



# Project Management

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  - Risk Management
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# I) Introduction



# What is a Project?



Temporary endeavour undertaken to create a  
unique product, service, or result

# Why Project Management?



On-time delivery  
of project



Meeting goals  
(all stakeholders)

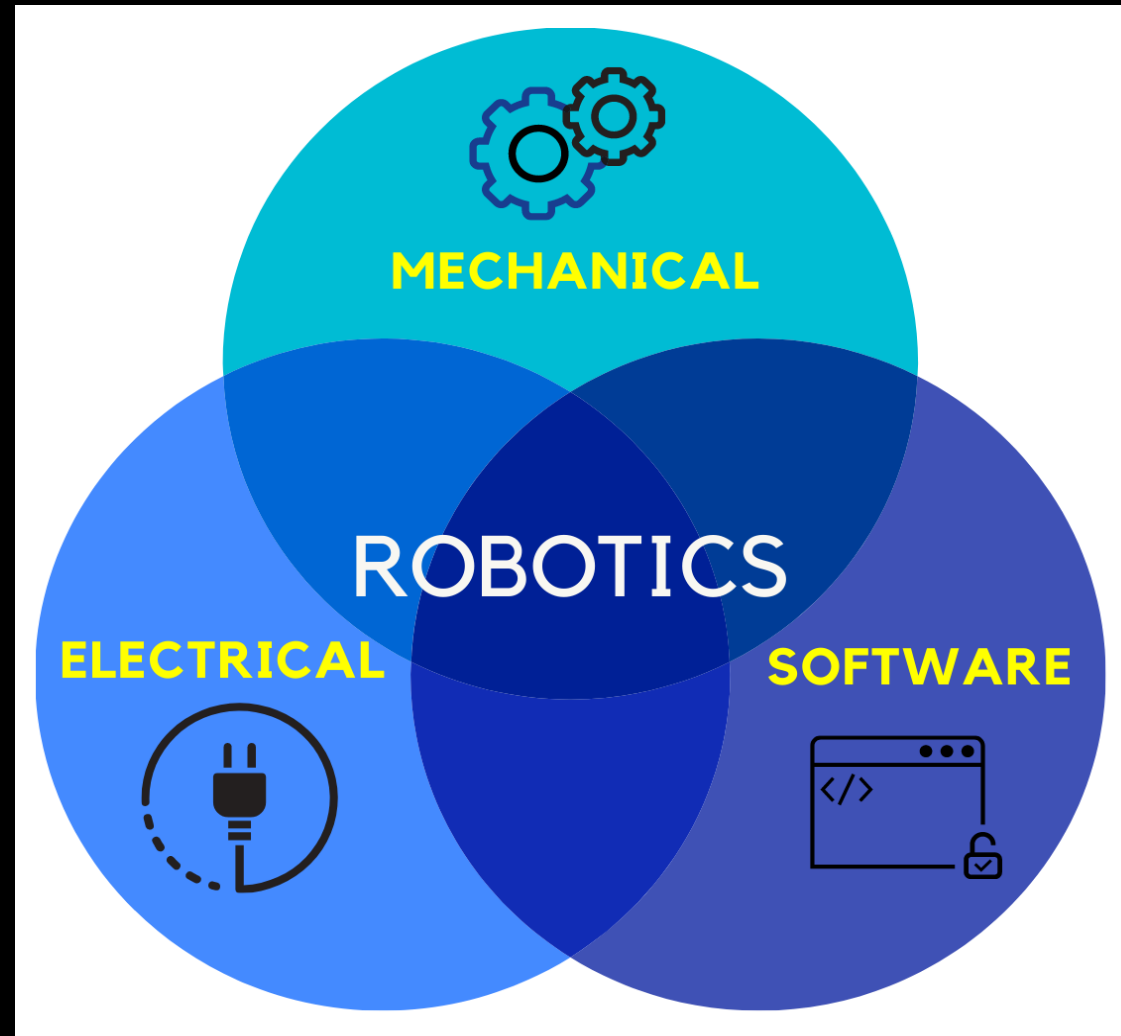


Coordinating effort



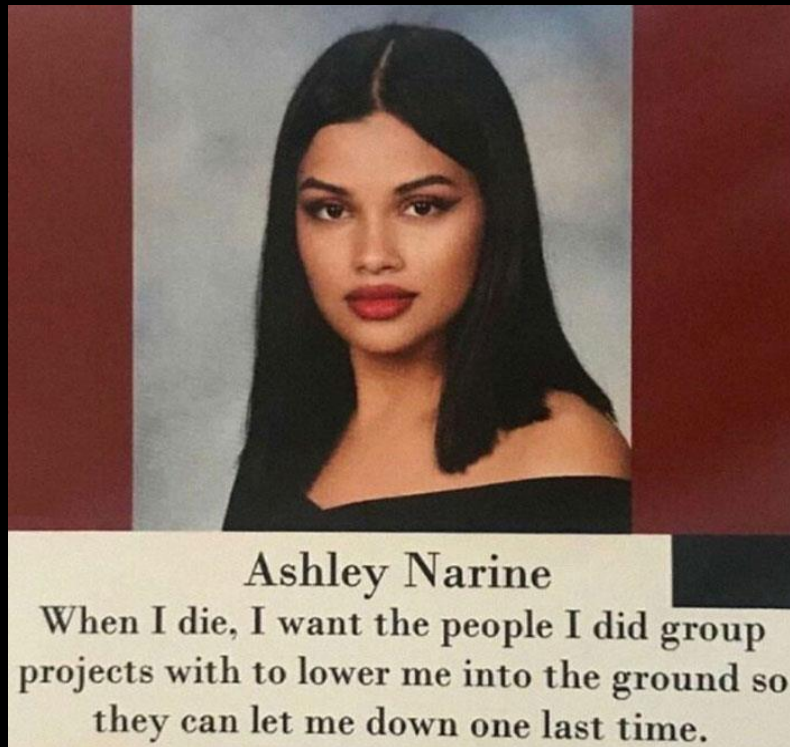
Task prioritization

# Interdisciplinary Nature of Robotics





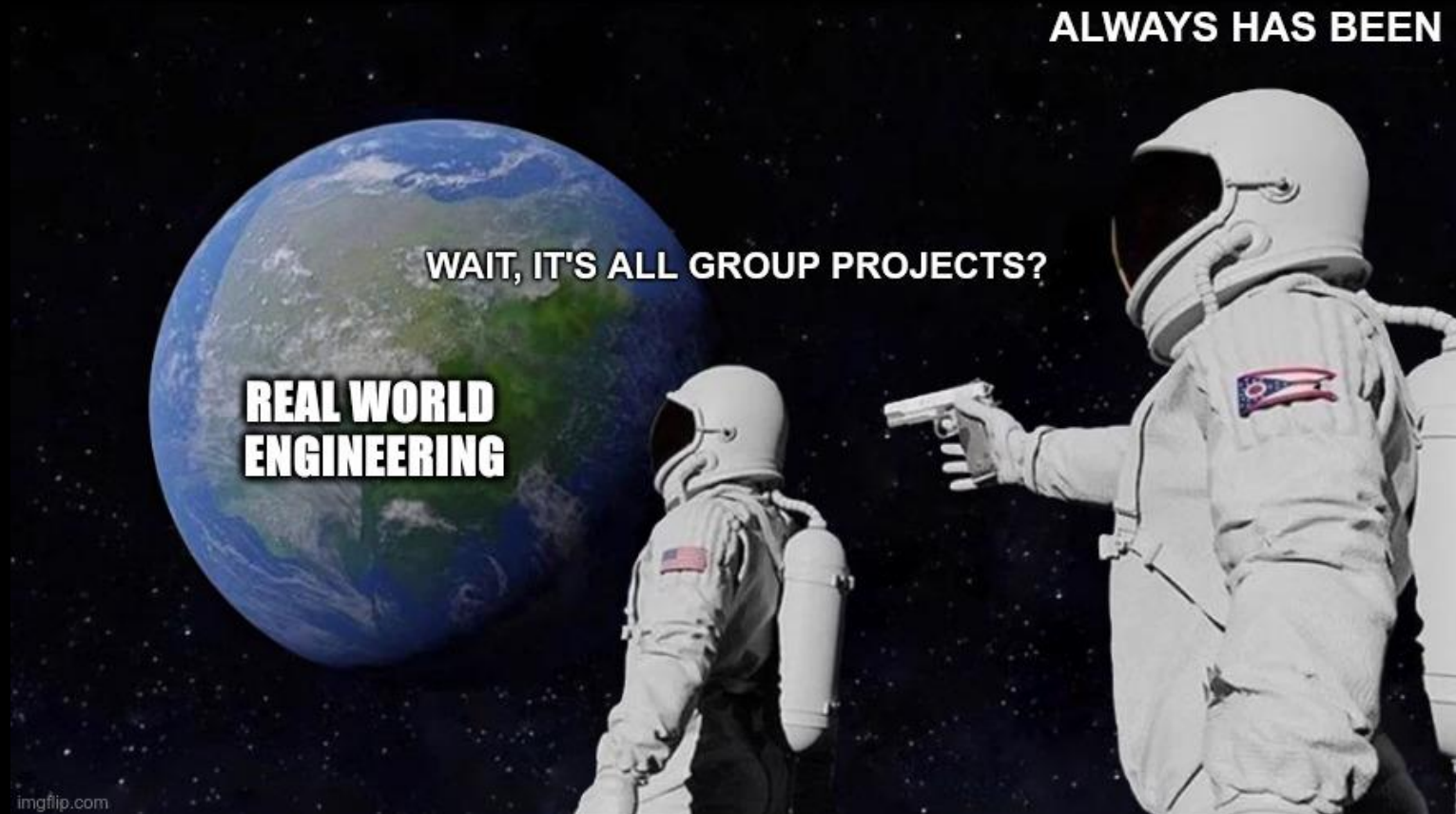
And to prevent these...



