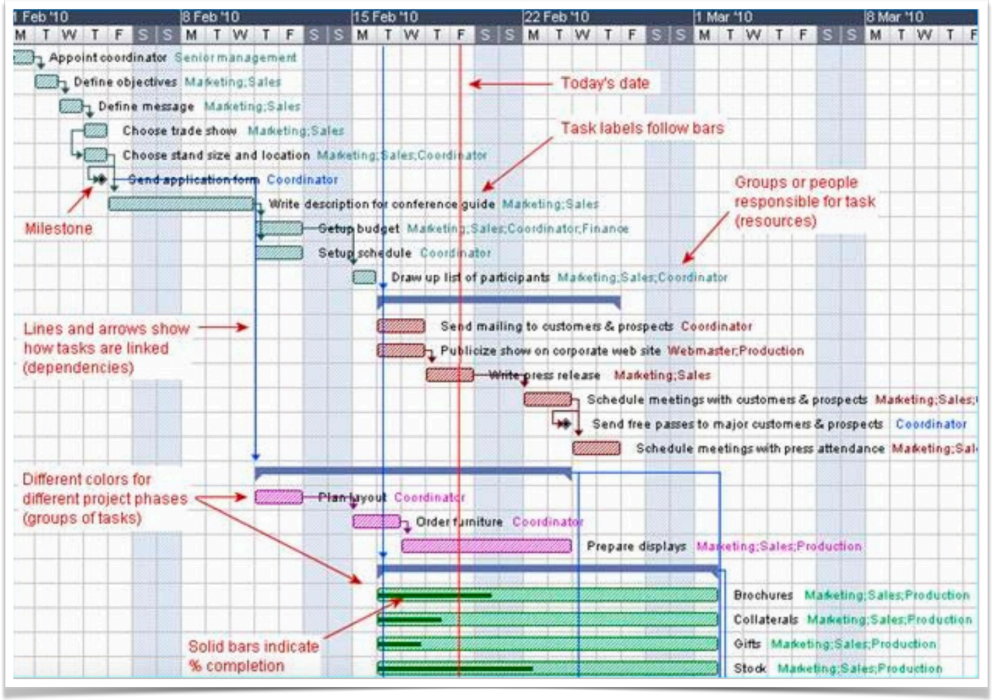
Gantt charts

Each activity is represented by a bar.

The position and length of the bar reflects the start date, duration and end date of the activity.



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Gantt charts

This allows you to know:

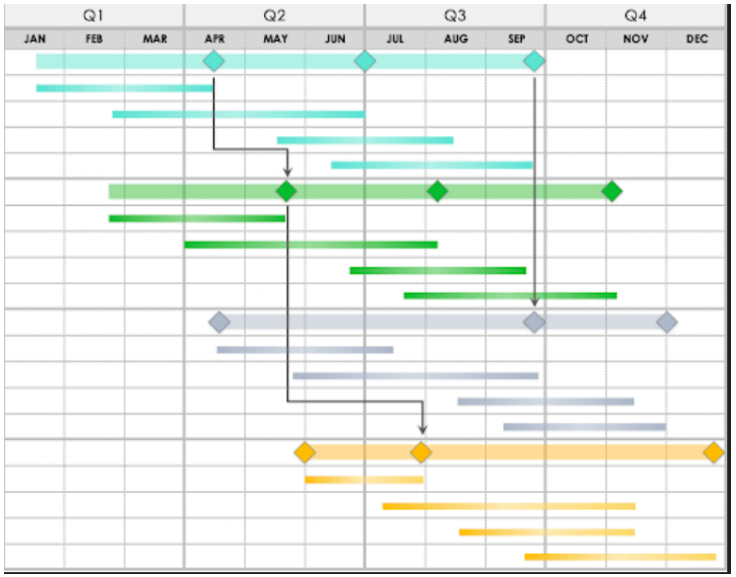
The various activities forecasted.

When each activity begins and ends.

How long each activity is scheduled to last.

Where activities overlap with other activities, and by how much.

The start and end date of the whole project.



