GITHUB ACTIONS

Automate Workflows
CI-CD Pipeline

WHAT IS CI-CD?

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EXAMPLE

I HAVE A WEBSITE

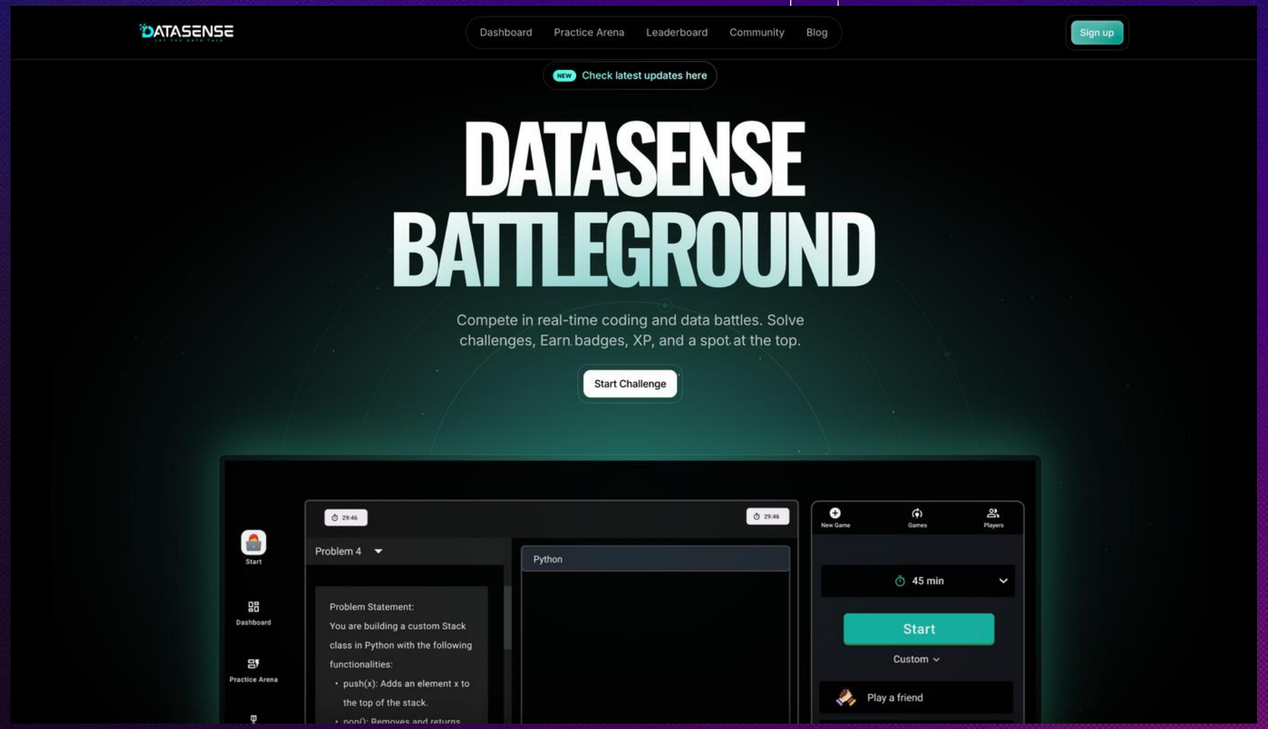
10,000 Active Users

1000 Paid Users

↓

I Want to Add a New Feature

But It wiill take 45 Days



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HOW WILL YOU BUILD THIS ?

