PROJECT MANAGEMENT METHODOLOGIES

Project activity modeling methods (Gantt chart, Pert, CPM), case of DIA program, its UML part Factors influencing project work, control techniques

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PROJECT MANAGEMENT METHODOGIES

Project management is a challenging task, however, there are special methodologies available to assist with accomplishing the tasks and executing the responsibilities.

Project management methodologies have own unique process and workflow.

two types of methdologies:

1. The traditional, sequential methodologies
2. The Agile family
3. The change management methodologies
4. The process-based methodologies
5. Other methodologies

Some require a computer with supporting software, while others can be used manually. Project managers should choose a project management tool that best suits their management style.

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"Project Management Techniques". http://www.tifb.state.tx.us/Handbooks/Project_Management.htm. Last update time unknown. Accessed Nov. 4, 2002.

http://www.umsl.edu/~sauterv/analysis/488_f02_papers/ProjMgmt.html

THE TRADITIONAL, SEQUENTIAL METHODOLOGIES

Traditional project management is an established methodology where projects are run in a sequential cycle including ***initiation, planning, execution, monitoring, and closure***.

Three main types of methdologies:

1. Waterfall project management methodology
2. Critical path method (CPM)
3. Critical chain project management (CCPM)

Feaures: Time and budget are variable and requirements are fixed due to which it often faces budget and timeline issues.

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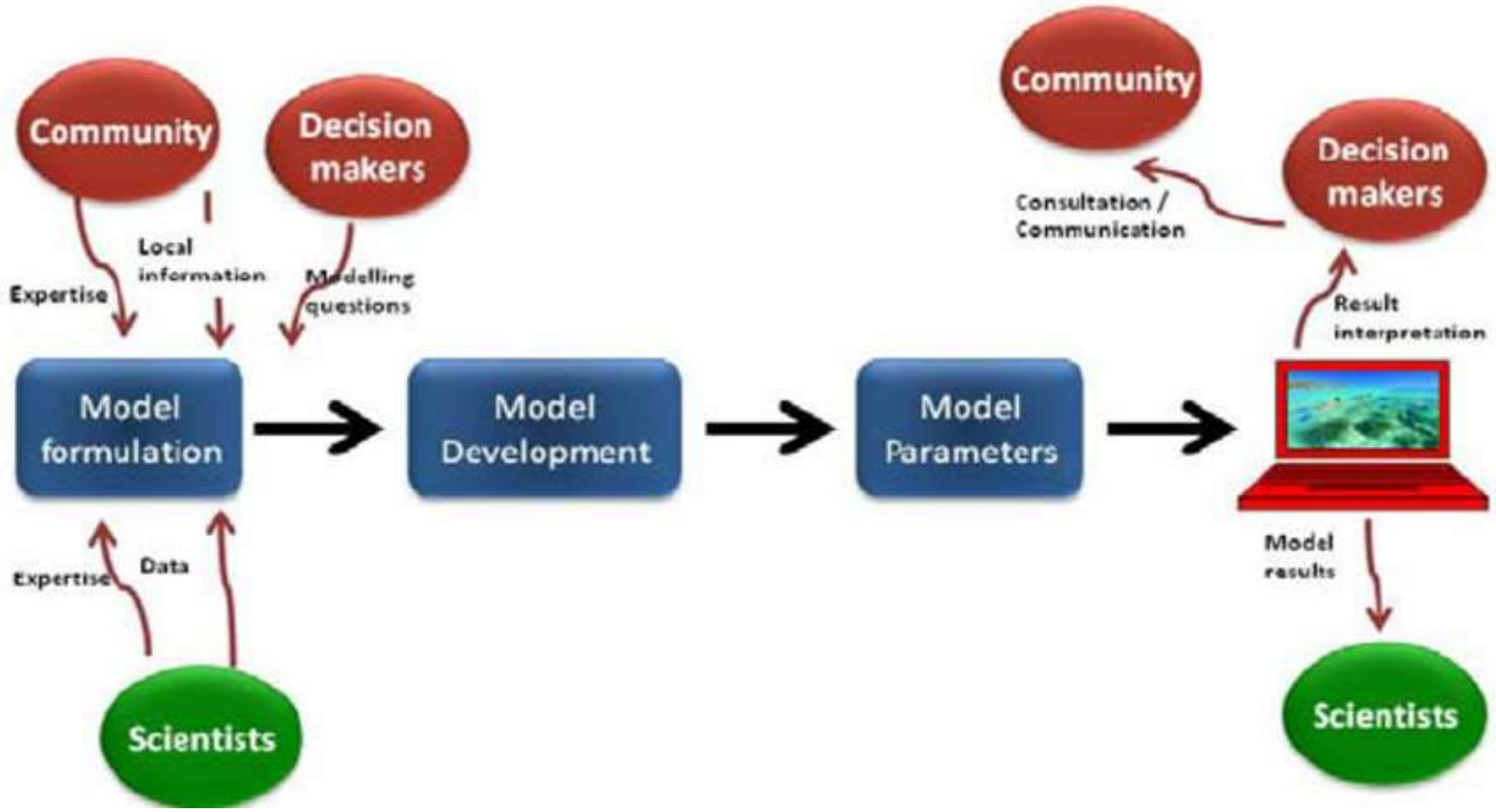
THE TRADITIONAL, SEQUENTIAL METHODOLOGIES



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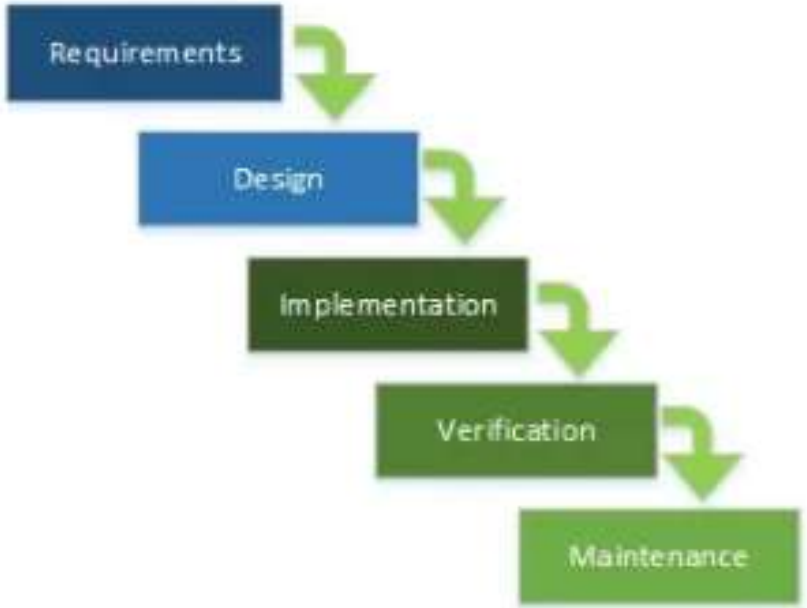
https://www.researchgate.net/figure/Traditional-sequential-model-development-stages-stakeholder-interaction-occurs-only-in_fig2_287117793