## Every Group Project Ever



And because...

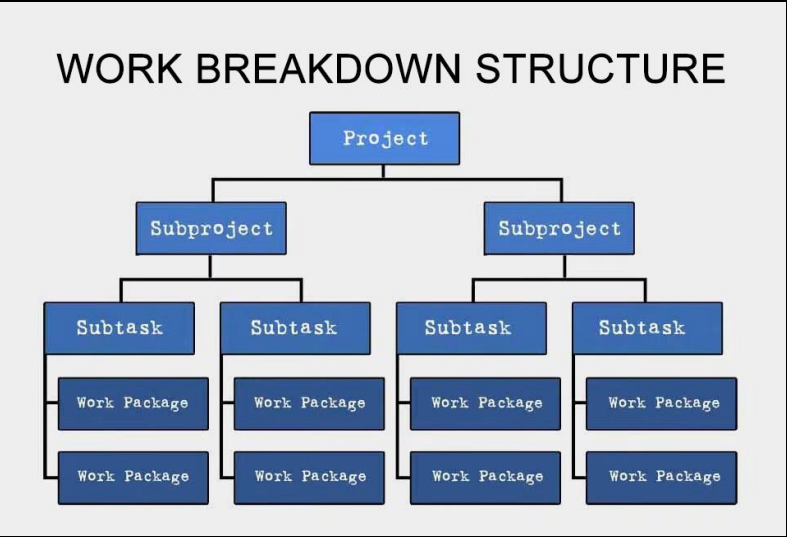






## II) Components

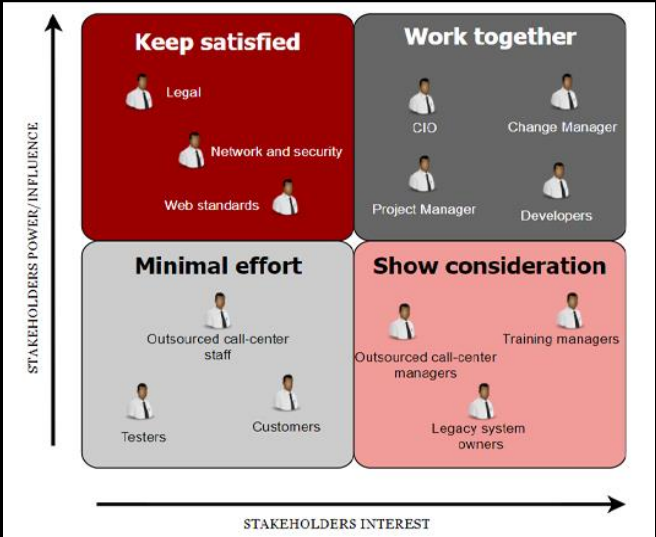
# Components of Project Management



Work Breakdown  
Structure



Risk  
Management



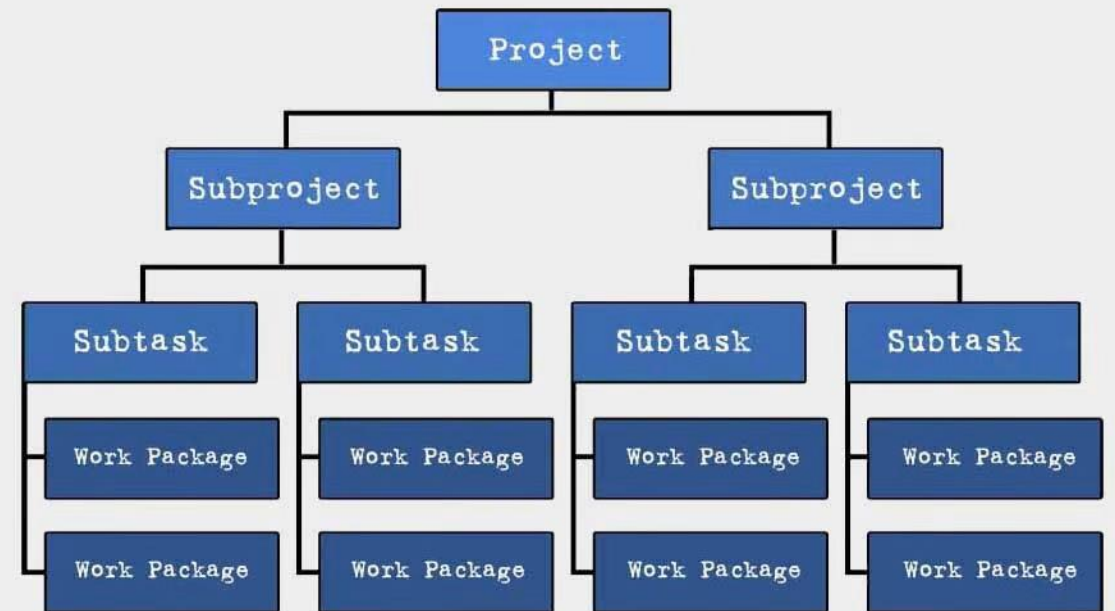
Stakeholder  
Analysis



## II) Components

# Work Breakdown Structure

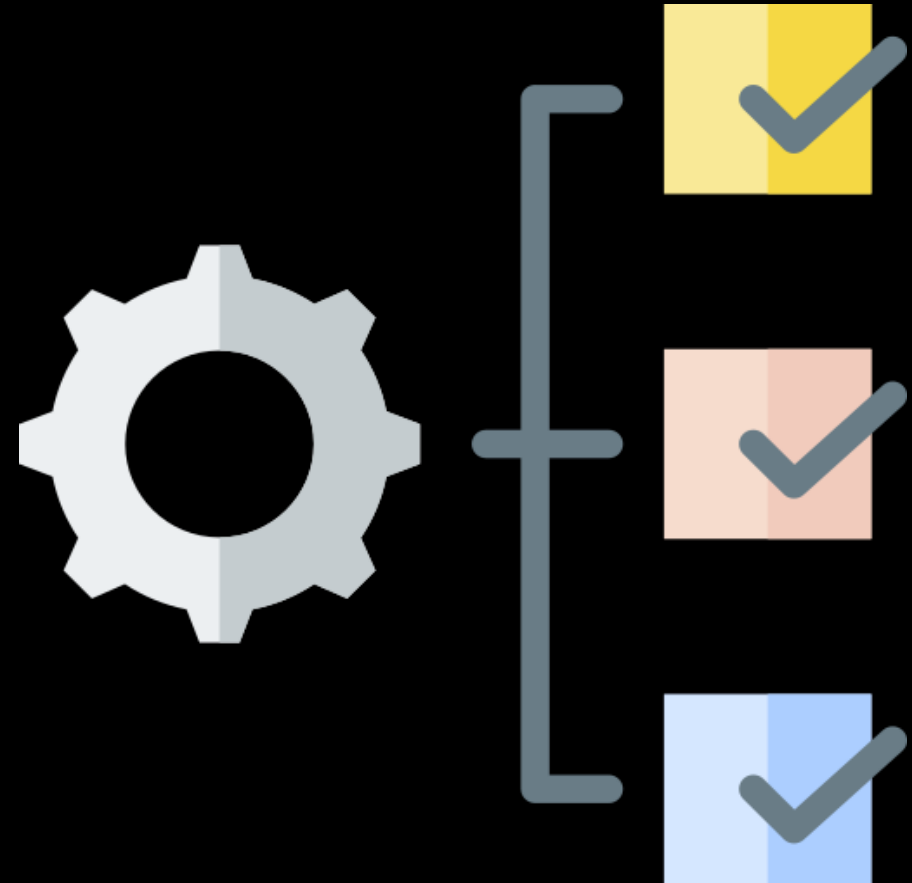
### WORK BREAKDOWN STRUCTURE



# Work Breakdown Structure (WBS)



- Core of project management
- Definition:
  - Deliverable oriented
  - Hierarchical decomposition of work to be executed
  - Each level defines greater detail of project work
- Objective
  - Organize and define total scope of project



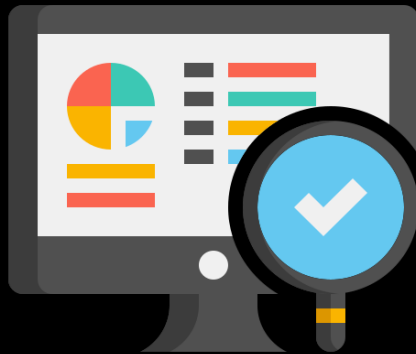
# Properties of Work Package



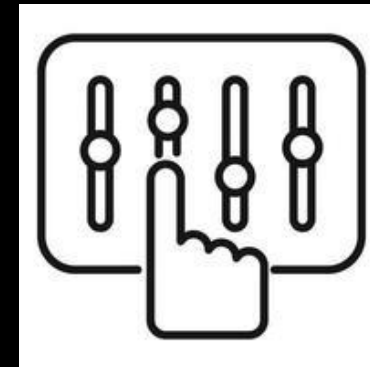
Scheduled



Cost-Estimated



Monitored



Controlled



# Composition of Work Package

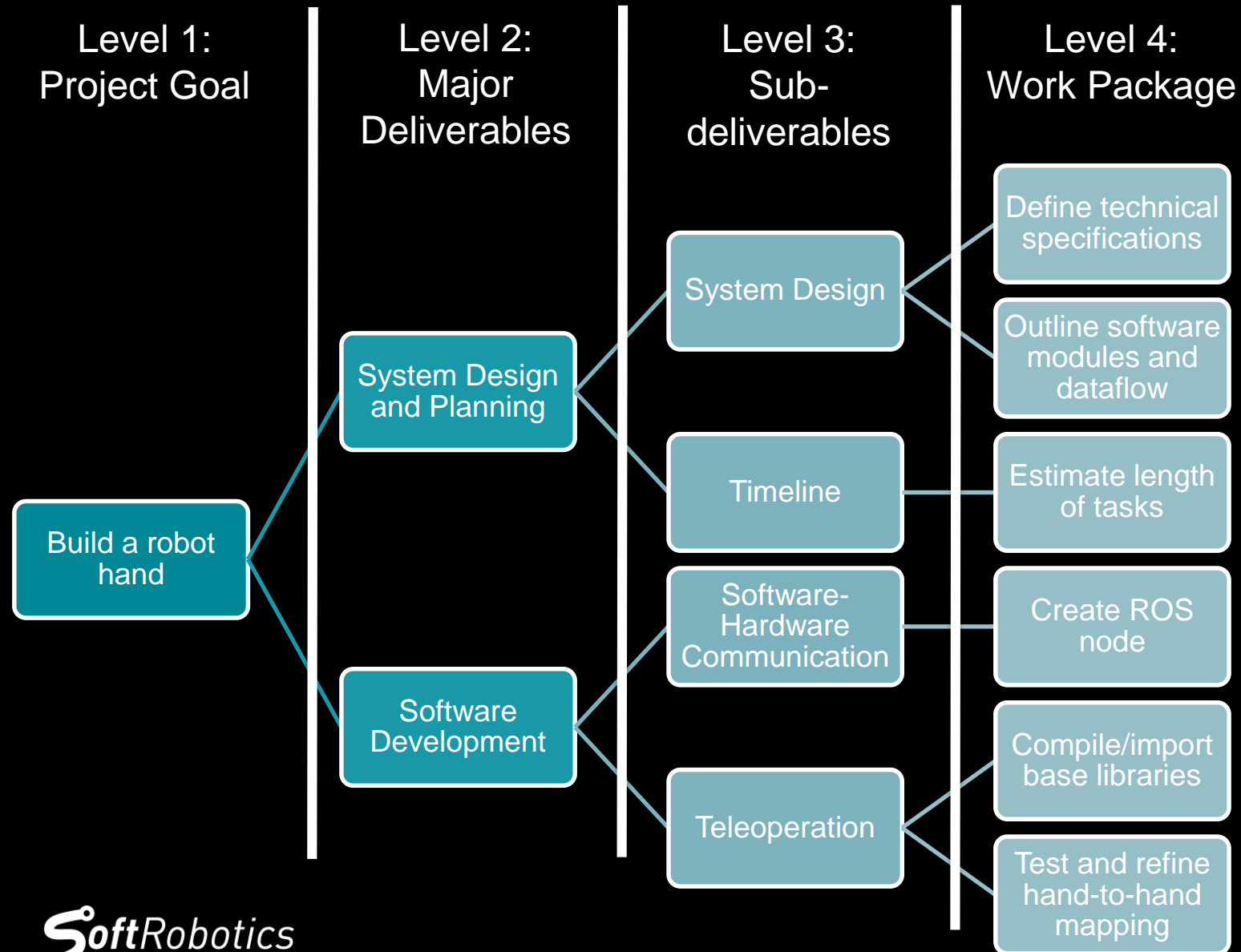


Product Breakdown Structure  
(noun/product)



Activity Breakdown Structure  
(verb/activity)