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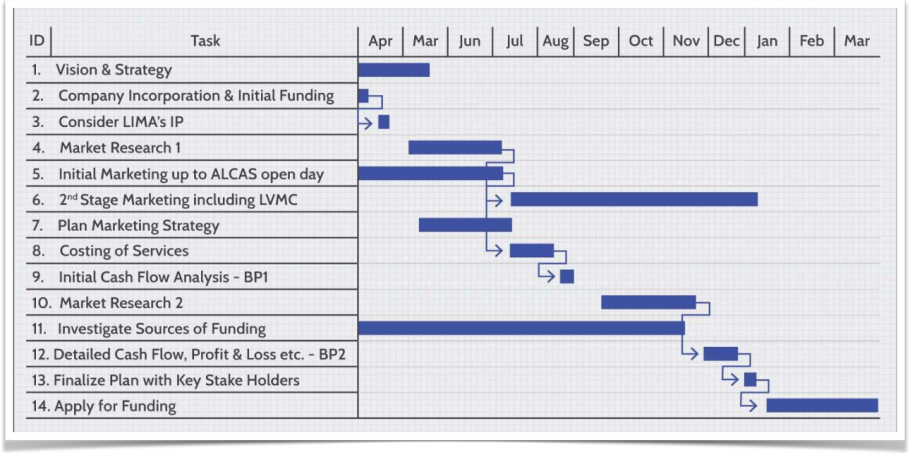
Gantt charts

Gantt charts show you what has to be done (the activities) and when (the schedule).



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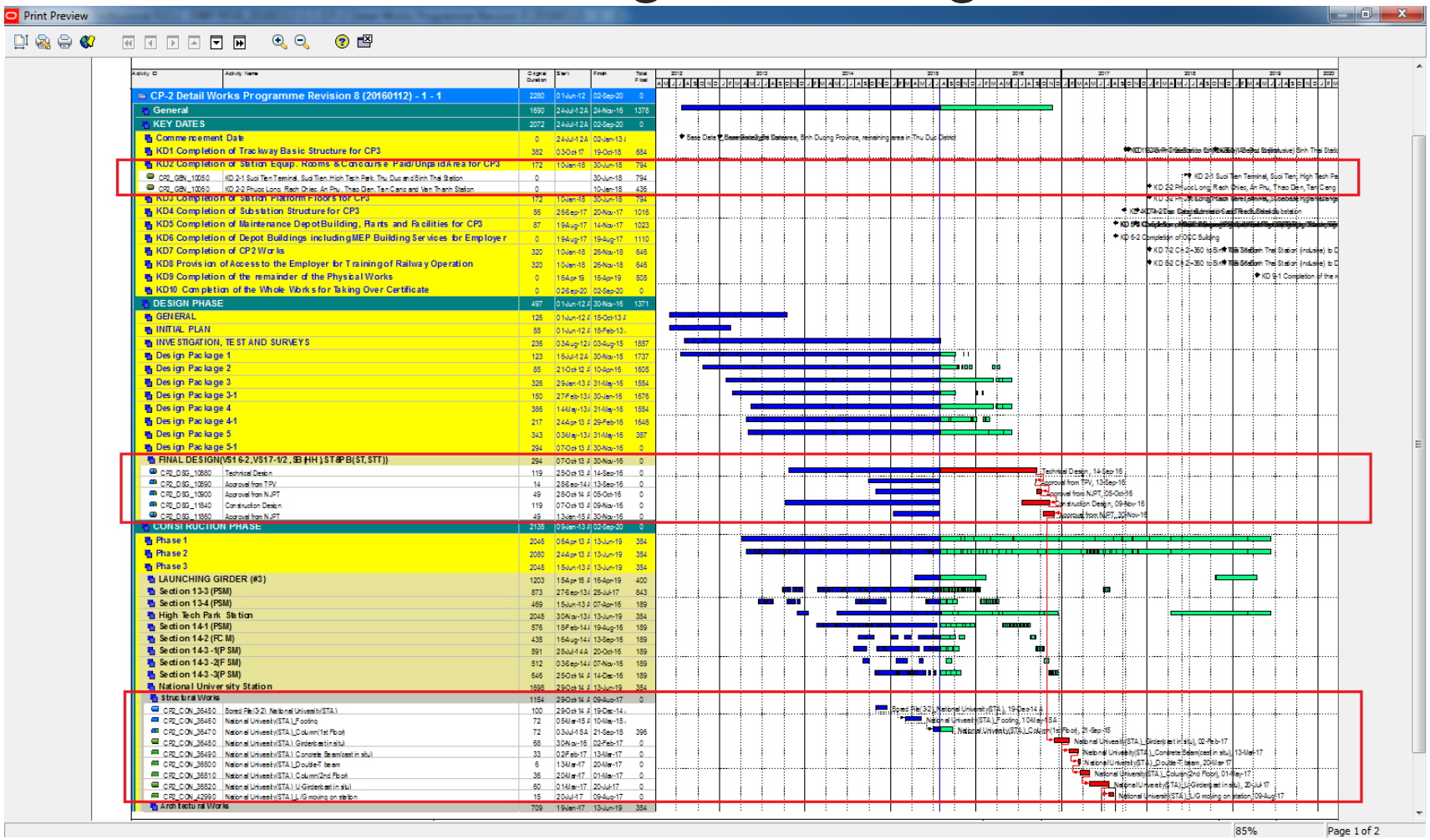
GIGO: Garbage In, Garbage Out