THE TRADITIONAL, SEQUENTIAL METHODOLOGIES: WATERFALL PROJECT MANAGEMENT METHODOLOGY

It is also called the Waterfall model

Benefits of traditional methodology:

Clearly defined objectives
Controllable processes
Clear documentation
More accountability



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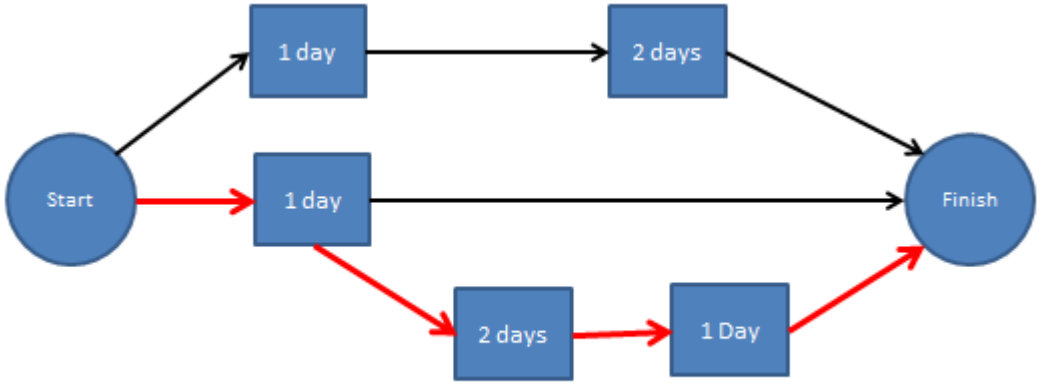
https://www.researchgate.net/figure/Traditional-sequential-model-development-stages-stakeholder-interaction-occurs-only-in_fig2_287117793

THE TRADITIONAL, SEQUENTIAL METHODOLOGIES:
CRITICAL PATH METHOD (CPM) PROJECT MANAGEMENT METHODOLOGY

The Critical Path Method (CPM) is a way to determine the critical path of a schedule that is the longest path of scheduled activities that must be met to execute a project.



Critical Path = 4 Days

The Steps
1: List of all activities required to complete the WBS
Step 2: Determine the sequence of tasks
Step 3: Draw flowcharts
Step 4: Determine the time of each activity will take to completion
Step 5: Determine the dependencies between the activities
Step 6: Compute the critical path
Step 7: Update the flowcharts as the project progresses

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https://www.researchgate.net/figure/Traditional-sequential-model-development-stages-stakeholder-interaction-occurs-only-in_fig2_287117793

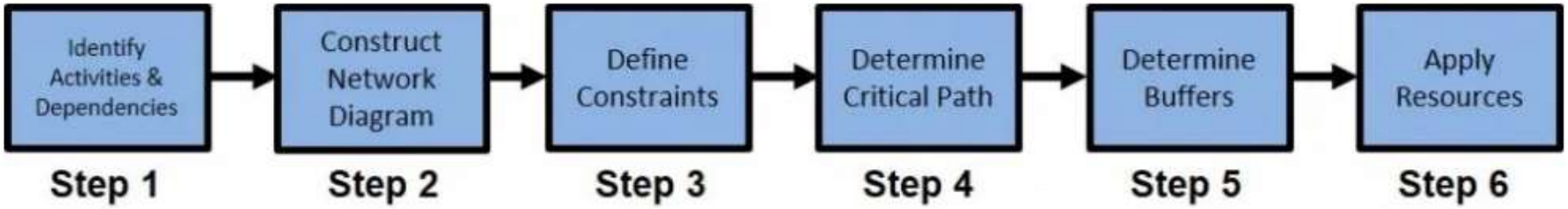
https://acqnotes.com/acqnote/tasks/critical-path-critical-path-method

THE TRADITIONAL, SEQUENTIAL METHODOLOGIES: CRITICAL CHAIN METHOD (CCM) STEPS

Step 1. Identify all tasks and its dependencies
Step 2. Construct a Schedule flowcharts/diagrams
Step 3. Define limitations
Step 4. Determine critical path
Step 5. Determine buffers
Step 6. Apply resource availability

The CCM has three (3) different types of Buffers which are:

Resource buffer: is added before a critical chain where a critical resource is required. Feeding Buffer: is added as a safety margin in the non-critical chain of a network schedule.
Project buffer: all the internal buffers added to each project task or activity.



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GAO 12-120G "Schedule Assessment Guide: Best Practices for Project Schedule" - May 2012

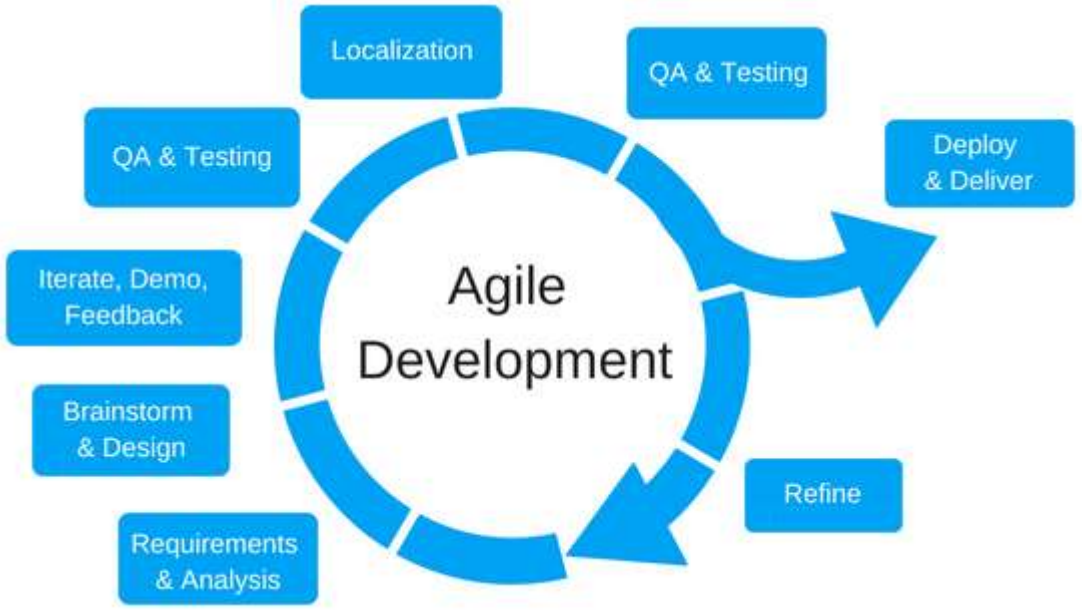
https://acqnotes.com/acqnote/tasks/critical-path-critical-path-method