# Example



# Example



## Define a Work Package





## II) Components

# Risk Management





# Risk Management

- Process of identifying, assessing, and controlling for potential problems that could impact successful completion of project
- Why
  - o Minimizes surprises
  - o Protects resources
- *Relevant for innovative and R&D projects*





# Procedure



		Risk Assessment Matrix			
		Severity			
		Catastrophic - 4	Critical - 3	Marginal - 2	Negligible - 1
Probability	Frequent - 4	High (16)	High (12)	Serious (8)	Medium (4)
	Probable - 3	High (12)	Serious (9)	Serious (6)	Medium (3)
	Remote - 2	Serious (8)	Serious (6)	Medium (4)	Low (2)
	Improbable - 1	Medium (4)	Medium (3)	Low (2)	Low (1)

# Example



Situation	Probability	Severity	Total	Mitigation/Solution
Team member dropping out of course	1	3	3	<ul style="list-style-type: none"><li>- Ensure that multiple people understand each other's work</li><li>- Document extensively</li></ul>
A servo motor breaks	2	3	6	<ul style="list-style-type: none"><li>- Implement limits on system (ex. current)</li><li>- Design system in way to quickly replace motors</li><li>- Have backup motors</li></ul>
Team becomes hungry	4	4	16	<ul style="list-style-type: none"><li>- Have snacks on hand</li><li>- Go eat ASAP</li></ul>