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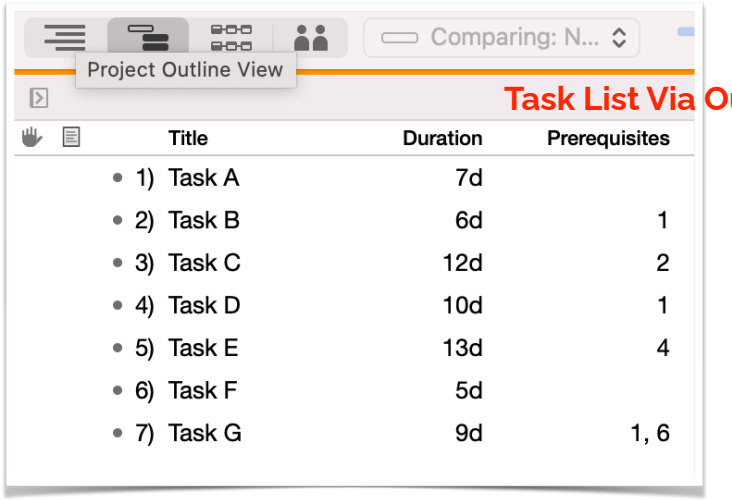
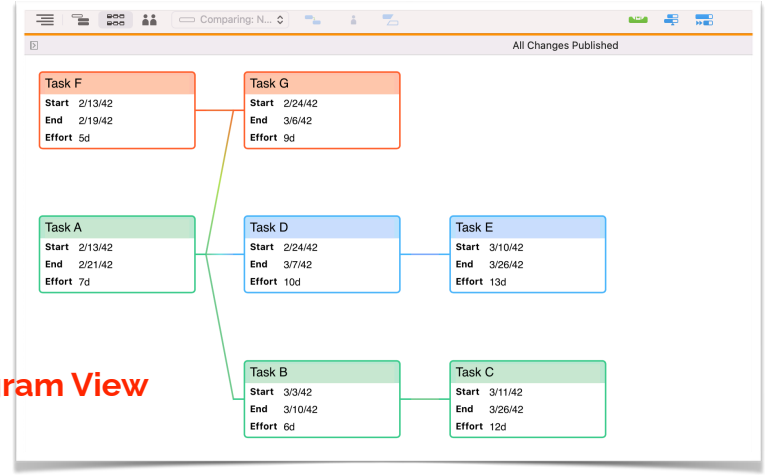
PM Software and Our Example Project