AGILE FAMILY:

AGILE PROJECT MANAGEMENT METHODOLOGY STEPS

Four main values of Agile:

- Individuals and interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a planbility



Agile methodologies prioritize shorter, iterative cycles and flexibility.

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https://www.wrike.com/project-management-guide/methodologies/

https://www.workfront.com/project-management/methodologies/agile

AGILE FAMILY:

SCRUM METHODLOGY

Scrum:

- Scrum is the most popular Agile methodology. Relatively simple to implement and solves for inflexible project plans, and shifting production schedules for software developers problems.

- In Scrum, Scrum master removes all obstacles to working efficiently. The team works in short cycles of two weeks called “sprints,” though the team members meet daily to discuss their work and any roadblocks that need removing.

Agile methodologies prioritize shorter, iterative cycles and flexibility. This methodology suitable for rapid development and testing within small teams.

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https://www.wrike.com/project-management-guide/methodologies/

https://www.ntaskmanager.com/blog/best-kanban-tools/

AGILE FAMILY:

Kanban

KANBAN METHODOLOGY

Kanban is a Agile methodology based on a team's capacity. Project teams create visual representations of the activities, often using sticky notes and whiteboards (or online Kanban boards), moving the notes or activities through predetermined stages to see progress as it happens and identify where roadblocks could occur.

Core Kanban method practices

Visualize the flow of your work
Limit work in progress
Manage and improve the flow
Define and visualize your process policies
Implement feedback loops
Improve collaboratively through a scientific method

Benefits of using the Kanban system

Allows your team members the ability to focus
Creates increased efficiency
Improves productivity
Provides flexibility
You reduce wasted time as well as wasted work
You and your team are forced to focus on continuous delivery

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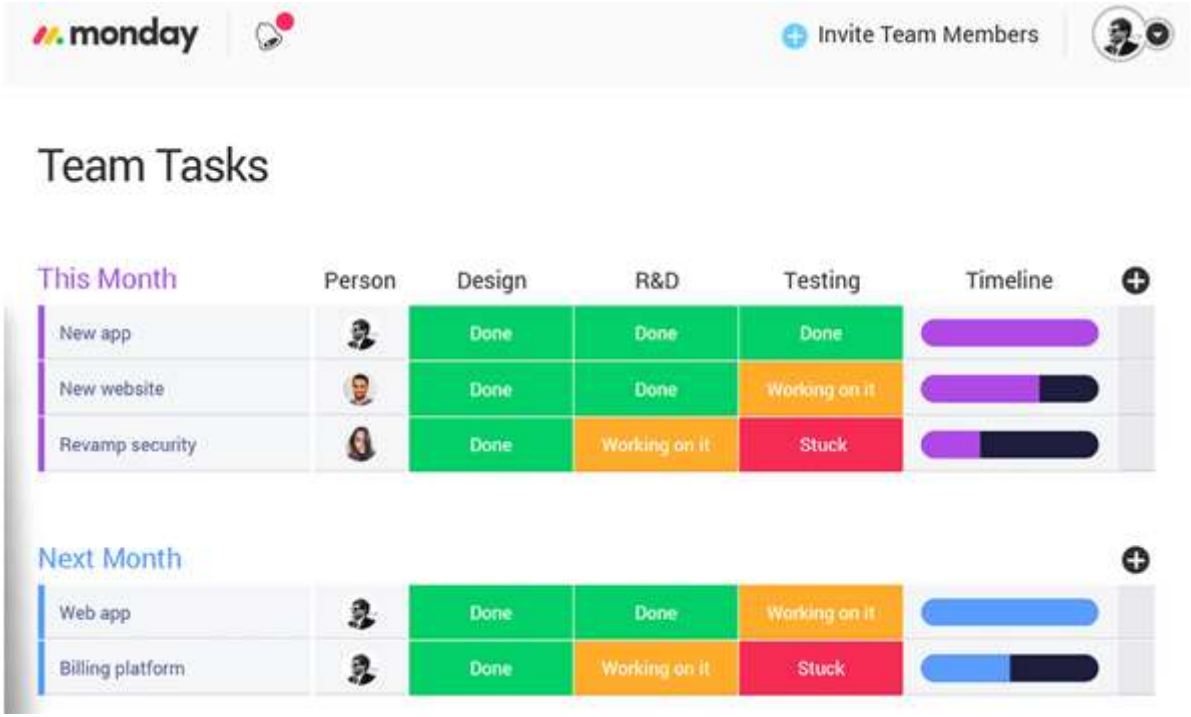
https://www.ntaskmanager.com/blog/what-is-kanban/

AGILE FAMILY:

MONDAY TOOL

Kanban tools

1. ProProfs Project
2. Trello
3. Monday
4. Hive
5. Hygger
6. Bitrix24
7. MeisterTask
8. Taskworld
9. Kanbanize
10. Productboard
11. Kanban One
12. Kanban Tool
13. Asana
14. LeanKit
15. KanbanFlow
16. Zoho Projects
17. Jira



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https://www.proprofsproject.com/blog/best-kanban-tools/

AGILE FAMILY:

EXTREME PROGRAMMING (XP)

It is a software development methodology.

XP is built upon values, principles, and practices, and its goal is to allow small to mid-sized teams to produce high-quality software and adapt to evolving and changing requirements.

