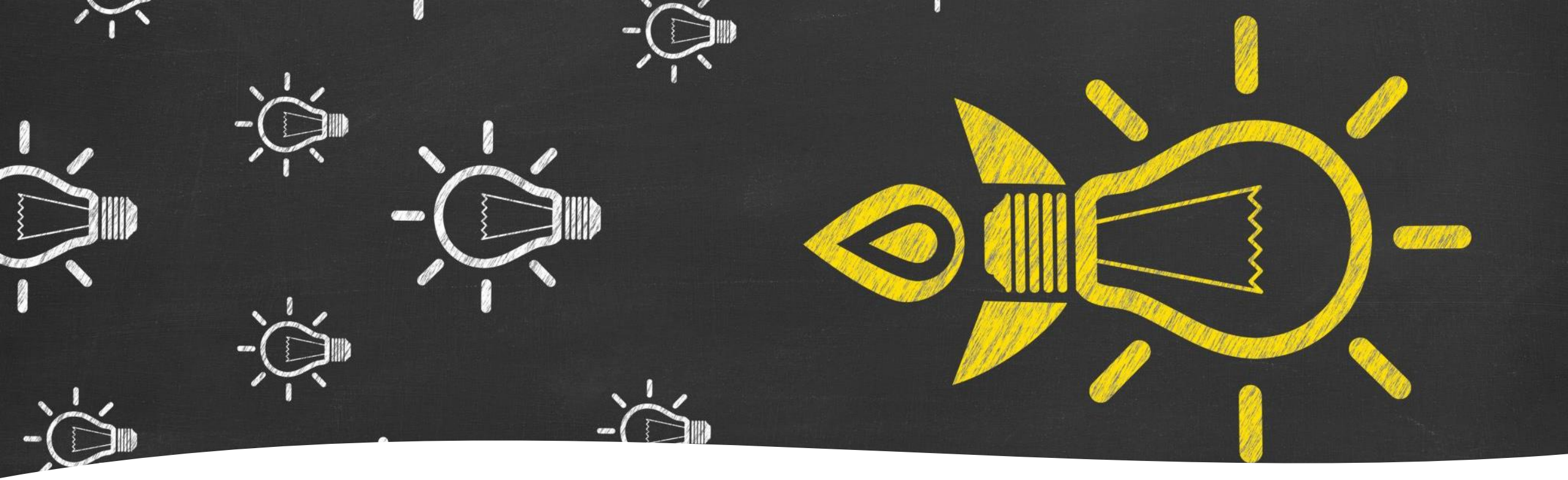# Designing innovative products -introduction-

Tech

- Sem 1: Innovation in project Management: Agile
- Sem 2: Innovation in UX/UI
- Sem 3: Innovative products with AI. Part 1
- Sem 4: Innovative products with AI. Part 2
- Sem 5: IoT and Cloud
- Sem 6: Data driven innovation
- Sem 7: Habit forming products

What is innovation?

Innovation Is not Invention

- May include **invention** but requires many other things:
  - Deep understanding of customers
  - How can work with partners
  - How it will pay for itself