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PLAN- A

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WEBSITE UNDER MAINTENANCE

+

WORK ON CHANGES

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PLAN- B

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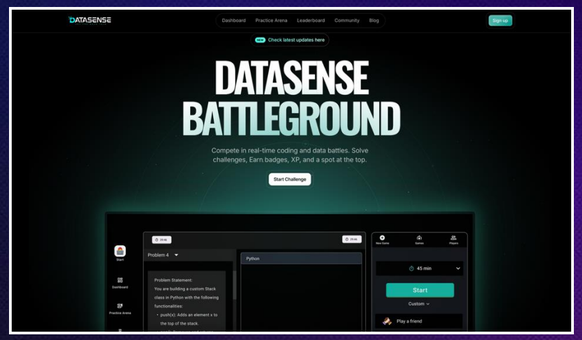
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Dashboard
Practice Arena
Leaderboard
Community
Blog
Sign up
New
Check latest updates here
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BATTLEGROUND
Compete in real-time coding and data battles. Solve challenges, Earn badges, XP, and a spot at the top.
Start Challenge
Problem 4
Problem Statement:
You are building a custom Stack class in Python with the following functionalities:
push(x): Adds an element x to the top of the stack.
Python
45 min
Start
Custom
Play a friend

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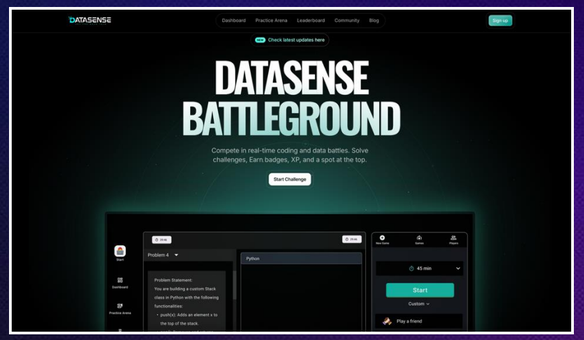

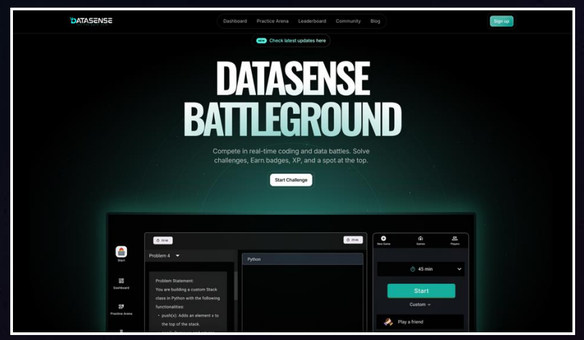

Copy the Code

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Save Website Data

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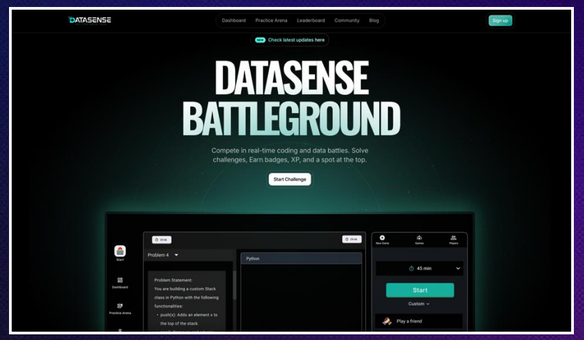

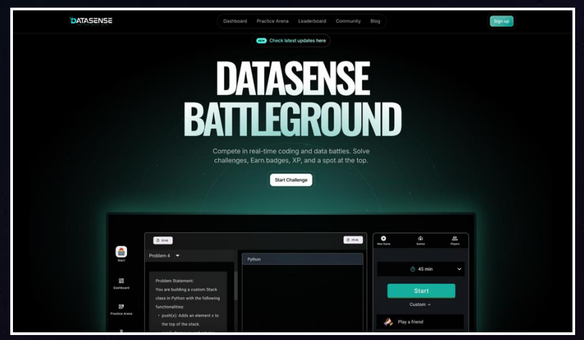

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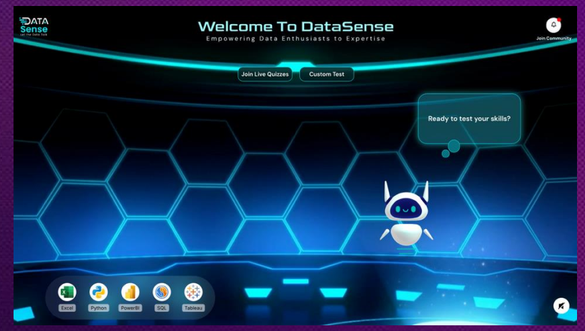
Save Website Data