To compare, Scrum doesn't dictate how developers do the work. XP, as mentioned, puts much emphasis on good programming practices.

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https://www.digite.com/agile/extreme-programming-xp/

METHOD BASED : THE CHANGE MANAGEMENT METHODOLOGIES

This methodology deals with planning for risks and taking control of change when it happens. Notable methods include:

Event chain methodology (ECM)

The methodology is prepared for risks of the project's outside scope risks, when unexpected outside events will impact your project's schedule, deliverables, and potentially its success.

Extreme Project Management (XPM)

Extreme project management (XPM) is ,the opposite of waterfall, to manage massive change to project completion. In XPM, you can alter the plan, budget, all finals to fit changes needs, no matter how far along the project is.

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https://www.digite.com/agile/extreme-programming-xp/

THE PROCESS-BASED METHODOLOGIES

Main types

Lean

Six sigma

Lean six sigma

Process-based project management

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THE PROCESS-BASED METHODOLOGIES

It is just a business process management (BPM). Types of methods

Lean

Lean is for cutting out waste based on the creation of a work process breakdown to identify and eliminate bottlenecks, delays.

Six sigma

Six sigma is a statistics-based methodology to help quality improvement of a process. It can delete the defects or bugs. A process can attain a six sigma rating if 99.99966% of the final product — means defect-free product.

Lean six sigma

means lean ("no waste!") and the quality improvement of six sigma ("zero defects!"), lean six sigma just eliminate waste then finals are defect free products: efficient, cost-effective.

Process-based project management

Process-based project management with strategic goal to define the process, metrics, methods, goals efficiently when these were in unstable situations.

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METHOD BASED METHODOLOGIES VS PROCESS-BASED METHODOLOGIES

Methodology

- Methods based
- Seldom end to end
- Project Document focused
- Based upon Standards
- Driven by Project Reporting
- Seldom updated
- Methodology integrated into Tools

Process

- Outcome based
- Typically end to end
- Product of the Project focused
- Based upon business needs
- Driven by Project Delivery
- Continuously updated
- Tools integrated into Process

Methods-Based vs Process-Based PMO

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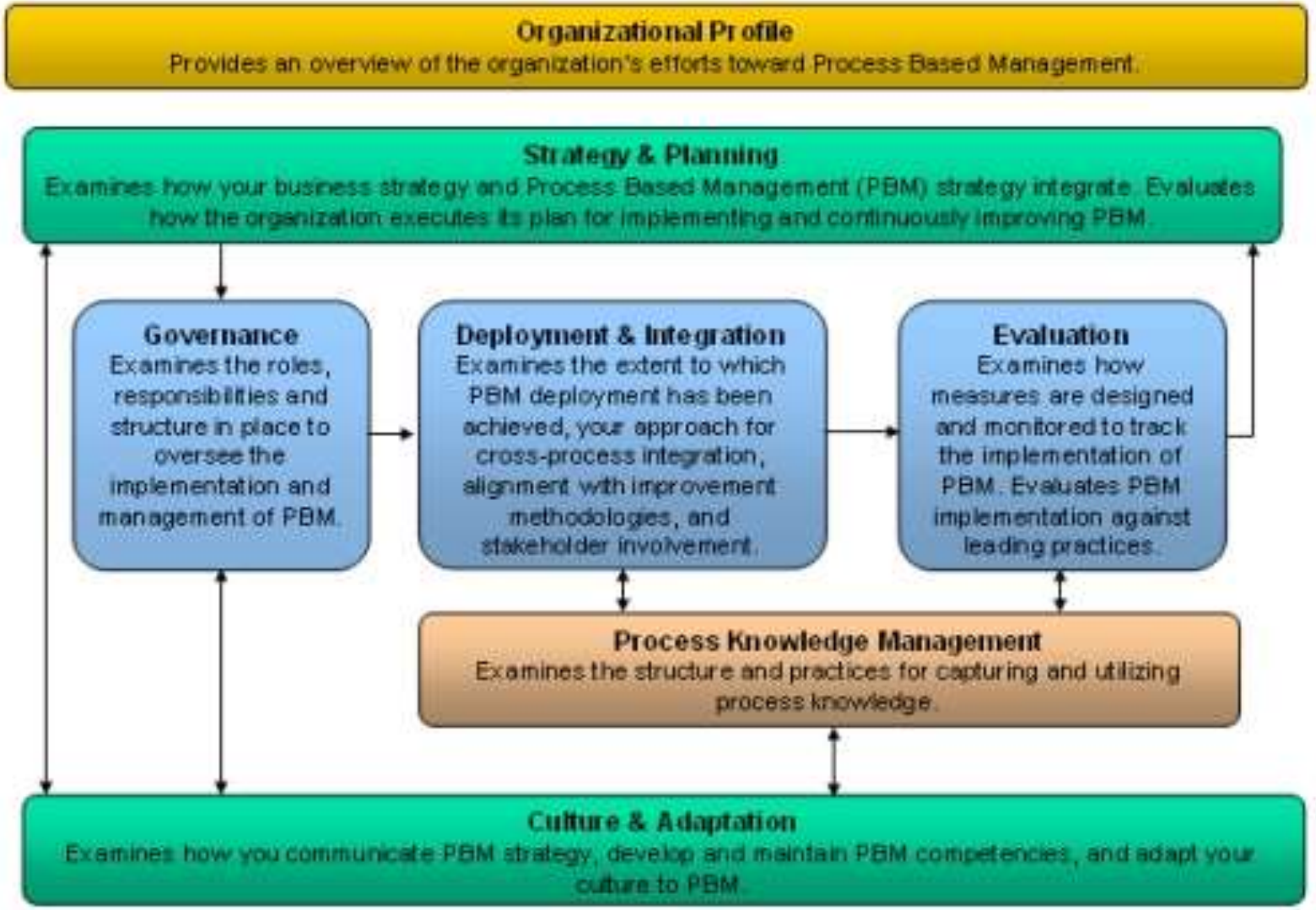
https://www.akratech.in/more-process-and-less-methodology/

THE PROCESS-BASED METHODOLOGIES



https://www.bpminstitute.org/resources/articles/starting-journey-towards-process-based-management

OTHER METHODOLOGIES

PRINCE2

PRINCE2 gives teams good control of resources and the ability to mitigate risk effectively and used by the UK government and characterized by a product-based planning approach. The board is in charge of high level activities for the business justification and resource allocation. A project manager is in charge of the lower level, day-to-day activities like scheduling.