- Innovations are based on **previous** advances. Don't have to be new to the world.
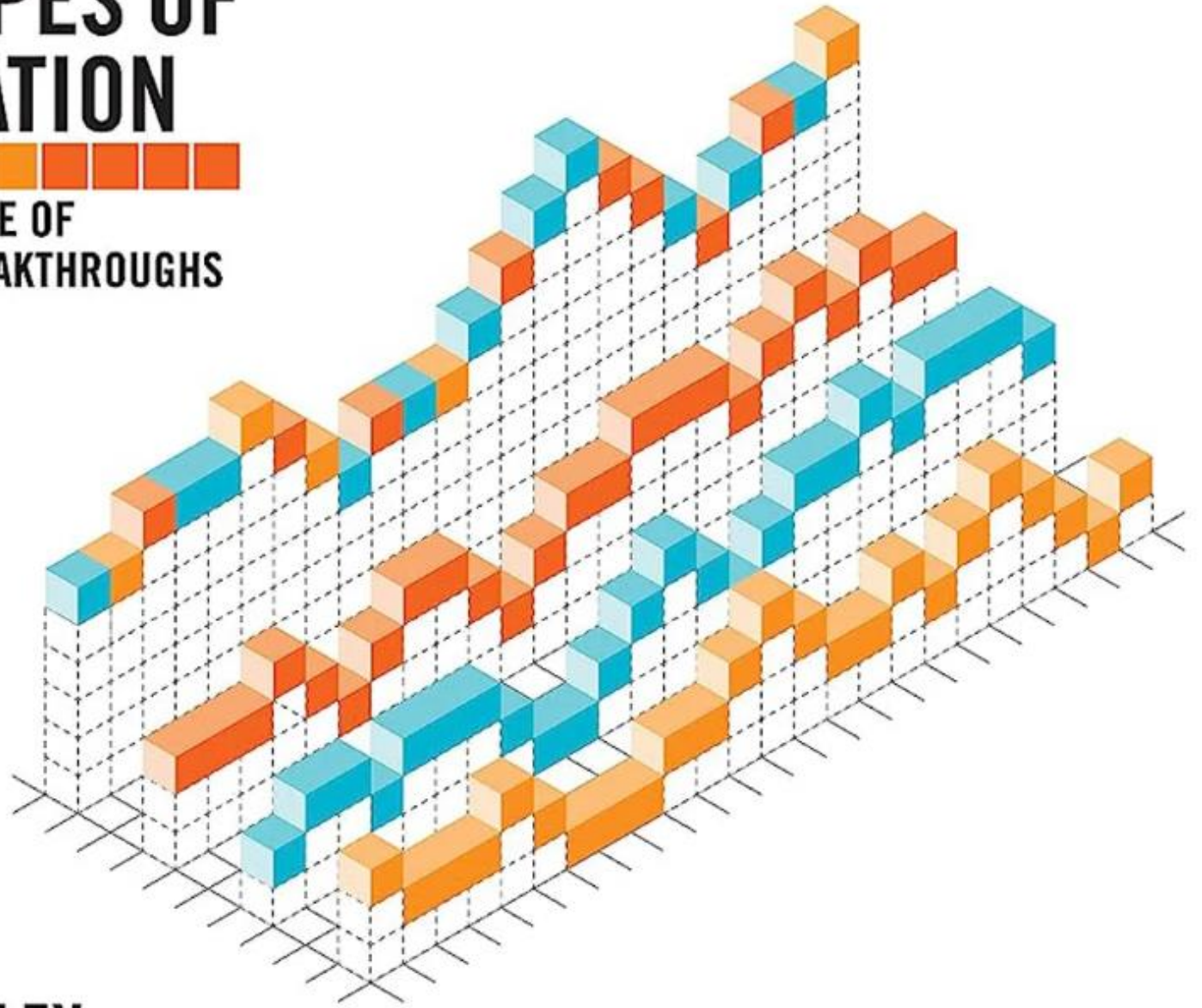
Def.

Innovation requires **Identifying**[1] the problems that **Matter**[2] and **Moving through Them**[3] Systematically to **Deliver Elegant Solutions**[4].

TEN TYPES OF INNOVATION

DISCIPLINE OF ...DING BREAKTHROUGHS

...ARRY KEELEY
RYAN PIKKEL, BRIAN QUINN, HELEN WALTERS

Examples of inventions/innovations

Invention: Airplane → Innovation: Commercial flights

In 1903, the Wright brothers created the first human-piloted motorised aeroplane

Commercialization: after World War II with the rise of airlines like Pan Am and Boeing's commercial jets

Invention: Artificial Intelligence Algorithms → Innovation: Autonomous Vehicles

Inventors: AI pioneers like Geoffrey Hinton, Yann LeCun, and Yoshua Bengio developed foundational algorithms in machine learning and neural networks

Commercialization: Companies such as Waymo (owned by Alphabet), Tesla, and Uber have turned AI algorithms into commercial products

Invention: Lithium-Ion Battery Research → Innovation: Electric Vehicles

Inventor: John B. Goodenough, along with a team of researchers, developed the lithium-ion battery in the late 1970s and 1980

Commercialization: Companies like Tesla, Panasonic, and LG Chem have commercialized lithium-ion batteries in consumer electronics and electric vehicle

Software Product Innovation

refers to **changes** that improve design, materials, feel, look, capacity, functionality, and overall user experience