Create New Version

at a

Seperate Link

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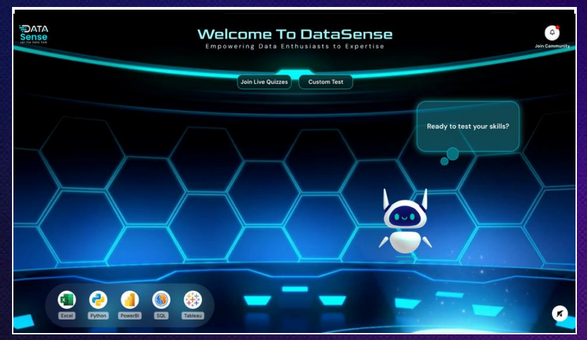
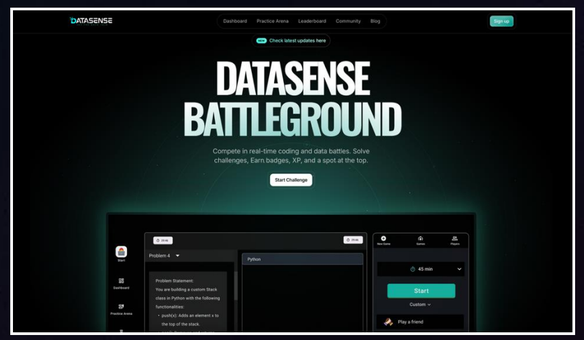
Update Website





Copy the Code
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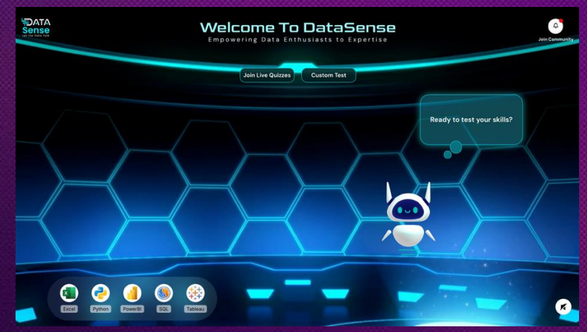
Save Website Data



Create New Version
at a
Seperate Link

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ADVANTAGES OF THIS METHOD?

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CI-CD

CI/CD (Continuous Integration & Continuous Deployment) is a modern software development practice that automates testing and deployment, ensuring fast, reliable, and error-free software releases.

CONTINOUS INTEGRATION (CI): Every time a developer makes a change, the code is automatically tested and merged to avoid conflicts and errors.

Continuous Delivery (CD) – The tested code is ready for deployment with a single click.

Continuous Deployment (CD) – Code changes are automatically pushed to production without manual approval.

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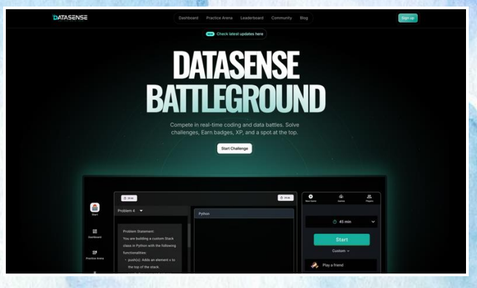
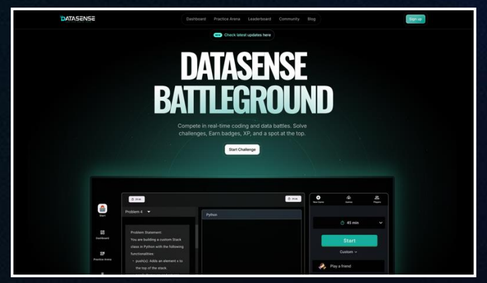
Continuous Integration (CI)