PRiSM

PRiSM can manage the change with sustainability improvements into its processes to reduce a project negative environmental and social impact as a green project management.

Benefits realization

It focuses on whether your deliverables satisfy the benefits the customer expects, (also on time or within budget) provides real value to customers and stakeholders.

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https://www.wrike.com/project-management-guide/methodologies/

PRINCE2

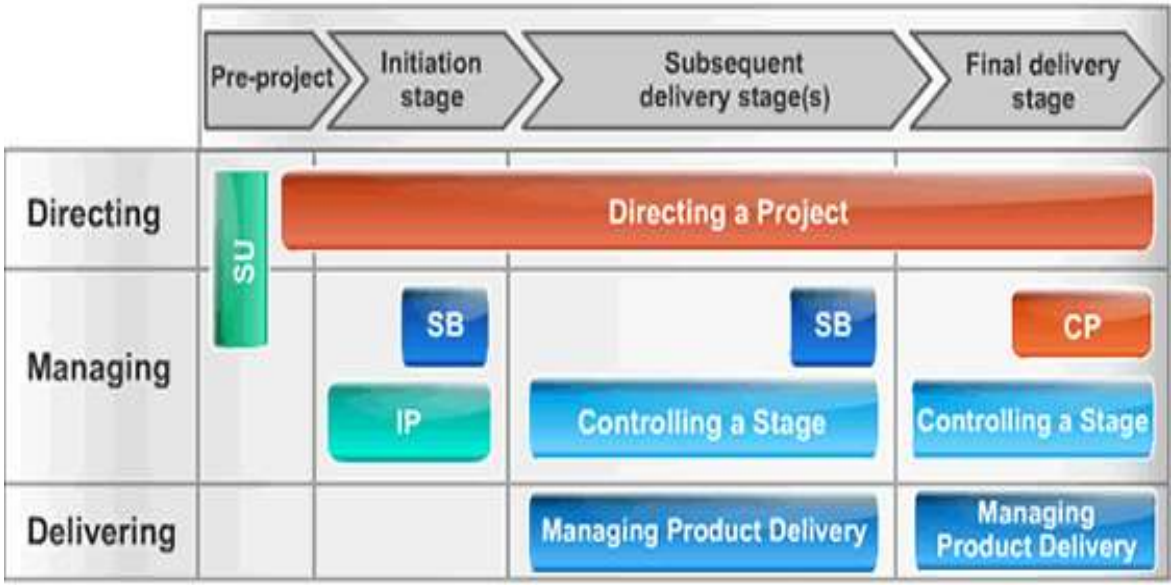
The key processes

Initiation (for starting the project off on the right foot)

Stage boundaries (for more resources after checking results so far)

Ad hoc direction (for monitoring progress, for advice and guidance, for exception situations)

Project closure



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https://www.prince2.com/uk/prince2-processes

THE PMBOK "METHOD"

Means the project management body of knowledge (PMBOK) method for managing projects.

This breaks down projects into the five process groups agreed upon by the Project Management Institute (PMI) and documented in the Guide to the Project Management Body of Knowledge (PMBOK). The five stages include:

Initiating
Planning
Executing
Controlling
Closing

PMBOK guide

has processes, best practices, terminologies, and guidelines that the project management industry accepts as standards.
You'll find it documented in the link, https://www.pmi.org/pmbok-guide-standards/foundational/PMBOK

A Guide to the Project Management Body of Knowledge (PMBOK Guide), compiled and overseen by the Project Management Institute (PMI).

The PMBOK Guide provides project managers with guidelines and best practices.

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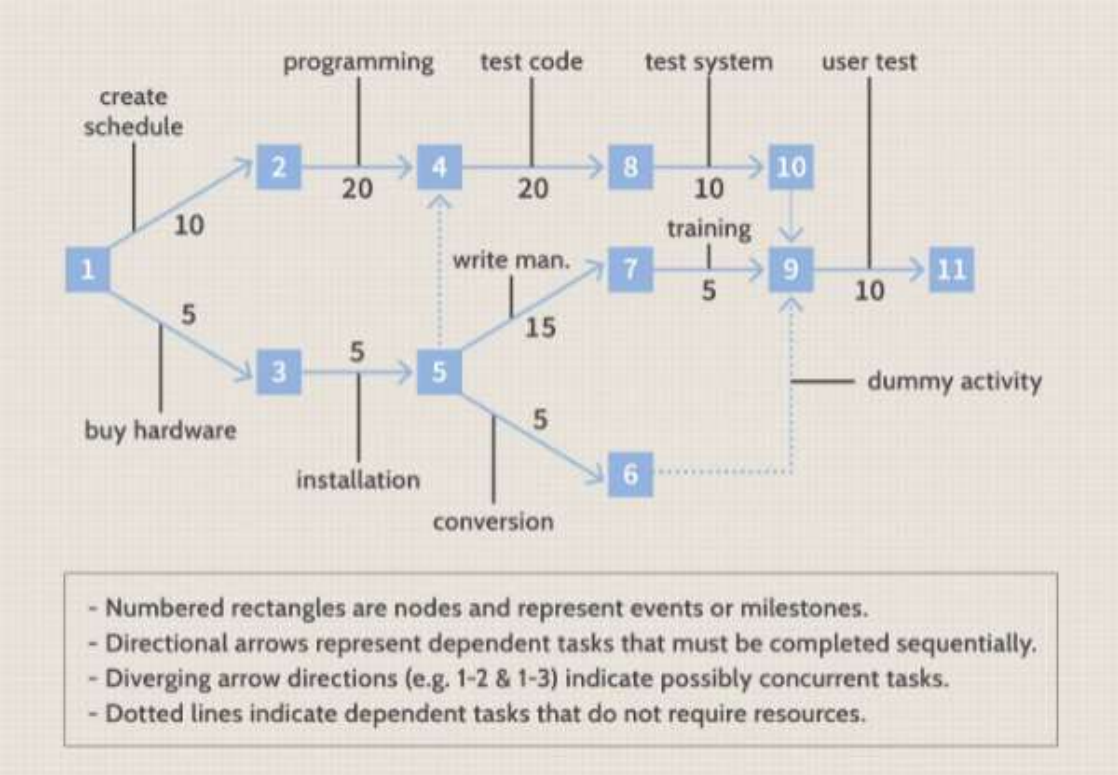
https://www.pmi.org/pmbok-guide-standards/foundational/PMBOK

THE PMBOK "METHOD"

https://www.softexpert.com/solucao/pmbok/

PROGRAM EVALUATION REVIEW TECHNIQUE (PERT) CHART

A PERT chart provides a graphical representation of a timeline. The Program Evaluation Review Technique (PERT) breaks down the individual tasks of a project for analysis. PERT charts are considered preferable to Gantt charts because they identify task dependencies, but they're often more difficult to interpret.



