CSI 321

Software Development Methodologies

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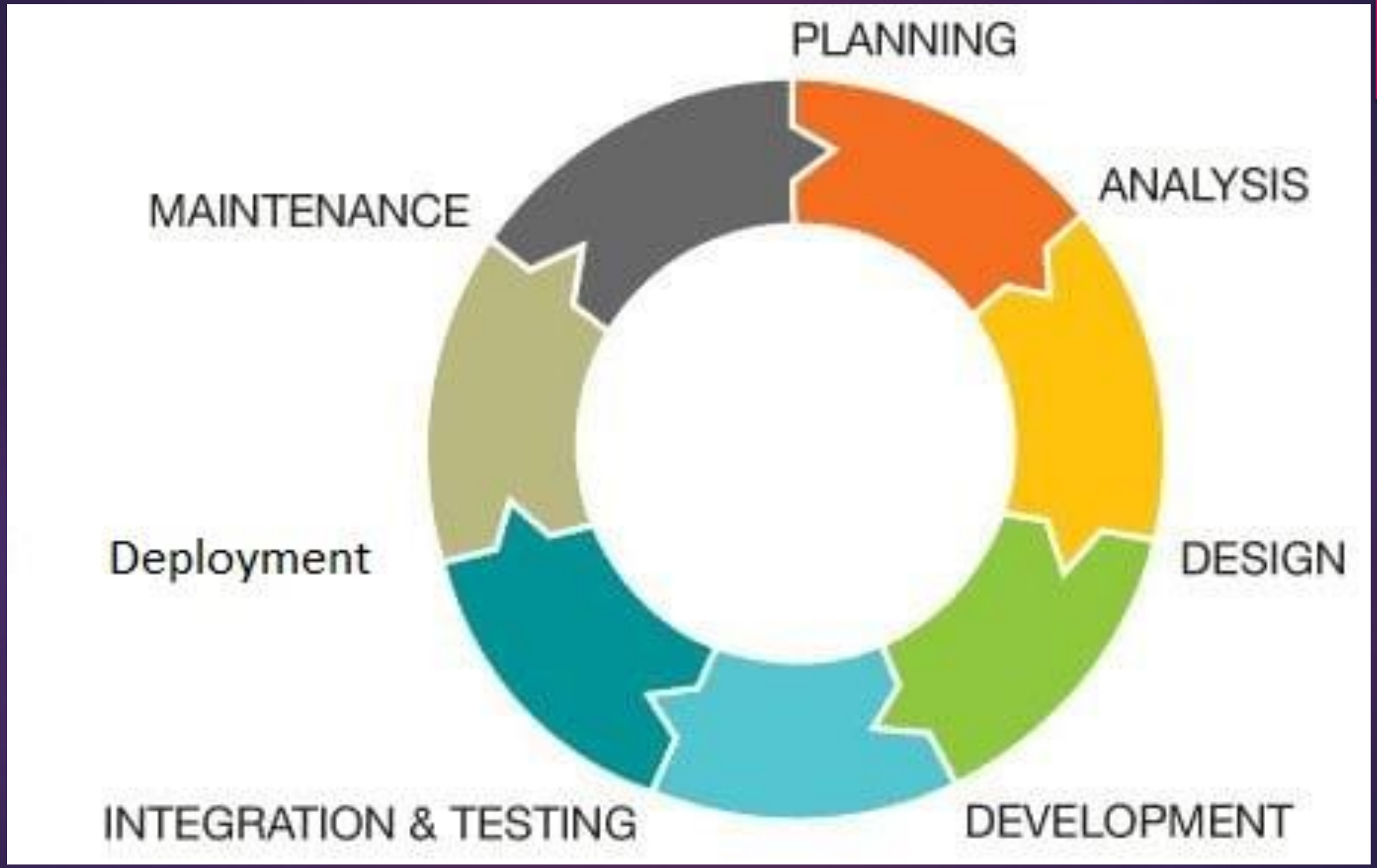
Why This Lesson?

We are going to do something.
Which is better- With or Without Plan?