Innovation is a team sport, it's not the domain of rare genius or chosen few. Anyone can (and should) innovate, and there is no longer an excuse
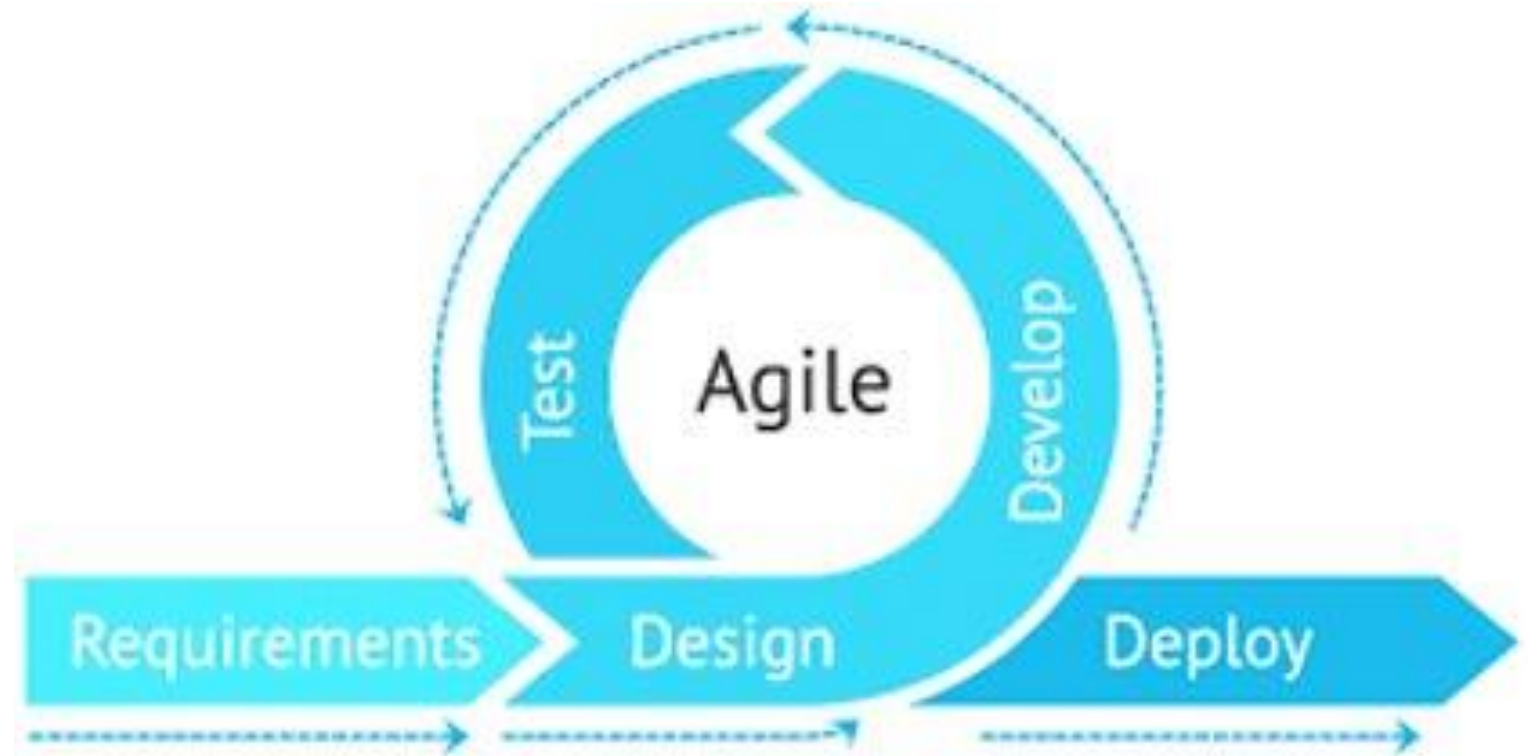
Seminary 1

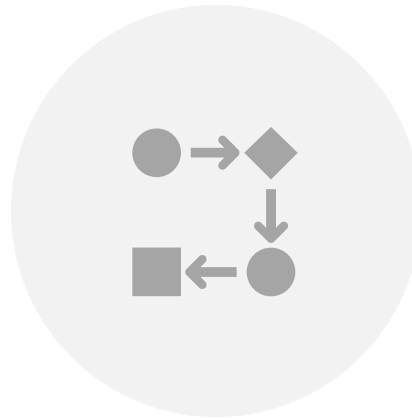Innovation In product management

Agile
project management
(APM)

Agile Project Management (APM)

AGILE PROJECT MANAGEMENT (APM) IS AN **ITERATIVE APPROACH** TO PLANNING AND GUIDING PROJECT PROCESSES.