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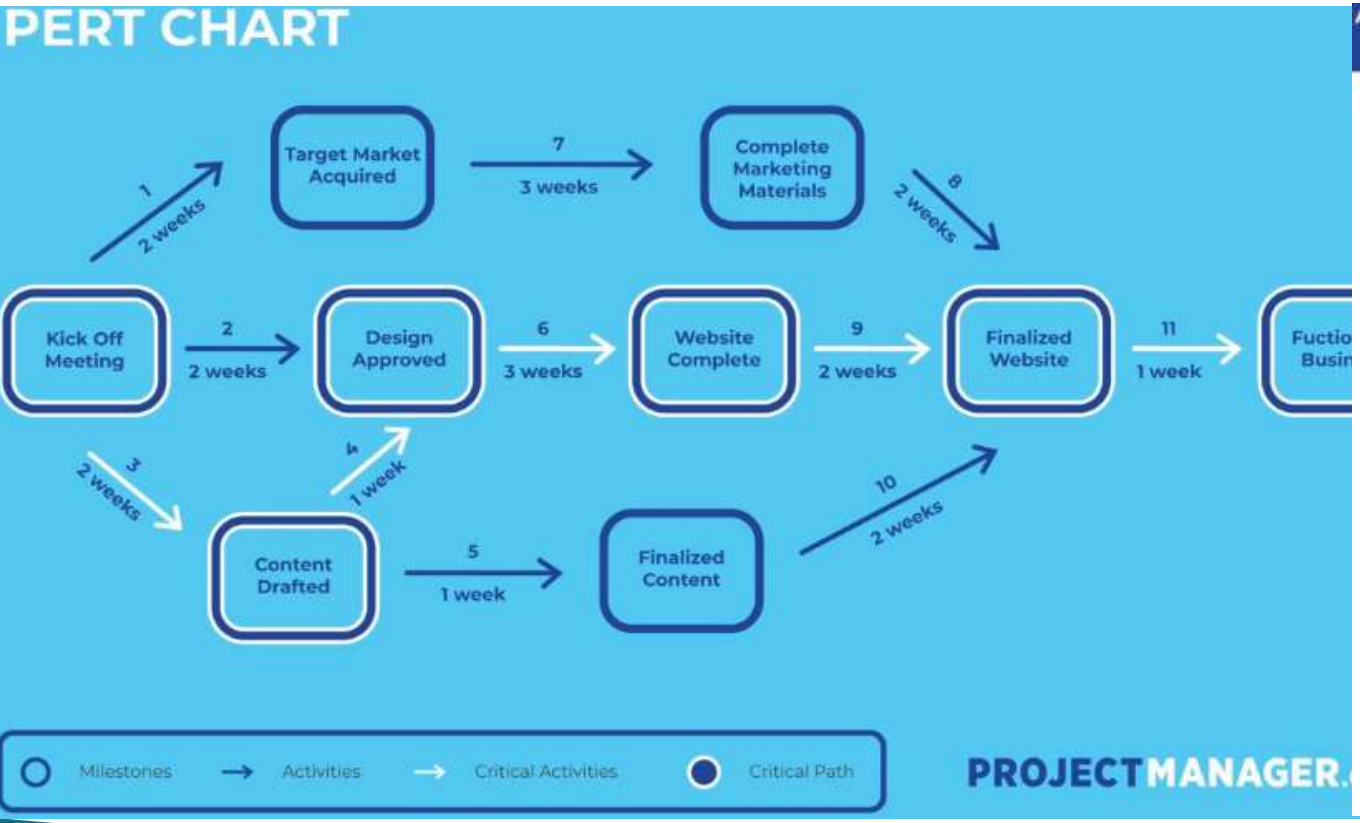
https://www.investopedia.com/terms/p/pert-chart.asp