A structured management of the workflow during a project

Ways of Implementing Software Development Life-Cycle (SDLC)


PLANNING
ANALYSIS
DESIGN
DEVELOPMENT
INTEGRATION & TESTING
Deployment
MAINTENANCE

Seven Phases of Software Development Life Cycle

Planning

Define Requirements

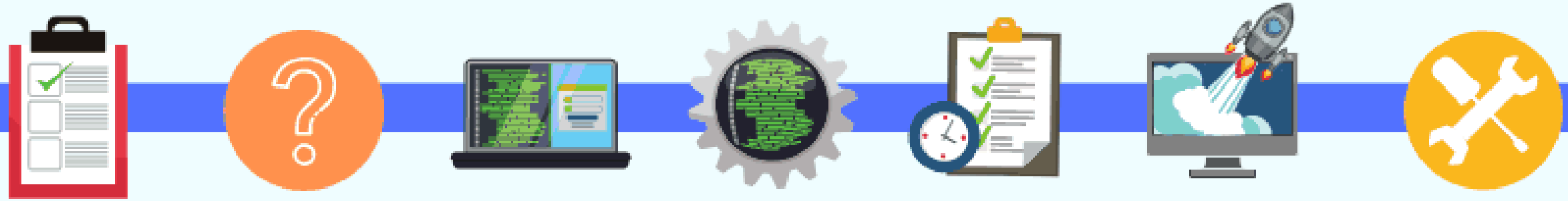
Design & Prototyping

Software Development

Testing

Deployment

Operations & Maintenance



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Planning

- Defining Scope
- Feasibility Analysis
- Benchmark Study

Requirement Analysis

- Analyzing the Resources:
  - Hardware
  - Software
  - Skilled People
  - Time

Designing & Prototyping

- Visual Representation of the project :
  - Diagram
  - Chart

- Prototype: A prototype is an early sample, model, or release of a product

Development/ Implementation

Testing

Deployment/ Release

Maintenance

- Post-release bug fixing
- Check for improvement scope
- Release newer versions

Project scales

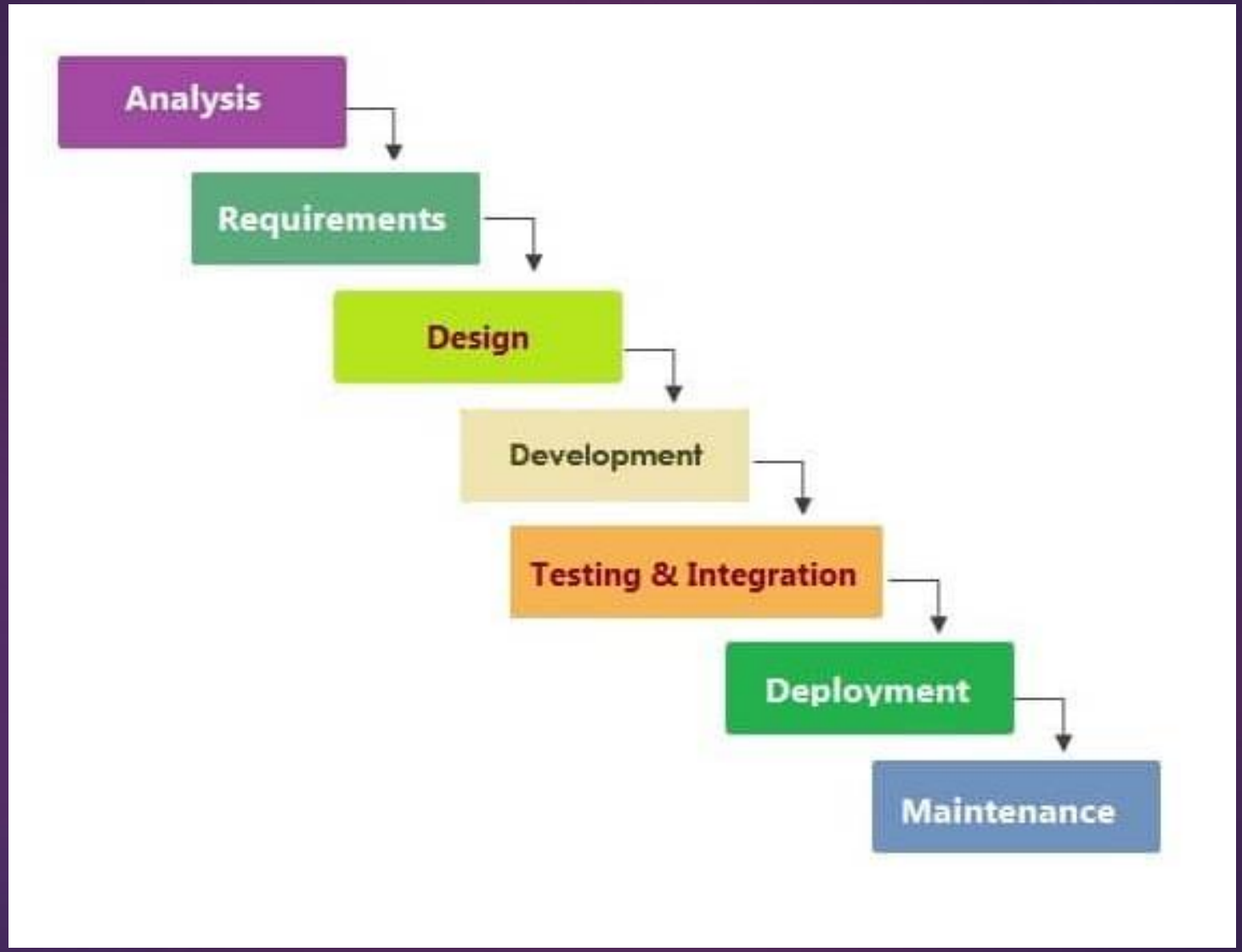
- Deciding factors: Duration, Finance, Resource