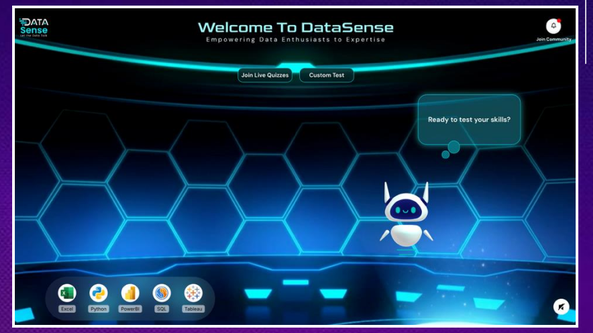


Download Code



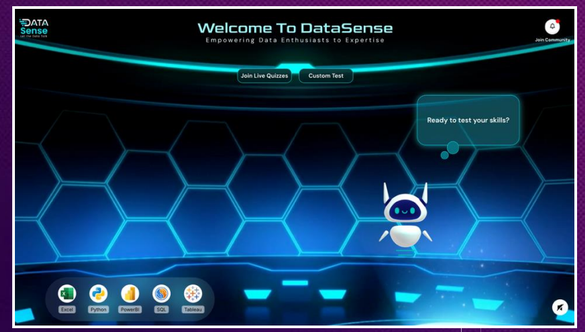
Downloaded Code

Write Code for New Feature



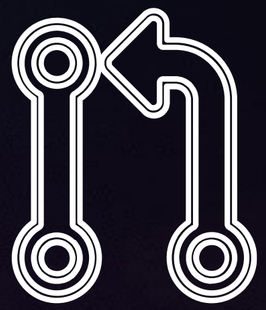
Updated Code

Commit Changes



Push to Github

Create a Pull Request then Merge



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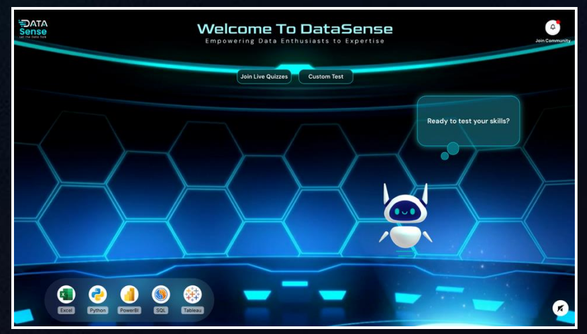
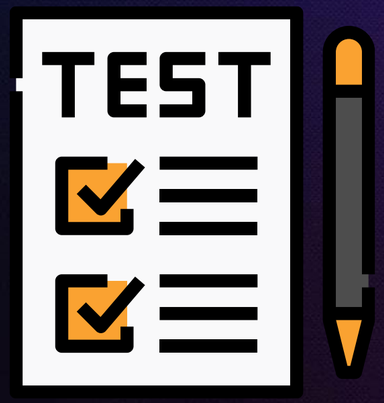
Continuous Delivery (CD)

You Made Changes but Now you want to do Unit Testing



Updated Code



Upload Code to Testing Server

Check Report

Or

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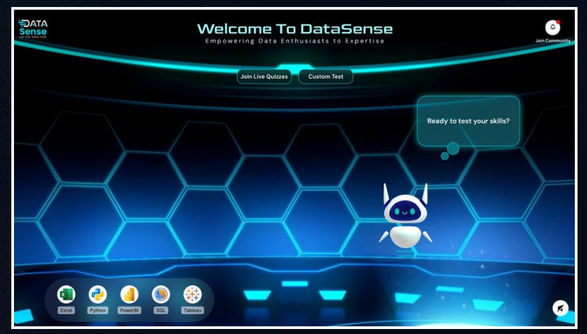
Continuous Deployment (CD)