EXAMPLE: PROGRAM EVALUATION REVIEW TECHNIQUE (PERT) CHART

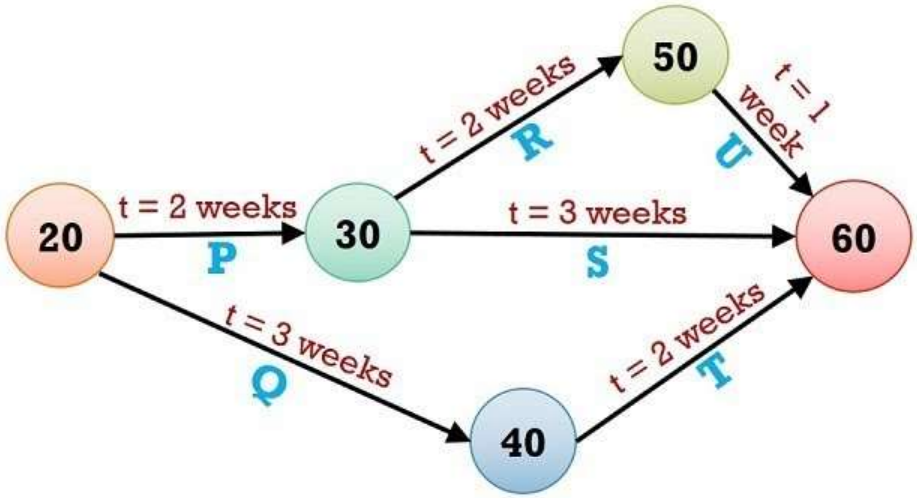


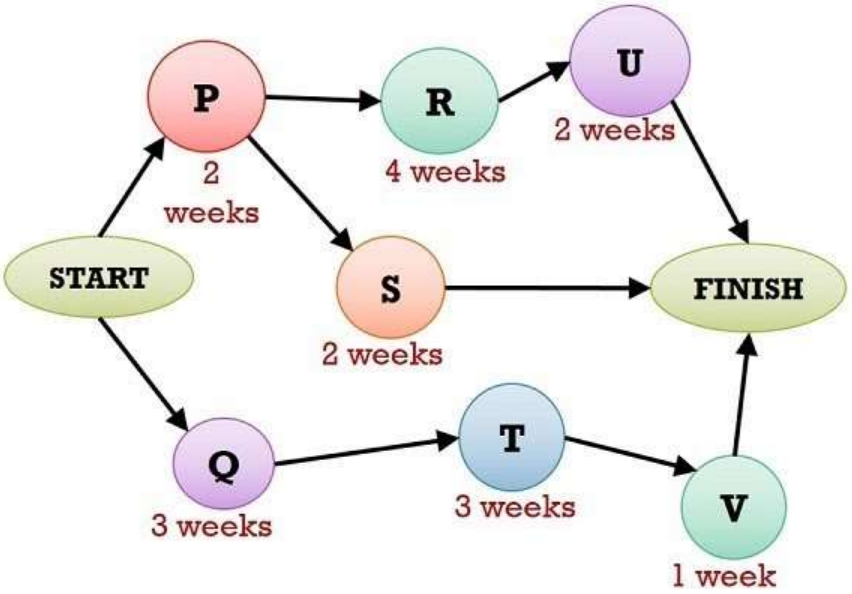
Activity	Description	Predecessor
0	Kick Off Meeting (Start)	-
1	Identify Market	-
2	Design Site	-
3	Create Content	-
4	Submit Content	3
5	Edit Content	3
6	Build Site	2, 4
7	Develop Marketing	1
8	Marketing Push	7
9	Test Site	6
10	SEO Work	5
11	Launch	8, 9, 10

Nodes: Arrows: PERT Event: Slack: Critical Path: Critical Path Activity: Critical Path Method: Lead Time:
Lag Time: Fast Tracking: Crashing Critical Path: Predecessor:

https://www.projectmanager.com/pert-chart

PERT Vs CPM





Key Differences

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https://www.youtube.com/watch?v=dFTG3ohAcso

THE UNIFIED MODELING LANGUAGE™ (UML)

UML: “Unified Modeling Language”

- UML is a graphical modeling tool based on object oriented concepts.
- UML is termed as a “Visual Modeling Language’.
- UML is used for modeling software systems
- UMl is an industry standard graphical language for specifying, visualizing, constructing, and documenting the artifacts of an object oriented system under development.
- UML expresses the OO analysis to design software projects.
- UMl simplifies the complex process of software design

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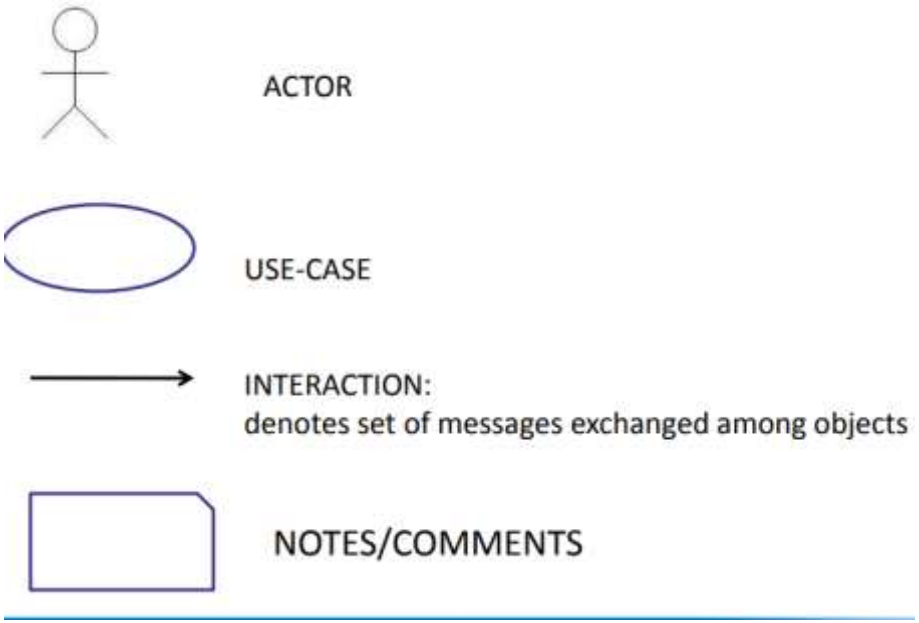
THE UNIFIED MODELING LANGUAGE™ (UML)

UML: "Unified Modeling Language" its key components:

- Views: different faces of the system and links with the process
- Diagrams: the graphs that explain the contents of view.
- ***Model Elements:*** within the diagrams.

• Main UML Diagrams

- Use case diagram
- Class diagram
- State diagram
- Object diagram
- Sequence diagram
- Collaboration diagram
- Component diagram
- Deployment diagram
- Activity diagram



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http://campar.in.tum.de/twiki/pub/Chair/TeachingWs10CPP/SoftwareProjectManagementandUML.pdf

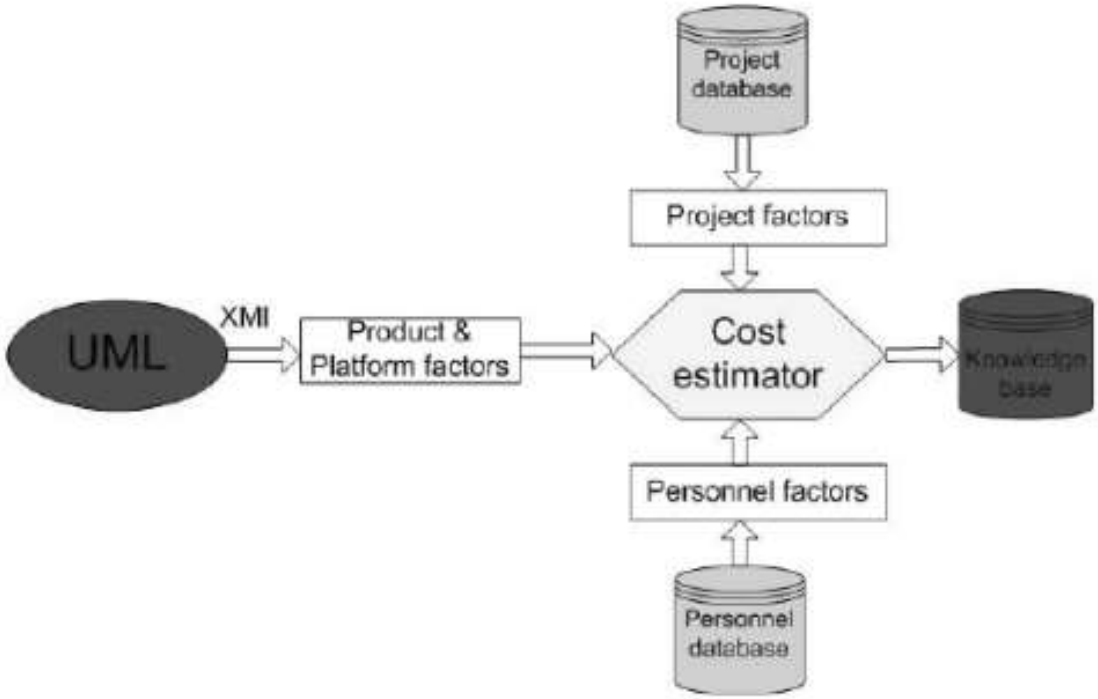
https://www.researchgate.net/publication/250894163_UML_BASED_SOFTWARE_PROCESS_MANAGEMENT