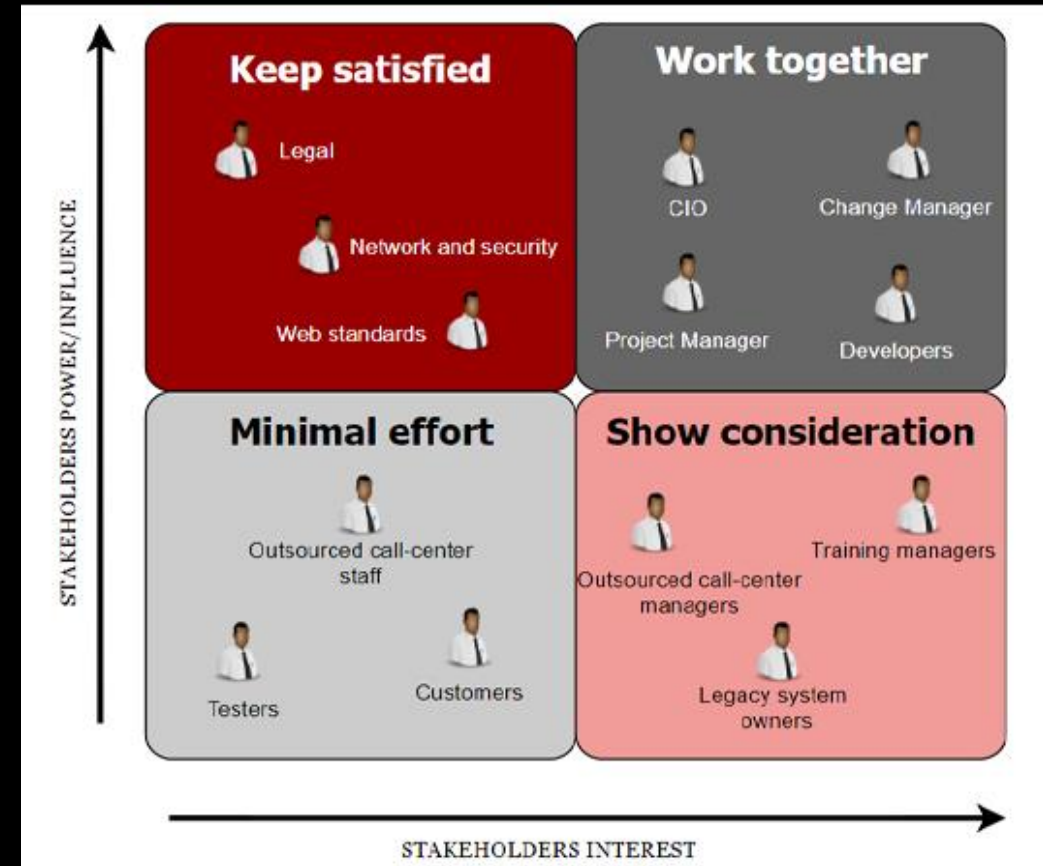
## Perform Risk Assessment





## II) Components

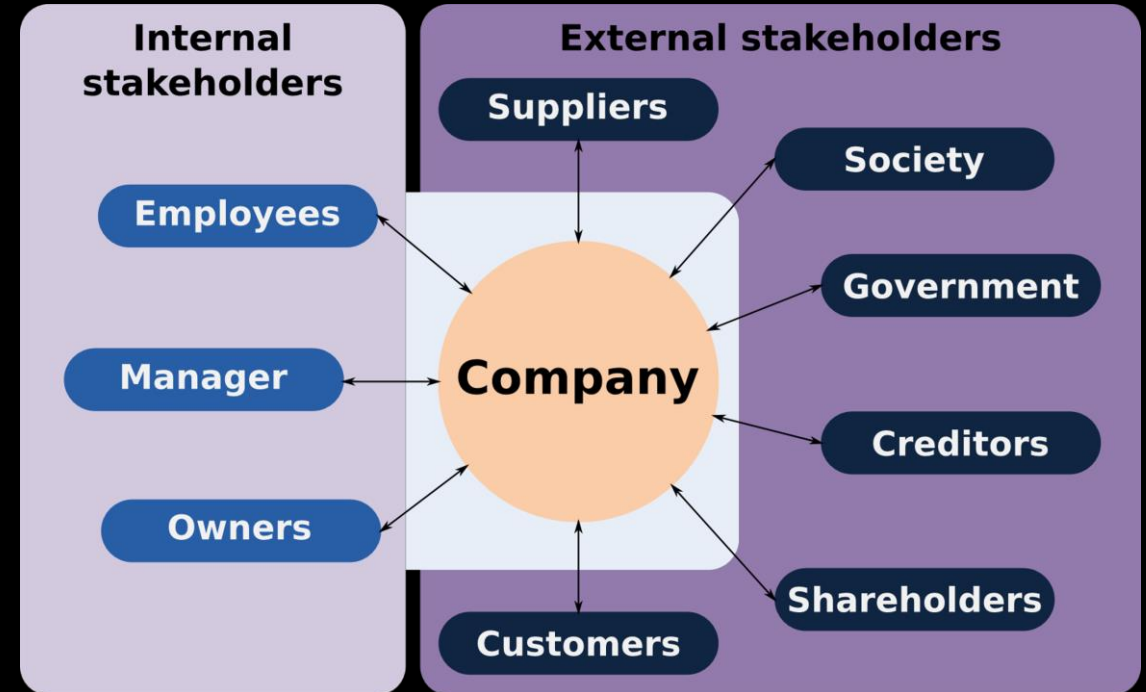
# Stakeholder Analysis





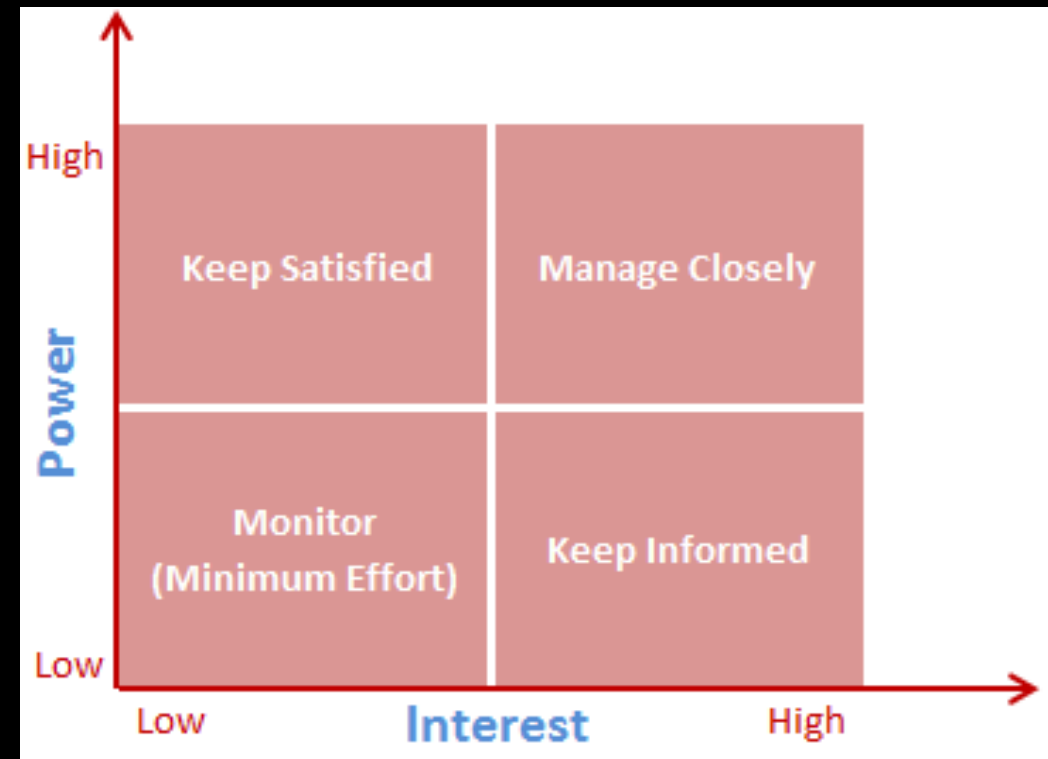
# Stakeholder Analysis

- Identifying and understanding people, groups, or organizations that can or are affected by outcomes of a project and addressing their needs and concerns
- Why
  - Manages expectations
  - Enhances support
  - Reduces risks