IT BREAKS PROJECT PROCESSES INTO **SMALLER CYCLES** KNOWN AS SPRINTS OR **ITERATIONS**.

CONTINUOUS RELEASES ARE A FOCUS, INCORPORATING FEEDBACK WITHIN EACH ITERATION.

Waterfall Model Project Management

- The **Waterfall Model** is a sequential project management approach. It consists of distinct phases that follow a **linear** and **one-directional** flow.

- According to a study by PMI, **56%** of projects used traditional — AKA Waterfall.

- Phases include **Requirements**, **Design**, **Implementation**, **Testing**, **Deployment**, and **Maintenance**.

Image source: https://monday.com/blog/project-management/waterfall-methodology/
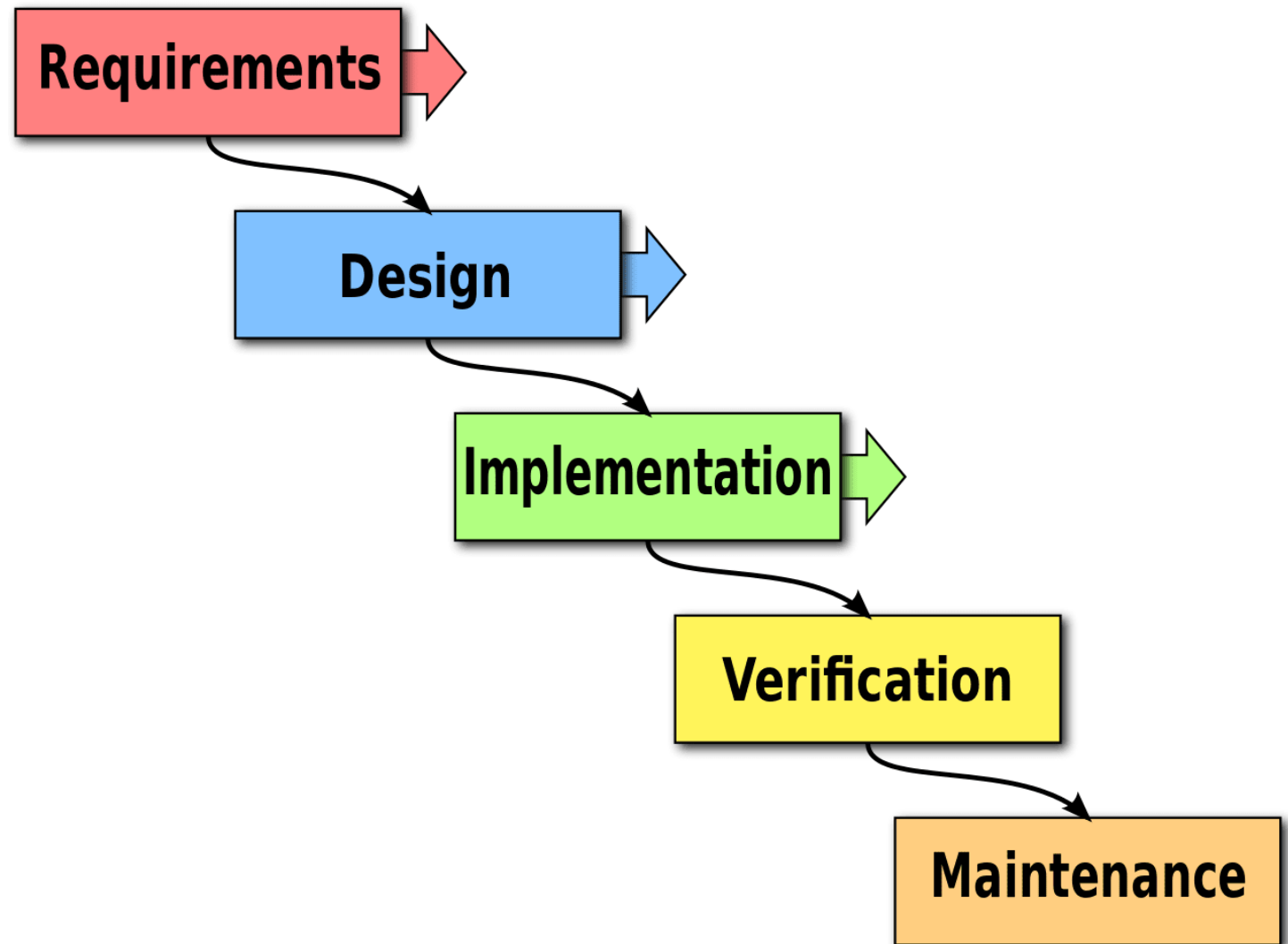
Agile workflow
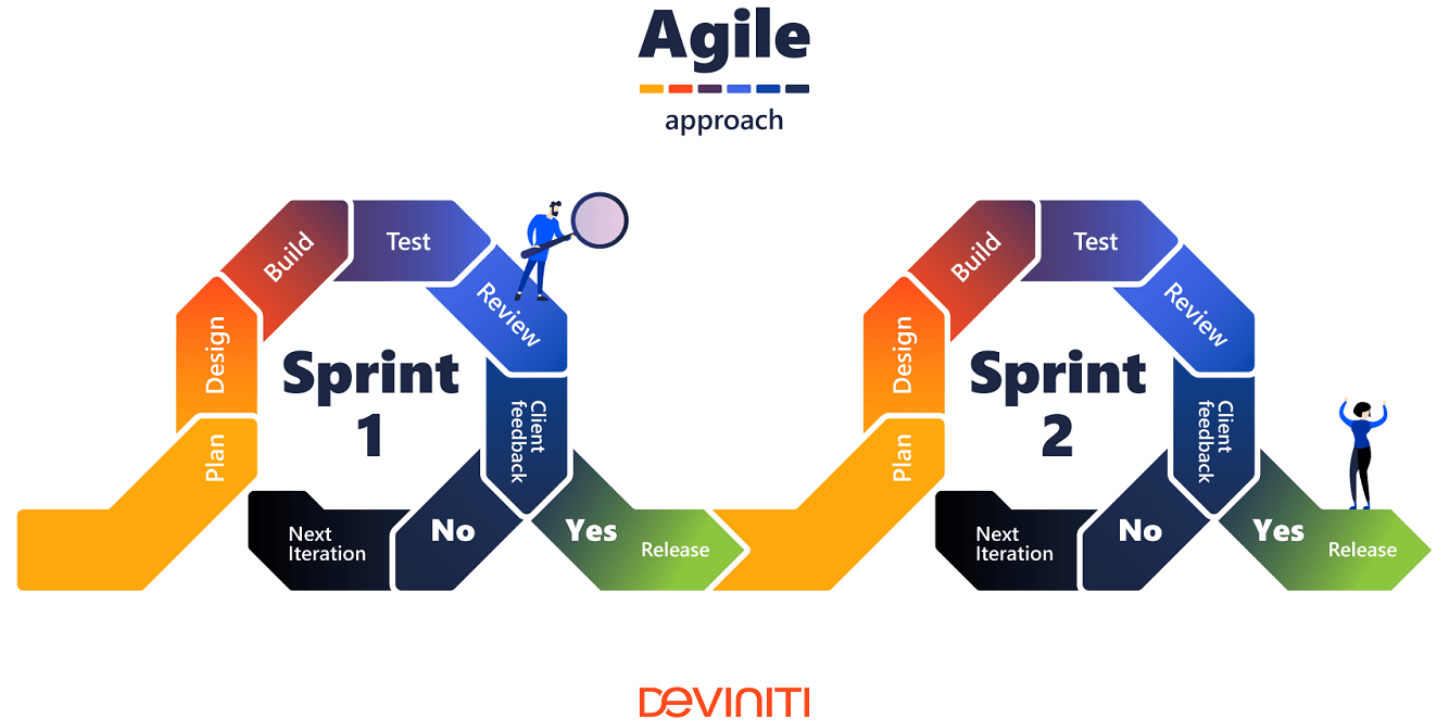
Agile vs Waterfall