GENERAL WAY OF PROJECT COST ESTIMATION BASED ON UML

3 sources for a project:

1. Project database
2. Personnel database
3. UML based models

The product and the platform related factors from UMLbased models.
The result of the cost estimation is usually stored in a knowledge base. This database can serve as a starting point for ongoing cost estimations.



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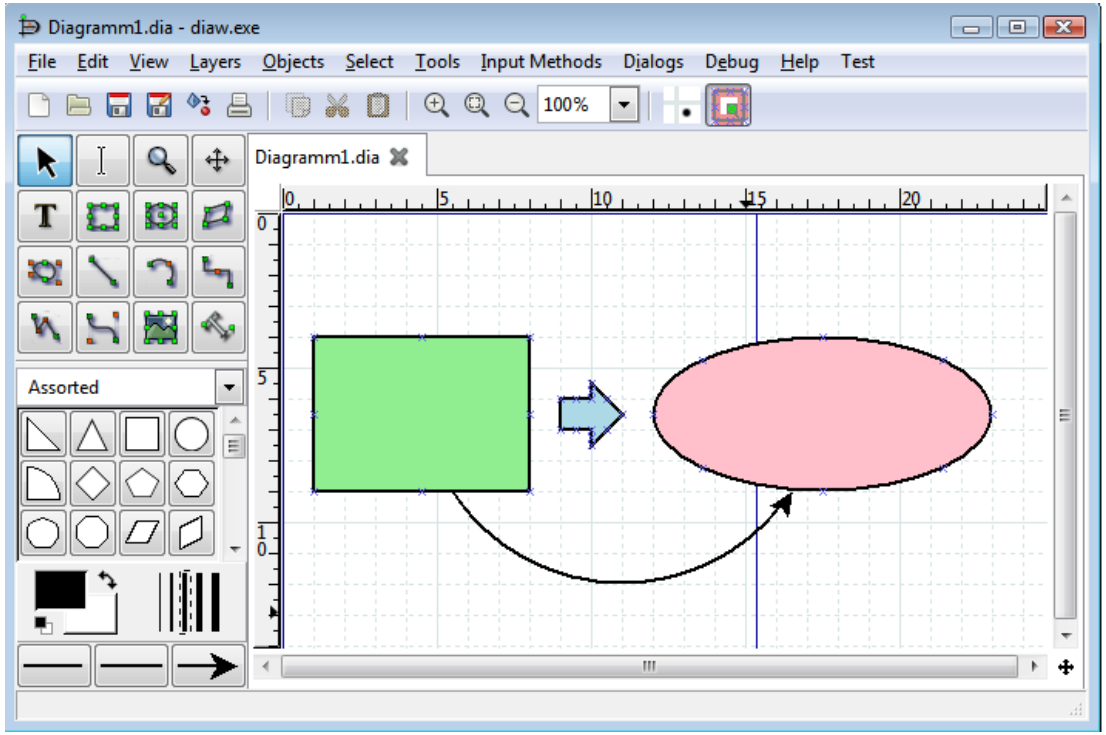
https://www.researchgate.net/publication/250894163_UML_BASED_SOFTWARE_PROCESS_MANAGEMENT

UML DIAGRAMS IN DIA FOR PROJECT MANAGEMENT

Dia helps to draw entity-relationship models, Unified Modeling Language (UML) diagrams, flowcharts, network diagrams, and simple electrical circuitsfor project mangaemn area

Dia (/ˈdiːə/)[3] is free and open source general purpose diagramming software.



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https://www.eg.bucknell.edu/~cs475/F04-S05/UMLTutorial.pdf

HOW TO CHOOSE THE RIGHT PROJECT MANAGEMENT METHODOLOGY

A. Start with the end in mind

Take a look at your requirements, project goals, and objectives.
What does your final deliverable need to look like?
What benefits should it provide? For example,

If it's a software product or app, try a flexible Agile methodology
If environmental sustainability is a core value for you, try PRiSM.
If you need rapid development with a minimum viable product, try process-based methodologies such as lean or lean six sigma

B. Assess what's already working

Look at the processes you already have in place that have proven successful for your team.

If they thrive on collaboration, incorporating new ideas as they work, try methodologies such as Scrum, Kanban, XP, or APF.
If you prefer to use orderly, structured plan for tasks sequentially, then, try methodologies such as waterfall, critical path, and critical chain project management.

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http://campar.in.tum.de/twiki/pub/Chair/TeachingWs10CPP/SoftwareProjectManagementandUML.pdf

HOW TO CHOOSE THE RIGHT PROJECT MANAGEMENT METHODOLOGY

Agile	Kanban	Lean	Waterfall	Six Sigma
Agile project management methodology provides flexible, iterative design and build process.	Tasks are represented visually on a board, allowing team members to see the state of every piece of work at any time.	Lean is a problem-solving tool for eliminating wastes and removing wasteful activities that don't add value to the process.	Waterfall provides a simple framework for planning projects. Tasks are in sequential order. The team completes one task or step then performs the next step	Six Sigma is a method that provides organizations tools to improve the capability of their business processes.

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