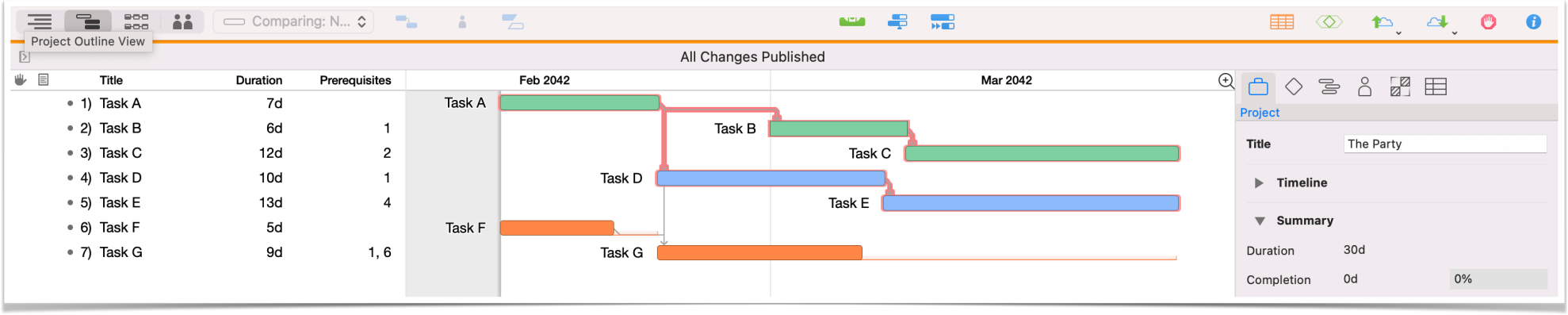


	Title	Duration	Prerequisites
1)	Task A	7d	
2)	Task B	6d	1
3)	Task C	12d	2
4)	Task D	10d	1
5)	Task E	13d	4
6)	Task F	5d	
7)	Task G	9d	1, 6

Task List Via Outline View



Network Diagram View



	Title	Duration	Prerequisites
1)	Task A	7d	
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3)	Task C	12d	2
4)	Task D	10d	1
5)	Task E	13d	4
6)	Task F	5d	
7)	Task G	9d	1, 6

Gantt chart with critical path (red)