Tested Code

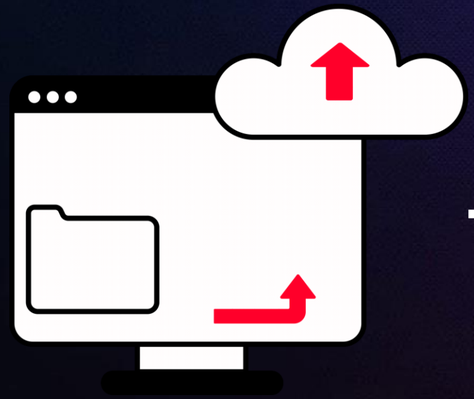
Push to Main Server

Main Updated Website

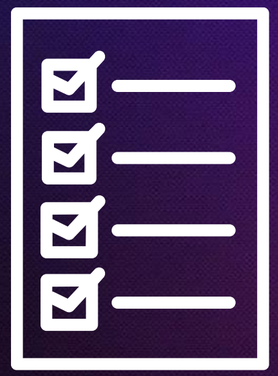
Final Workflow

All these Steps Should be Automatic

User



Uploads Code



Testing & Code Review

Staging and Approval

Deployment

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Tools for CI-CD

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Github Actions

💡 What it Does:

- Built directly into GitHub, allowing you to automate workflows, test, and deploy your code.

- Works seamlessly with GitHub repositories without extra setup.

🔑 Key Features:

✅ Simple YAML-based workflow definitions
✅ Deep GitHub integration
✅ Supports self-hosted & cloud runners
✅ Best for: Small to medium teams using GitHub extensively

🚀 Why Choose GitHub Actions?

🔹 If your project is already on GitHub, it's the easiest way to automate builds & deployments.

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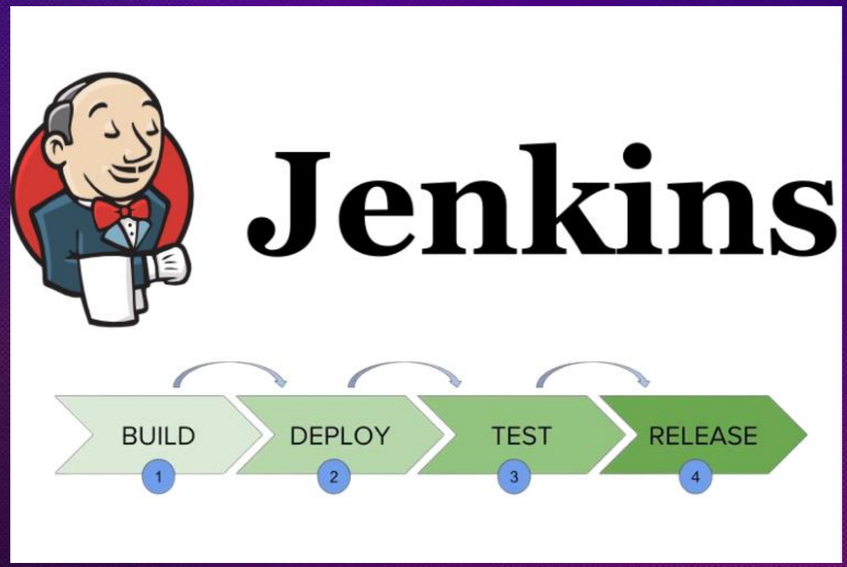
Jenkins

What it Does:

- One of the oldest and most widely used open-source CI/CD tools.
- Offers high flexibility but requires manual setup.



🔑 Key Features:

✅ Highly customizable with plugins
✅ Self-hosted (runs on your servers)
✅ Works with any programming language
✅ Best for: Enterprises needing custom pipelines

🚀 Why Choose Jenkins?

🔹 If you need full control & flexibility over your CI/CD pipeline.