- Small scale projects: some weeks
- Mid scale projects: some months
- Large scale projects: 1+ years

Major Types of Models

- Linear/ Sequential
- Iterative
- Incremental
- Adaptive

Waterfall Model


Analysis
Requirements
Design
Development
Testing & Integration
Deployment
Maintenance

Key Idea

- A linear-sequential life cycle model.
- Each phase must be completed before the next phase begins
- There is no overlapping in the phases.

https://www.tutorialspoint.com/sdlc/sdlc_waterfall_model.htm

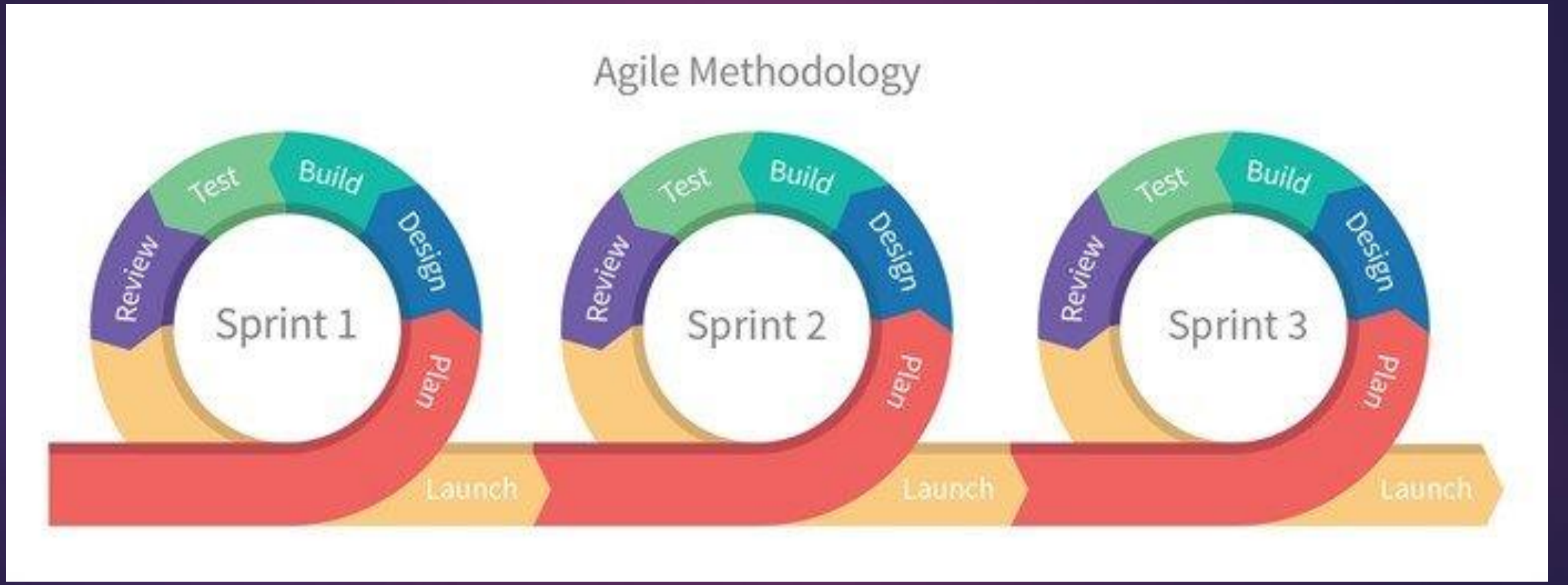
Advantages

- Simple and easy to understand and use
- Clearly defined stages.
- Easy to arrange tasks.
- Nice documentation is possible
- Good for small scale projects

Disadvantages

- Very rigid structure and thus slow
- No working software is produced until the end
- Cannot accommodate changing requirements.
- It is difficult to measure progress within stages.
- Not a good model for complex or large scale projects
- High amounts of risk and uncertainty.