# Procedures



Stakeholder Interest/Influence Grid

# Example



Stakeholder(s)	Power	Interest	Action	Strategy
RWR Course Staff	HIGH	HIGH	Manage closely	<ul style="list-style-type: none"><li>- Have preparations ready during check-points</li><li>- Raise questions and concerns to staff</li></ul>
Mentors/advisors	LOW	HIGH	Keep informed	<ul style="list-style-type: none"><li>- Share updates about project</li></ul>
Flat mate(s)	LOW	LOW	Monitor (minimum effort)	<ul style="list-style-type: none"><li>- Have a meal together</li><li>- Be kind</li></ul>



## Perform Stakeholder Analysis

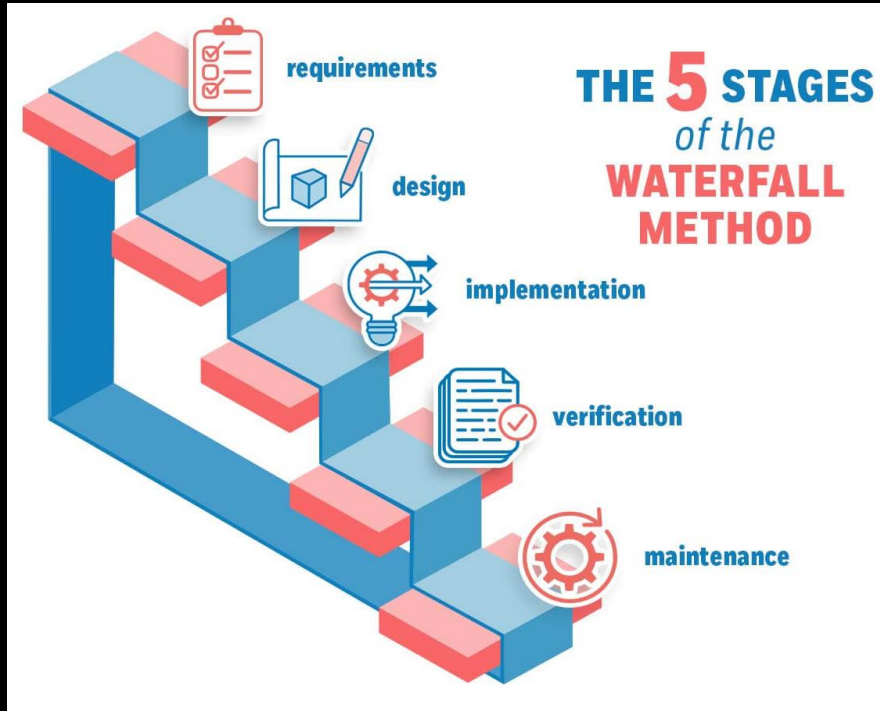




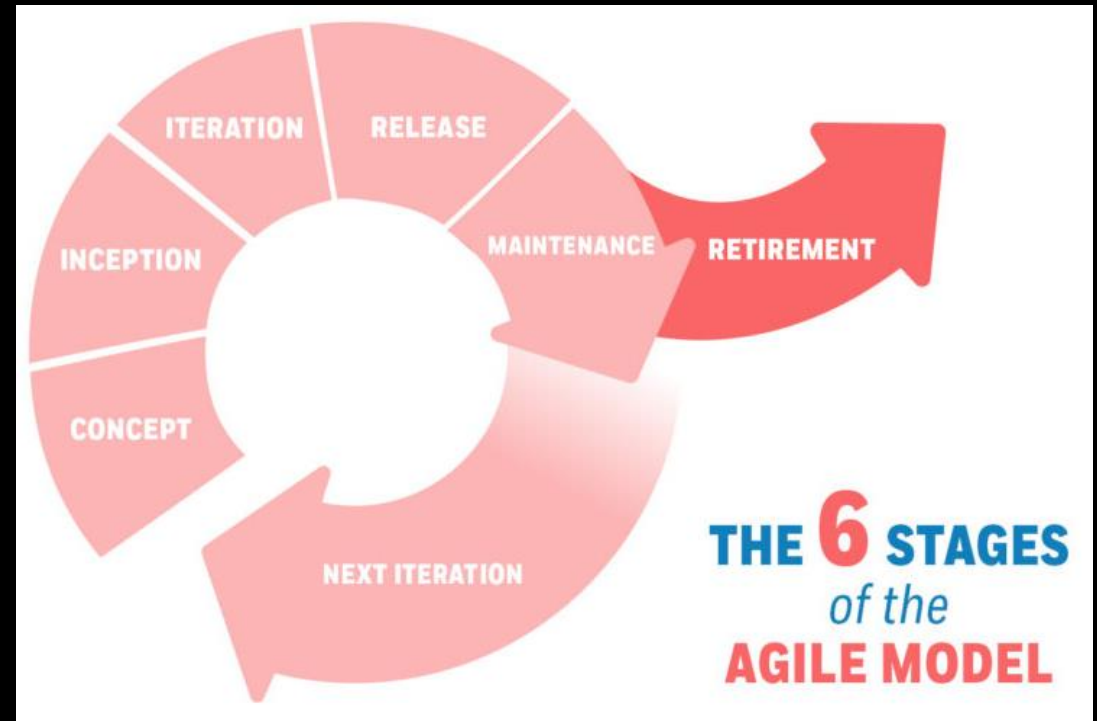