	Waterfall	Agile
Implementation	Linear	Iterative
Timescale of detailed plans	Entire project	Typically 2–8 weeks
Stakeholder engagement	Mostly upfront	Throughout entire project
Team structure	Traditional hierarchy	Often more self-organized
Main benefit	Predictable, reliable outcome, and controlled process	Flexibility to adapt to rapidly changing markets

- Source: https://monday.com/blog/project-management/waterfall-methodology/

Benefits

Optimal Resource **Utilization**: The approach facilitates swift deployment while minimizing resource wastage, ensuring efficient resource management.

Heightened **Flexibility** and **Adaptability**: Developers can more effectively adjust to changes and implement necessary modifications, showcasing greater adaptability.

Swift **Problem Identification**: The method enables rapid issue recognition, leading to quicker resolutions and improved project control.

Amplified **User Collaboration**: There is an increased interaction with users, fostering the development of products that align more closely with user requirements

Drawbacks

Variable Outcomes: Project outcomes may lack consistency due to the absence of well-defined initial approaches, potentially leading to deviations from the intended path.

Ambiguous Progress Assessment: Projects that deviate from their intended trajectory can result in less predictable results, making it challenging to gauge progress accurately.

Time constraints. Agile management relies on making decisions quickly, so it isn't suitable for organizations that take a long time to analyze issues.

Communication Complexity: The need for ongoing collaboration among teams and end users can introduce communication difficulties, essential for crafting an optimal end product.

Scrum

- A **Product Owner** orders the work for a complex problem into a Product Backlog.

- The **Scrum Team** turns a selection of the work into an Increment of value during a Sprint.

- The **Scrum Team and its stakeholders** inspect the results and adjust for the next Sprint.

- *Repeat*
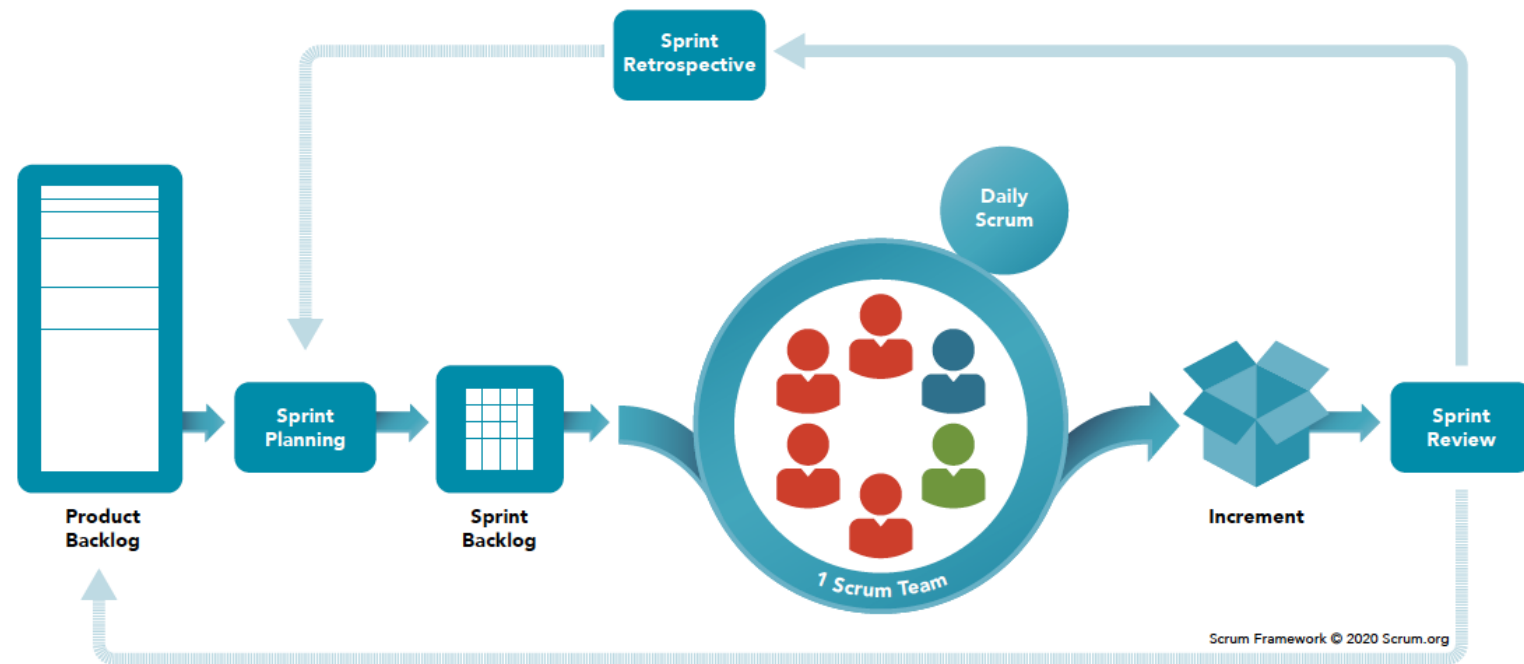
- *Knock knock!*
- *Who's there?*
  ***Done**.*
  Done who?
 *Depends on **who** you ask.*