Agile Model


Agile Methodology
Review
Test
Build
Design
Plan
Sprint 1
Launch
Review
Test
Build
Design
Plan
Sprint 2
Launch
Review
Test
Build
Design
Plan
Sprint 3
Launch

Key Idea

- An adaptive software development methodology
- Break the project into small incremental builds, also called sprint
- Incremental delivery of working software rather than documentation
- Interaction and collaboration of individuals

https://www.tutorialspoint.com/sdlc/sdlc_agile_model.htm

Advantages

- Enables concurrent development and delivery
- Allow users to realize software benefits by delivering partial working solutions.
- Easy to measure progress by stages
- Promotes teamwork and cross training.
- Accommodate changing requirements
- Improve working efficiency with team collaboration
- Good for large scale projects
- Lower risk factors

Disadvantages

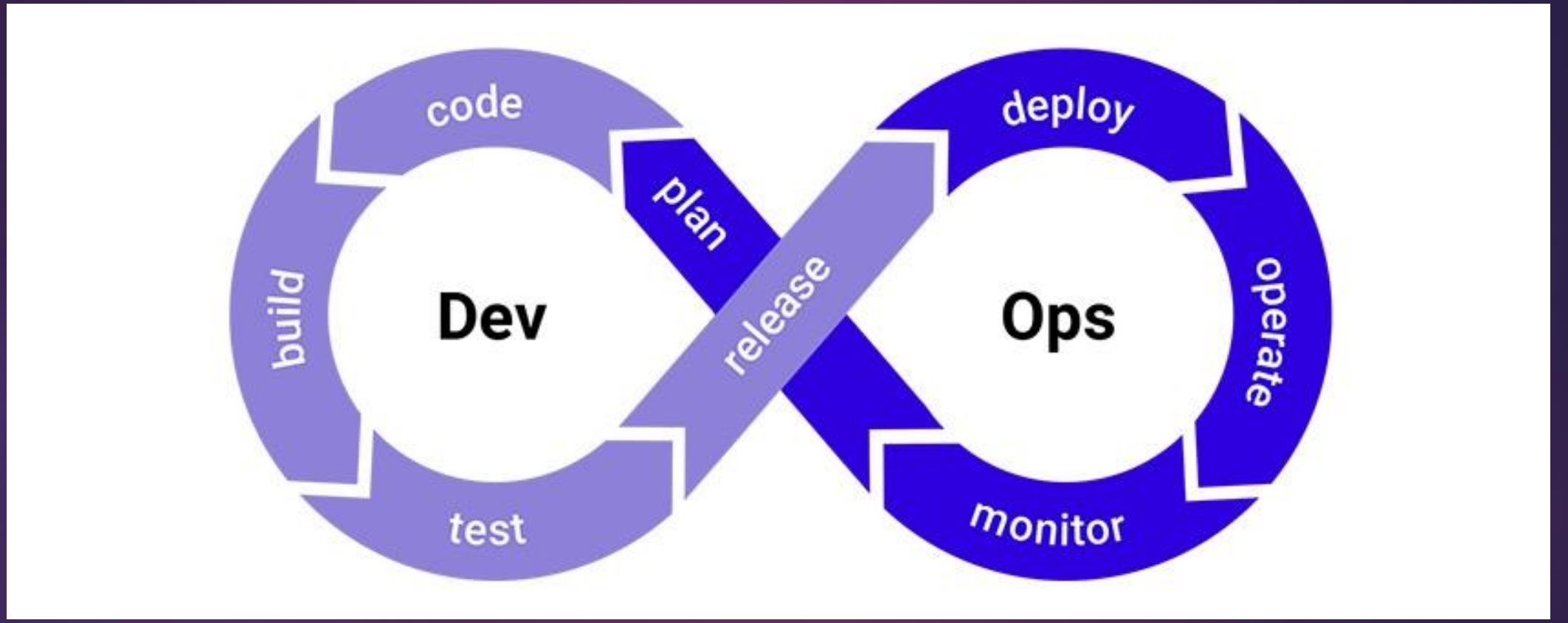
- High maintainability is a must
- Lack of documentation
- Difficult for a new comer to cope up
- Depends heavily on customer interaction

Different Forms of Agile

- Extreme Programming (XP)
- Scrum
- Crystal
- Feature Driven Development

Devops

DevOps is a set of practices that bridges the gap between software development and IT operations.


code
plan
build
Dev
release
test
deploy
operate
Ops
monitor

Devops Tools

- **Git and GitHub –** Source code management (Version Control System)
- **Jenkins –** Automation server, with plugins built for developing CI/ CD pipelines
- **Selenium –** Automation testing
- **Docker –** Software Containerization Platform
- **Jira** – Issue and project tracking software
- **Puppet** – Configuration Management and Deployment
- **Nagios** – Continuous Monitoring

Who is devops engineer?

- *DevOps Engineer is somebody who understands the Software Development Lifecycle and has the outright understanding of various automation tools for developing CI/ CD pipelines.*

Thank You