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Other Tools

Tool	Best For	Self-Hosted / Cloud	Key Distinction
GitHub Actions	GitHub users	Cloud-based	Seamless GitHub integration
Jenkins	Large enterprises needing flexibility	Self-hosted	Highly customizable with plugins
GitLab CI/CD	GitLab users	Both	Built-in DevOps with GitLab
CircleCI	High-speed deployments	Cloud-based	Faster build times
Travis CI	Open-source projects	Cloud-based	Free for public repos
Azure DevOps	Microsoft-based apps	Cloud-based	Best for Windows & Azure users
AWS CodePipeline	AWS-based apps	Cloud-based	Seamless AWS integration
ArgoCD	Kubernetes-based deployments	Cloud-native	Best for GitOps & Kubernetes

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Github Actions Architecture

Github Actions

GitHub Actions is a **workflow automation tool** built directly into GitHub. It helps developers automate testing, building, and deploying applications without needing an external CI/CD tool.

🔍 Key Components

1. **Workflow** – The complete process of automation (like a recipe for your project).

2. **Events** – Triggers that start the workflow (like "on push" or "on PR merge").

3. **Jobs** – A group of steps executed together (e.g., running tests, deploying code).

4. **Steps** – The individual tasks inside a job (like commands to install dependencies).

5. **Runners** – The machine that executes the workflow (can be GitHub-hosted or self-hosted).