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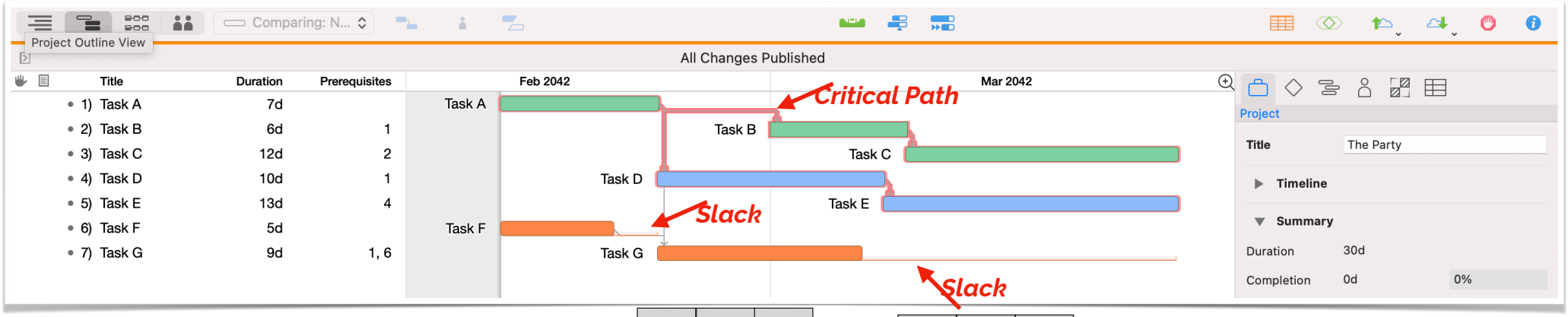
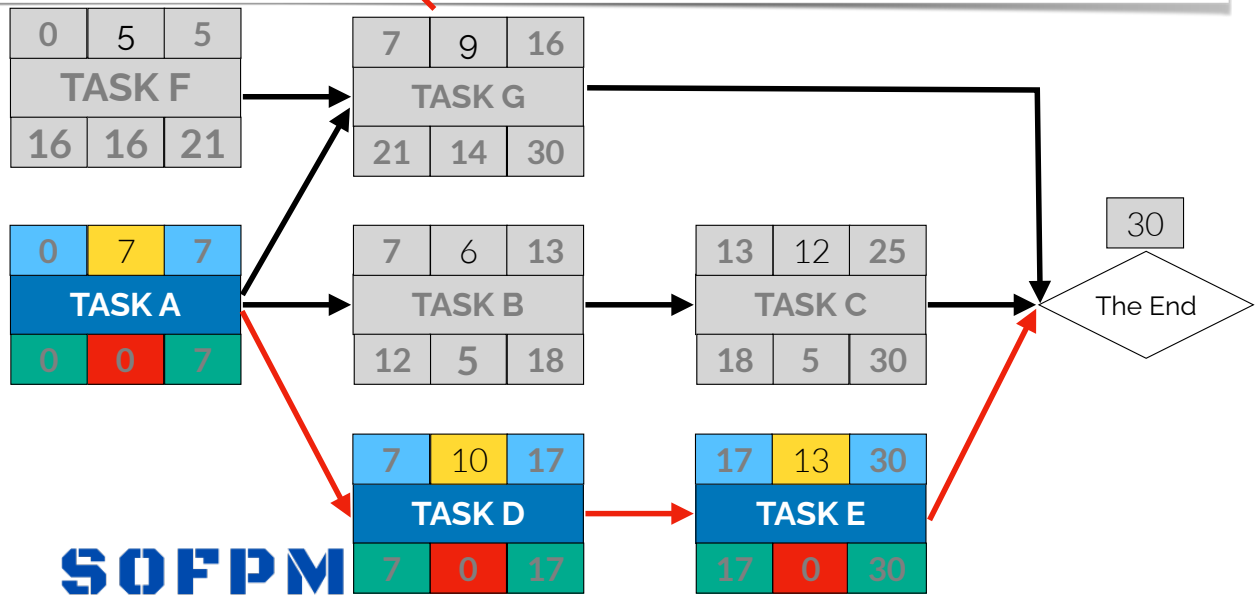
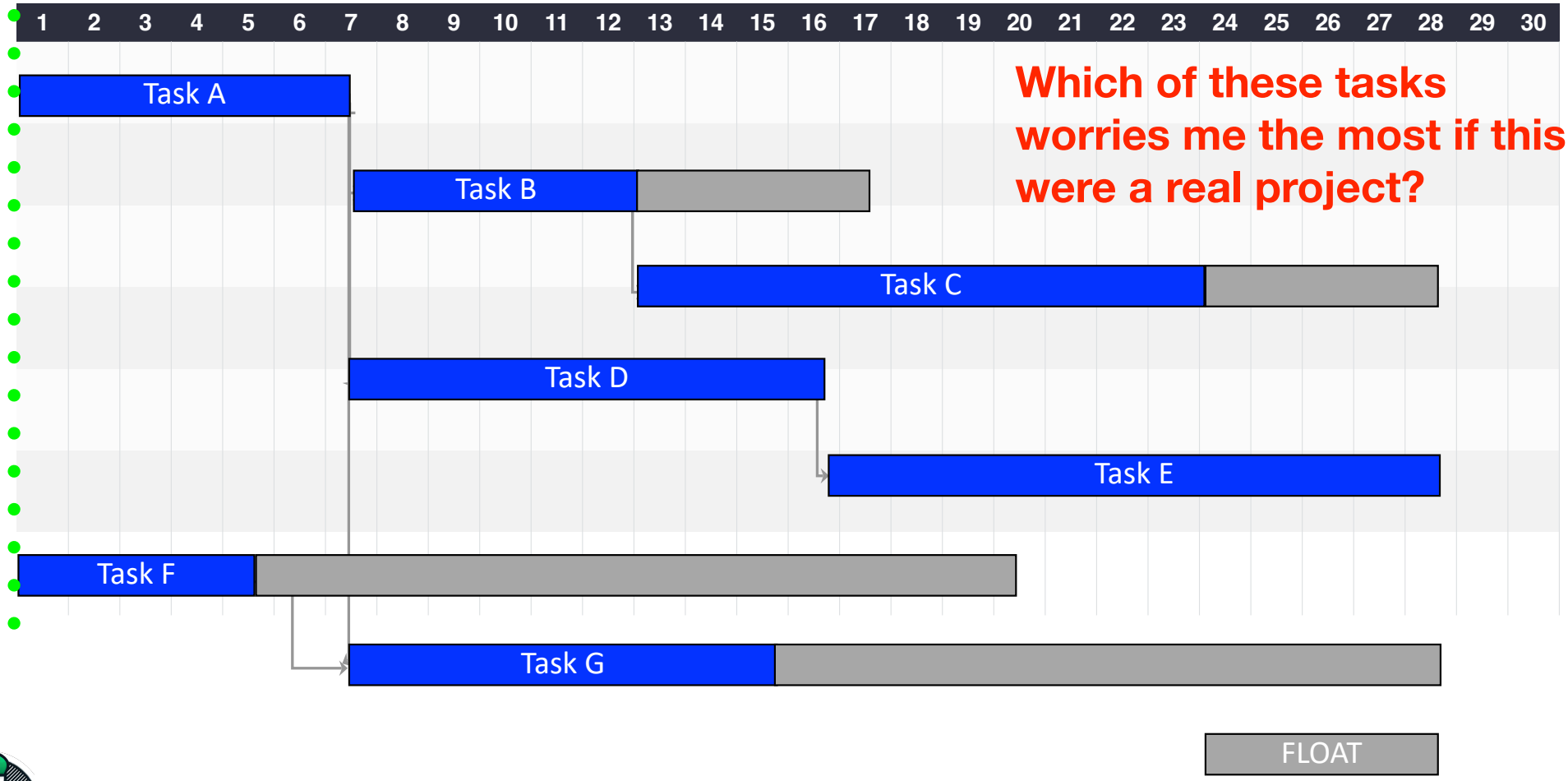
A Cautionary Note