Kanban

- Visual system used to manage and keep track of work as it moves through a process (pull system)
  - Implemented by Toyota in manufacturing (1950)

The 6 Core Kanban Principles

- **Start with what you do now:** understanding of the current processes and workflows

- **Agree to pursue incremental, evolutionary change:** advocates for small, incremental changes that build on each other

- **Encourage acts of leadership at all levels:** Anyone can take leadership and suggest improvements

- **Focus on customer needs and expectations:** understanding the needs and expectations of your customers

- **Manage the work, not the workers**: empowers people's abilities to self-organize around the work

- **Regularly review the network of services:** encourages team members to share their observations, ideas

*Source*https://upload.wikimedia.org/wikipedia/commons/b/b4/Abstract_Kanban_Board.svg
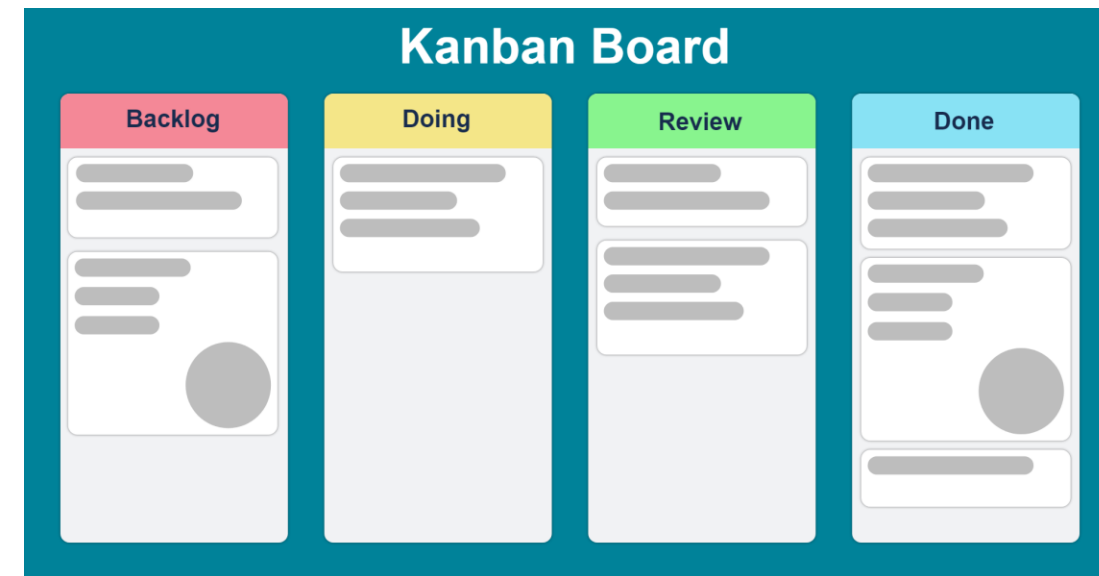
Extreme Programming (XP)

- **XP** emphasizes technical excellence and focuses on improving software quality and responsiveness to **changing customer requirements** through **frequent releases** in short development cycles.

- **Key Practices:**
  - Pair Programming,
  - Test-Driven Development (TDD),
  - Continuous Integration,
  - Refactoring,
  - Simple Design,
  - Collective Code Ownership

https://newline.tech/extreme-programming/

Pair Programming 101

Wrap-Up
Innovation in Product Management

- Incremental development
- Fast deploy
- Continuous communication
- Empower team members

Milestone 1
(Eng: week 3, Ro week 4)

- Decide the **working environment** and **setup** the project (create a "hello world" mobile/web/desktop/cloud application, or install the necessarily scientific tools for AI-models) **(2p)**

- **Assign roles** to the team members (one member can have multiple roles) **(3p)**:
  - Tech: UI/UX, data scientist, backend/frontend developer, …
  - Business: Project Manager, social media guru, marketing, market researcher …

- Define the **list of functionalities (backlog):** login, CRUD operations, notifications, AI-inference, backup, cloud storage, offline functionalities … **(4p)**

- Publish this **ONE PAGE DOC** in the MSTeams Assignment (one per team)

Bibliography

- https://www.techtarget.com/searchcio/definition/Agile-project-management

- https://monday.com/blog/project-management/waterfall-methodology/

- https://scrumguides.org/

- https://www.geeksforgeeks.org/lean-software-development-lsd/

- https://kanbanize.com/kanban-resources/getting-started/what-is-kanban