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Code Repository

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Code Repository

Workflow 1

DATASENSE

Code Repository

Workflow 1

Job 1

Job 2

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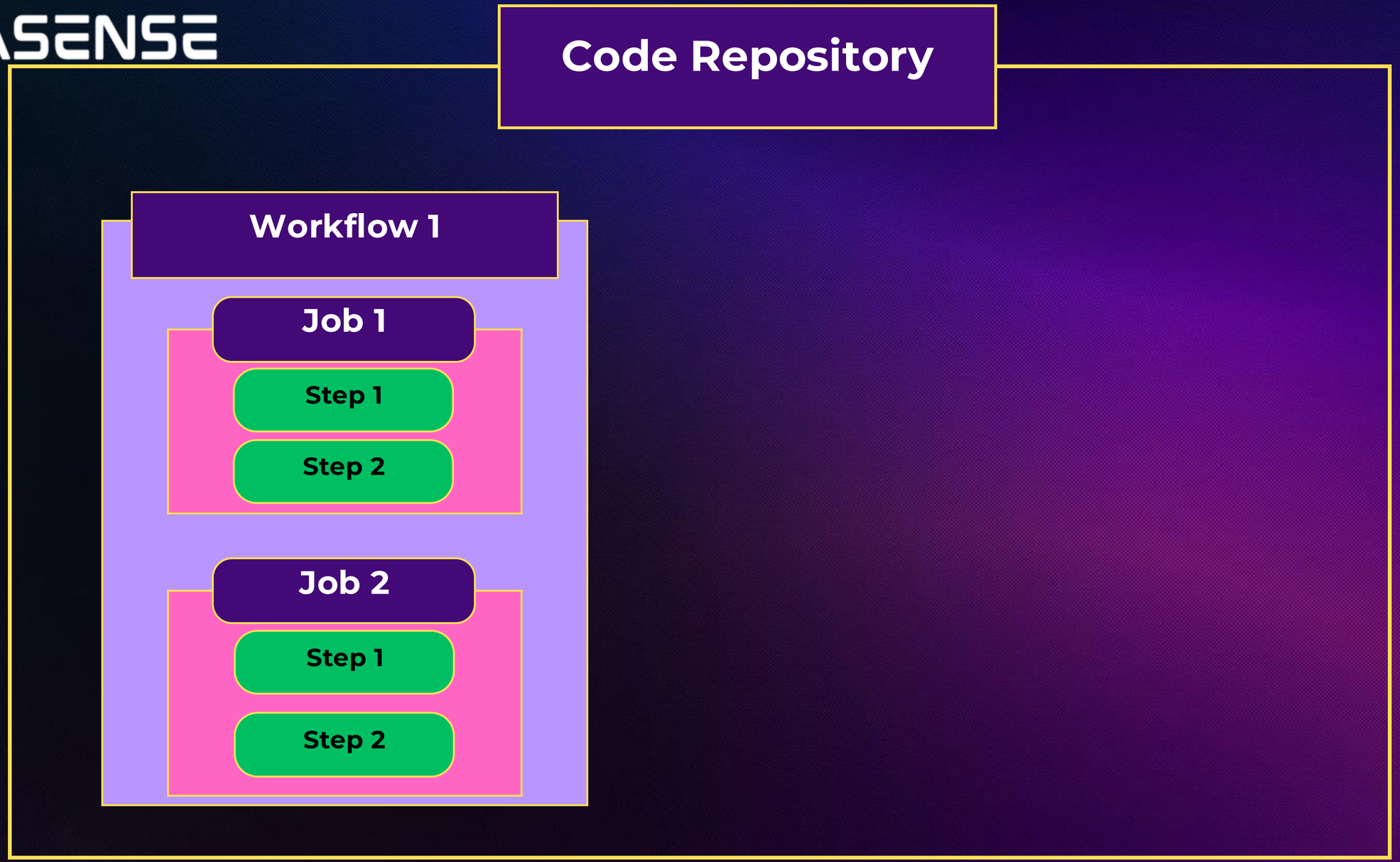
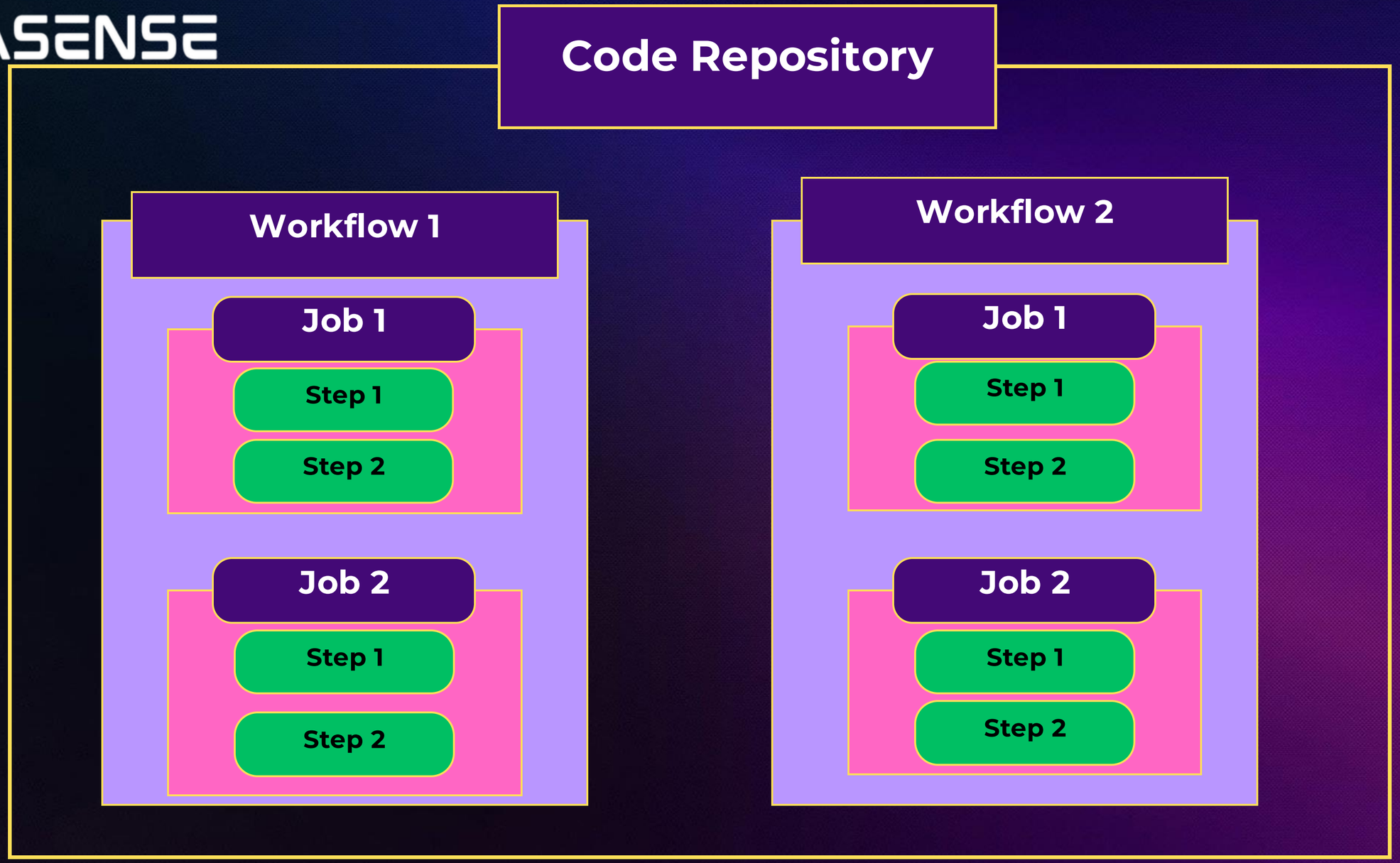