## II) Methodologies



# Methodologies



Waterfall



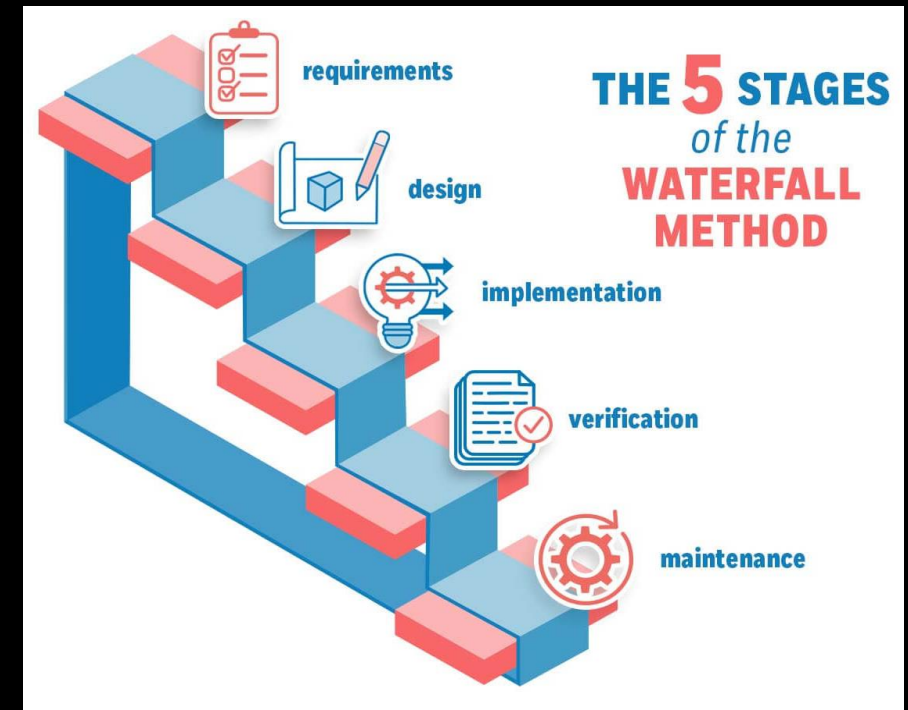
Agile



# Waterfall



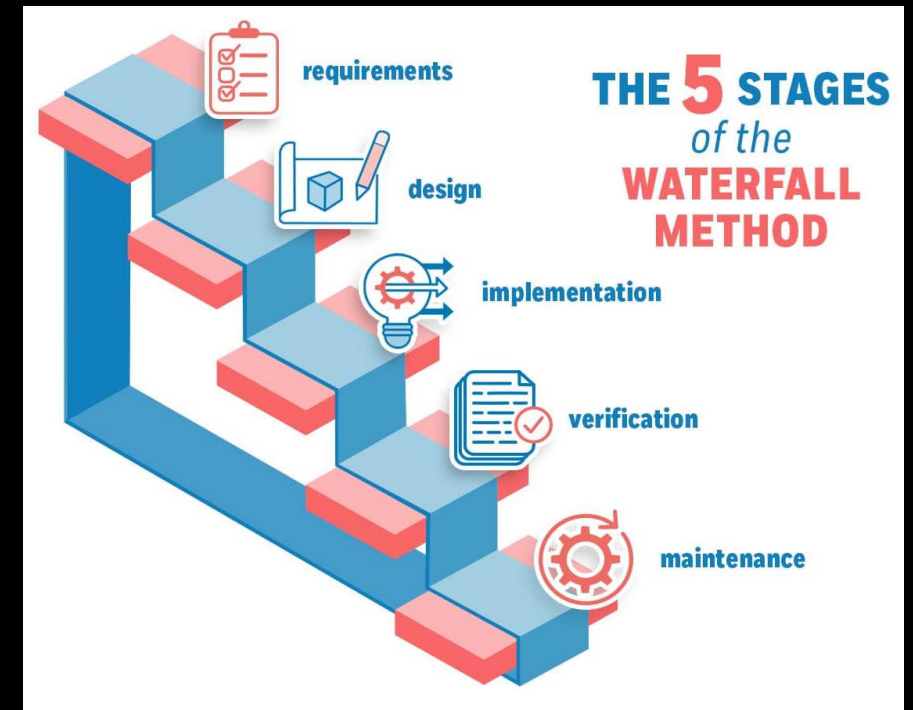
- Linear and sequential
- Use cases:
  - o Construction
  - o Defense and space projects



# Waterfall: Pros and Cons



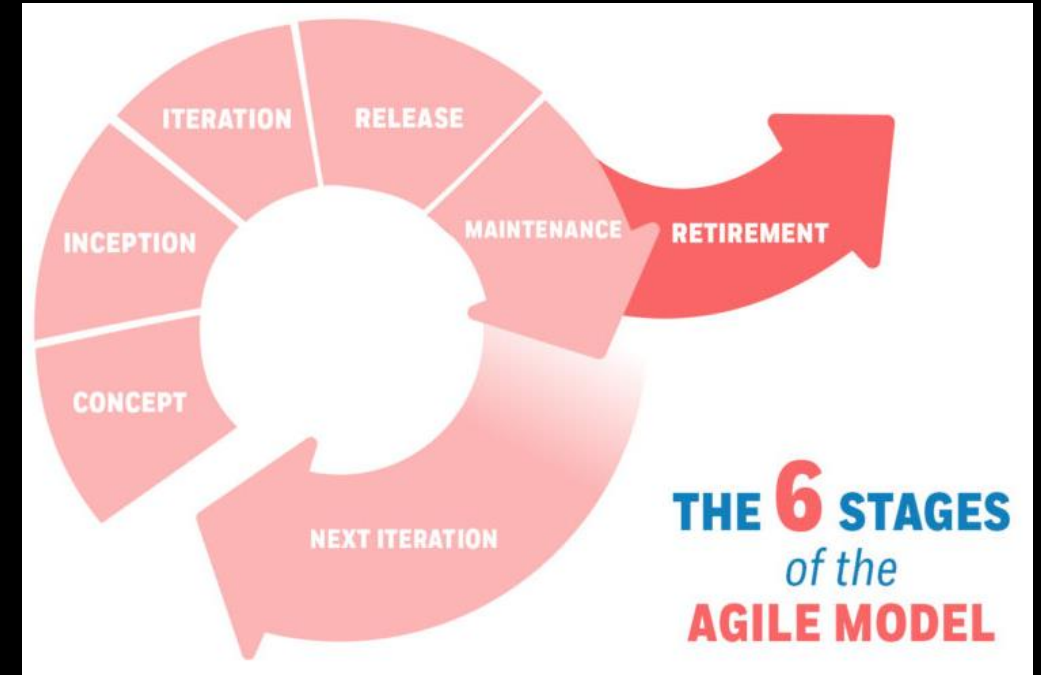
Pros (+)	Cons (-)
Less coordination needed	Harder to break up and share work
Clearly defines dependencies of work	Issues during phase transition (communication, delays)
Easier to estimate cost of project	More hiring for specialized roles



# Agile



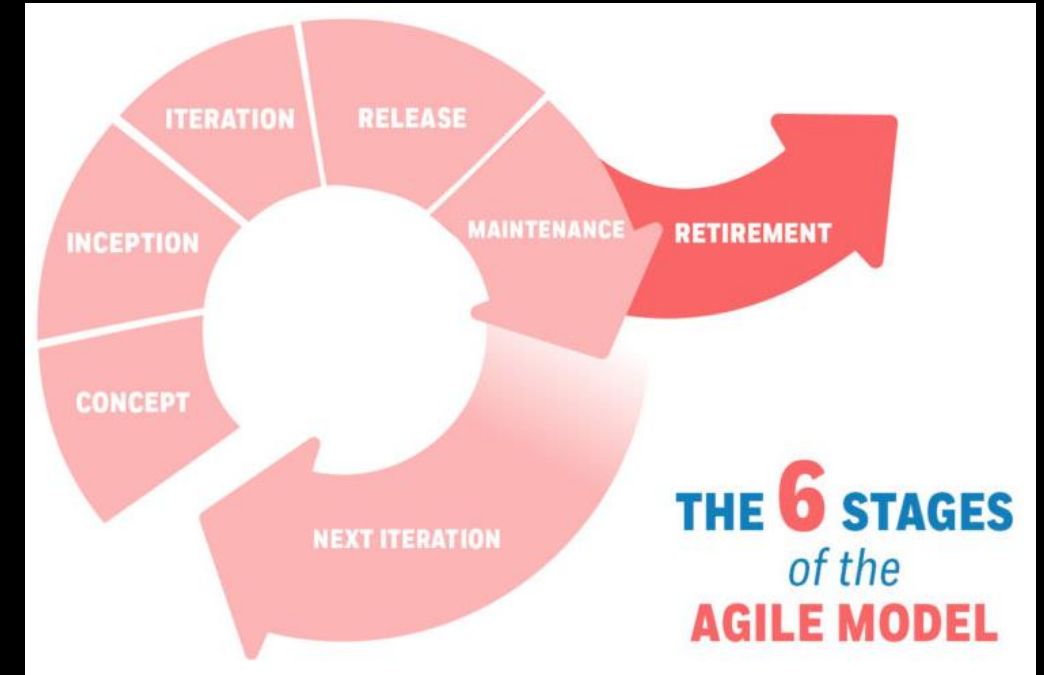
- Incremental and interactive
- Use cases:
  - o Software Development
  - o R&D projects