Note: Task A is on the Critical Path and as a result the project management software will show all tasks dependent on A as also on the Critical Path. This is often referred to as the Near Critical Path



We are here at the project kick-off meeting



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What can you accomplish with what you have?

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What can you accomplish with what you have?

Resource Constraints Exist: People, Time, Money, Material...

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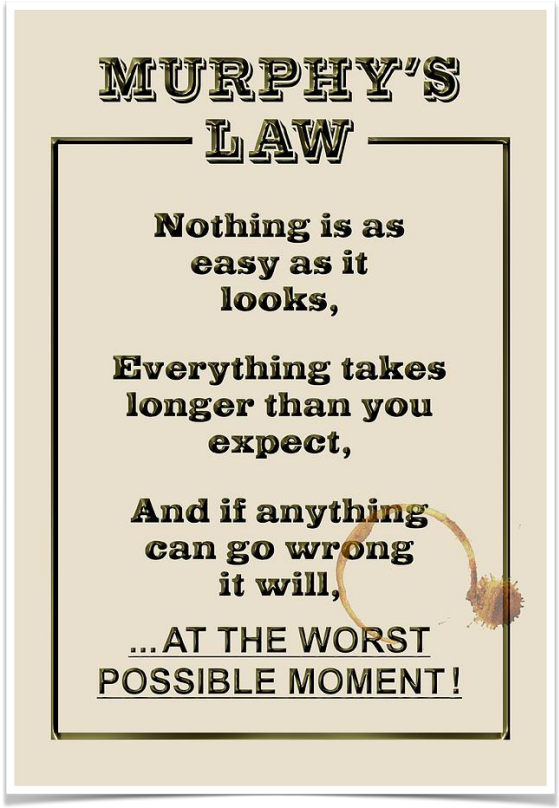
Improving Confidence in Estimates (Time and Money)

Define your method(s)
Assign responsibility to the right people
Use multiple sources
Clarify assumptions
Assume normal (not best case) conditions
Use consistent units (time / cost)
Assume task independence
Allow sufficient time to estimate



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Take-aways from Planning

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Know the constraints you face with your project

Understand team effort adds up quickly.

Know your task dependencies and how they work with your project.