Code Repository
Workflow 1
Job 1
Step 1
Step 2
Job 2
Step 1
Step 2

DATASENSE


Code Repository
Workflow 1
Job 1
Step 1
Step 2
Job 2
Step 1
Step 2
Workflow 2
Job 1
Step 1
Step 2
Job 2
Step 1
Step 2

Key Elements

Workflow

Jobs

Steps

Key Elements

Workflow

Jobs

Steps

Attached to a Github Repo

Key Elements

Workflow

Jobs

Steps

Attached to a Github Repo

Contains one or more Job

Key Elements

Workflow

- Attached to a Github Repo
- Contains one or more Job
- Triggerred Upon Events

Jobs

Steps

Key Elements

Workflow

Jobs

Steps

Attached to a Github Repo

Contains one or more Job

Triggerred Upon Events

Multple Workflows can be there

Key Elements

Workflow

- Attached to a Github Repo
- Contains one or more Job
- Triggerred Upon Events
- Multple Workflows can be there

Jobs

- Needs a Runner Machine

Steps

Key Elements

Workflow	Jobs	Steps
Attached to a Github Repo	Needs a Runner Machine	
Contains one or more Job	Contains one or more Steps	
Triggerred Upon Events		
Multple Workflows can be there		

Key Elements

Workflow	Jobs	Steps
Attached to a Github Repo	Needs a Runner Machine	
Contains one or more Job	Contains one or more Steps	
Triggerred Upon Events	Run in Parallel or Series	
Multple Workflows can be there		

Key Elements

Workflow	Jobs	Steps
Attached to a Github Repo	Needs a Runner Machine	
Contains one or more Job	Contains one or more Steps	
Triggerred Upon Events	Run in Parallel or Series	
Multple Workflows can be there	Can be Conditional	

Key Elements

Workflow	Jobs	Steps
Attached to a Github Repo	Needs a Runner Machine	Executes a Shell Script or Actions
Contains one or more Job	Contains one or more Steps	
Triggerred Upon Events	Run in Parallel or Series	
Multple Workflows can be there	Can be Conditional	

Key Elements

Workflow	Jobs	Steps
Attached to a Github Repo	Needs a Runner Machine	Executes a Shell Script or Actions
Contains one or more Job	Contains one or more Steps	Custom or third party actions
Triggerred Upon Events	Run in Parallel or Series	
Multple Workflows can be there	Can be Conditional	

Key Elements

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Attached to a Github Repo	Needs a Runner Machine	Executes a Shell Script or Actions
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