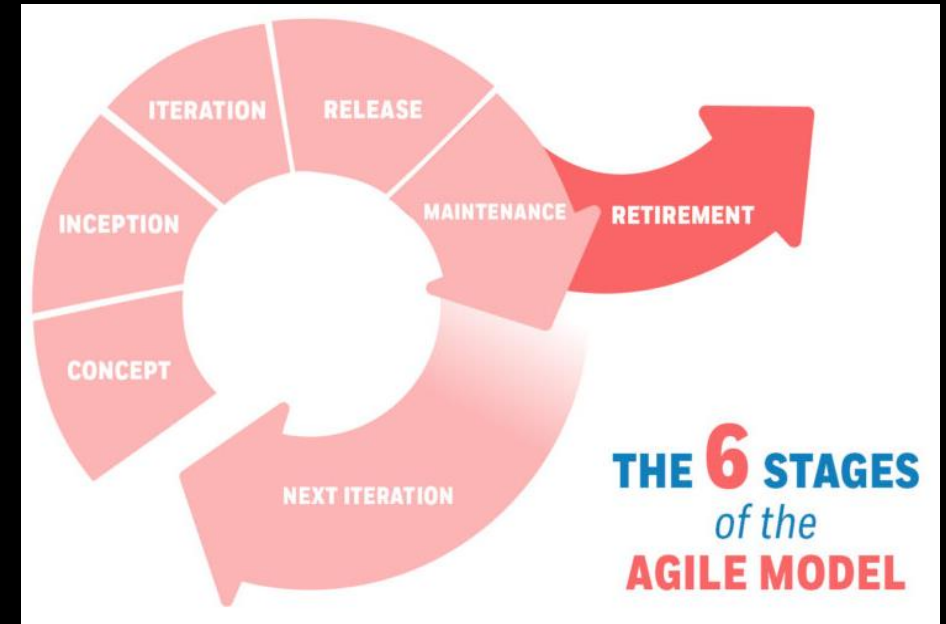
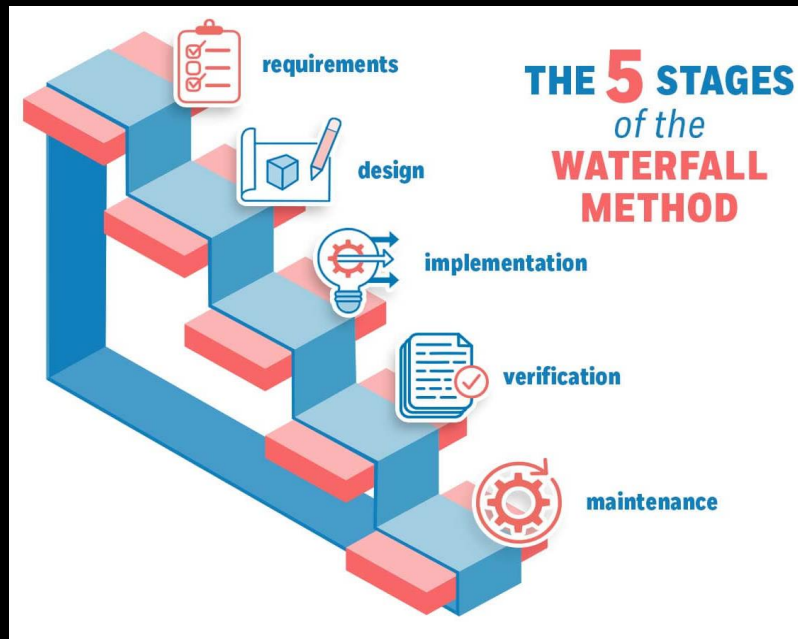
# Agile



Pros (+)	Cons (-)
Faster feedback cycles	Critical path and dependencies not as well defined
Identifies problem early	Organizational learning curve
Prioritization based on value delivery	Accumulation of technical debt/costs



# Hybrid Approach

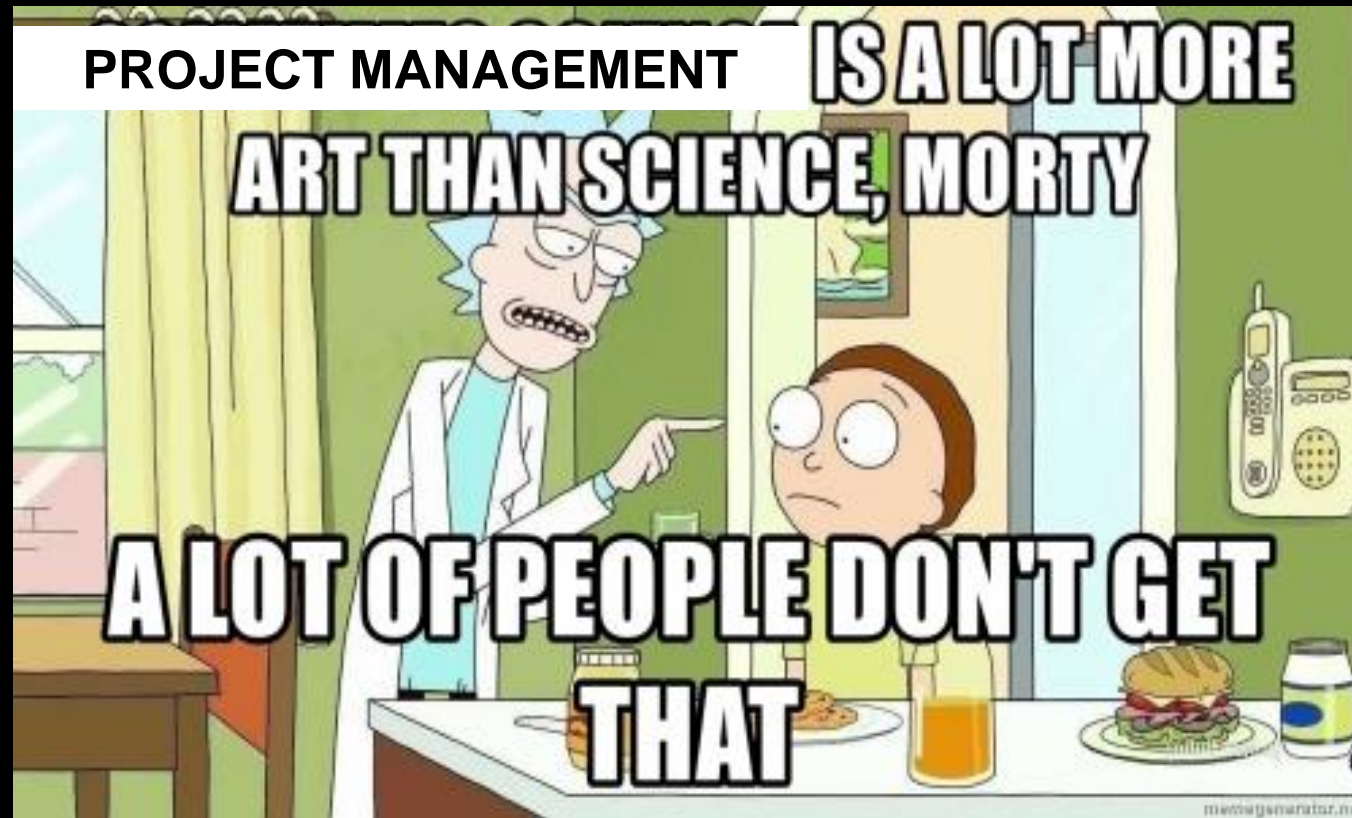




## III) Implementation in Real World



# Project Management: "More Art than Science"





# Project Management: "More Art than Science"



Randomness and  
Uncertainty

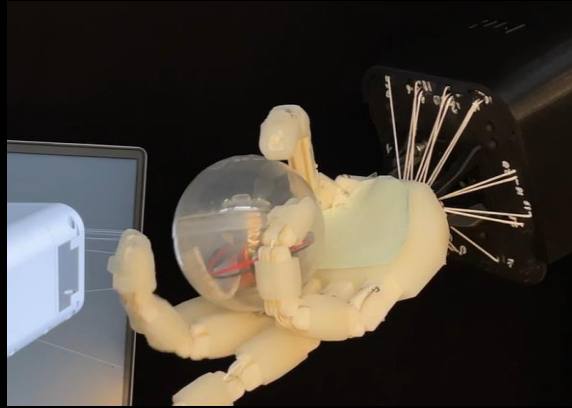


Experience matters



Dealing with people

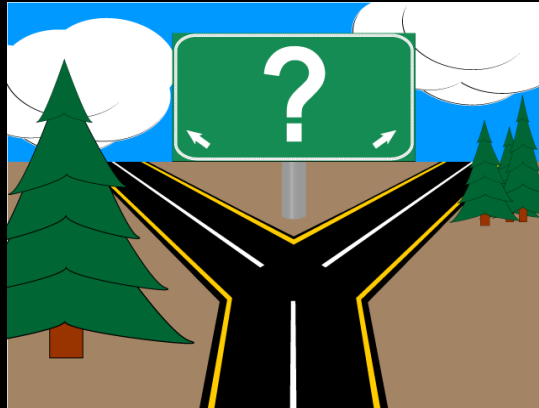
# Factors to Consider



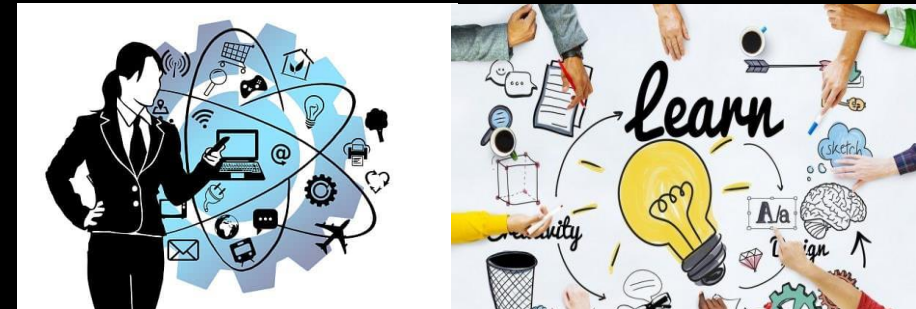
The Challenge



Constraints

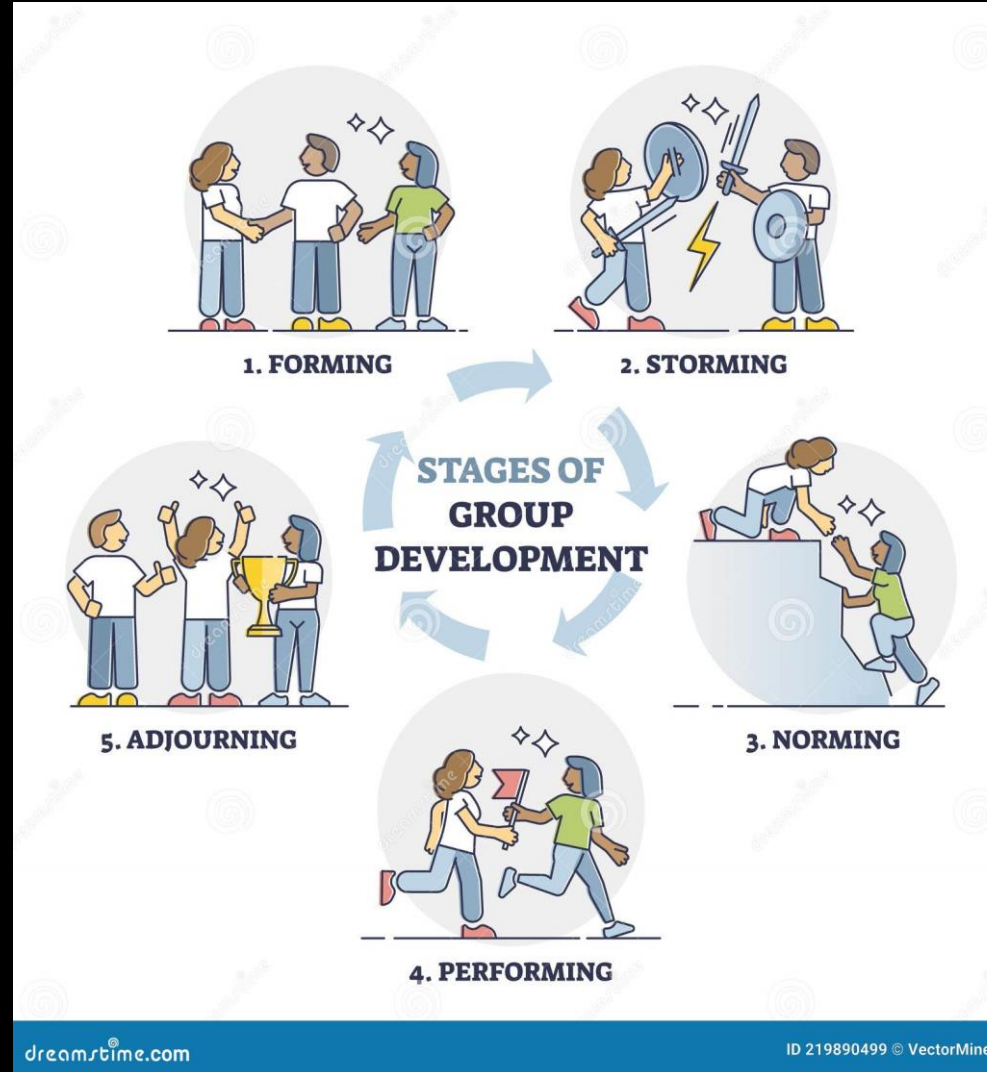


Uncertainties

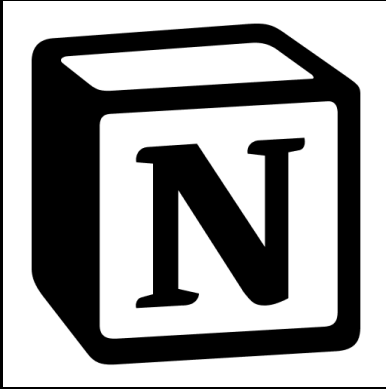


Skillsets

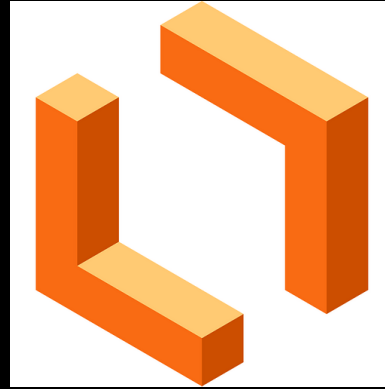
# Team Dynamics Development



# Project Management Tools



Notion



Lucid Chart



Drive

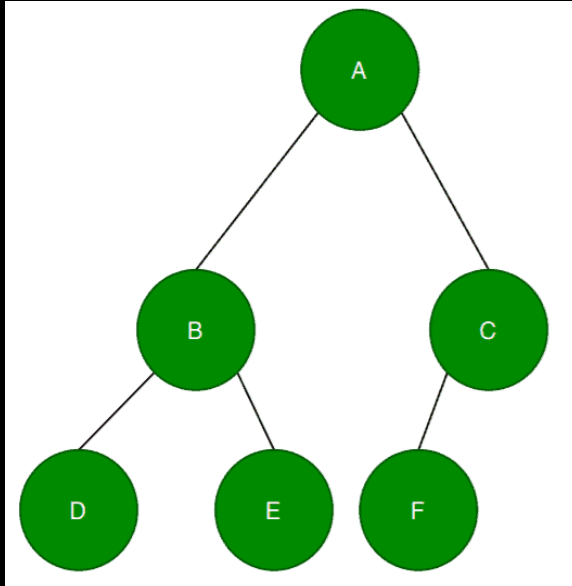


Trello



Microsoft  
Projects

# Key Takeaways for Project Management



Define Work Packages  
(Divide and Conquer)



Respectfully  
Communicate



## IV) Additional Material/Misc.

# Remarks



- Many thanks to lecturer Jeffery Hoffman (D-BAUG, Infrastructure Management group, retired) for providing the foundational material that was used!
  - o Material was based off his course *Project Management for Construction Projects*
- Some content was generated by ChatGPT to help provide clearer and alternative explanations.







## Additional Resources

- *How to Run Successful Projects III* by Fergus O'Connel
- *The Art of Project Management* by Scott Berkun
- *Project Management Absolute Beginner's Guide* by Greg Horine
- *Agile Project Management for Dummies* by Mark C. Layton, Steven J. Ostermiller, and Dean J. Kynaston
- *Project Management for the Unofficial Project Manager* by Kory Kogon

Note: These books are what popped up in the most recommended based on Reddit and LinkedIn.

<https://www.linkedin.com/pulse/18-project-management-books-succeed-manager-fichtner-pmp-csm-gcyae/>  
[https://www.reddit.com/r/projectmanagement/comments/jqlkyc/must\\_read\\_pm\\_books/](https://www.reddit.com/r/projectmanagement/comments/jqlkyc/must_read_pm_books/)