VISION TO VALUE

Designed by : V2V

N8N

NODEMATION

n8n

● COOK BOOK

AGILE EDITION

4 WEEK SPRINTS

VISION TO VALUE

Guide panel

WEEKLY SPRINTS

WEEK 01 Foundation

- ★ Introduction to automation and n8n
- ★ Local installation (Node.js, Docker)
- ★ n8n Nodes
- ★ JSON Basics and Expressions

WEEK 02 Integrations & Workflow Logic

- ★ Deep Dive Nodes
- ★ API integrations and credentials
- ★ Database integration
- ★ File Conversion

WEEK 03 AI Automation & Advanced Logic

- ★ Using OpenAI / Gemini / Local LLMs
- ★ Text classification and summarization
- ★ Loops, batching, and parallel workflows

WEEK 04 Discover Our Services

- ★ Workflow design patterns
- ★ Scaling with queue mode and workers

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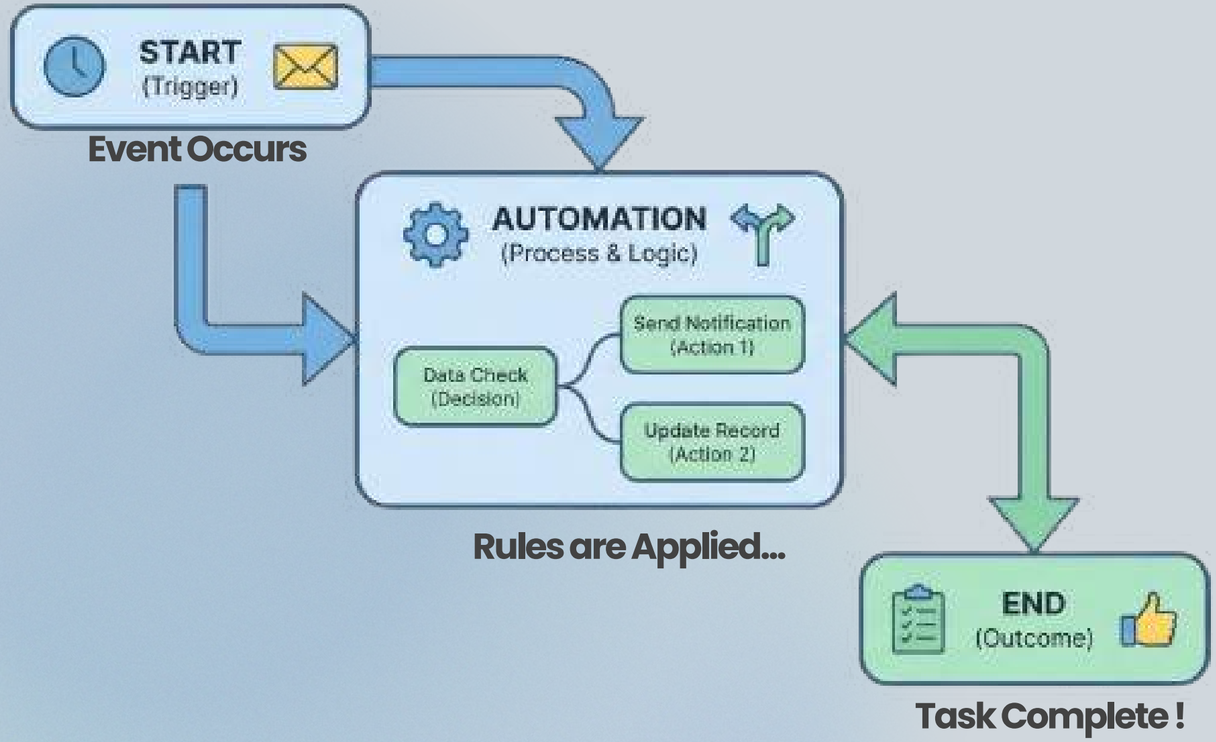
Foundation

Automation Workflow



What is Automation?

Automation means making a task happen automatically without a person doing it manually every time.

What is n8n ?

n8n is a no-code / low-code automation tool that lets you connect apps, move data, and run tasks automatically

What can n8n do?

- Connect apps
- Automate tasks
- Move information between apps
- Build chatbots
- React to events

WEEK 1

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Installation & Setup

01 Install Node JS

n8n needs Node.js run.

Download Node.js from : https://nodejs.org/

After installation check this in Command Prompt :

- **node -v**
- **npm - v**

```
C:\Users\phrav>node -v
v22.17.0
```

Choose the LTS version (Long Term Support)

02 Install n8n using npm

Open Command Prompt and Run this command

- **npm install n8n -g**

```
C:\Users\phrav>npm install n8n -g
```

03 Start n8n

After installation, just type : **n8n**

```
C:\Users\phrav>n8n
Initializing n8n process
n8n ready on ::, port 5678
```

WEEK 1

TroubleShoots

1.n8n command not found

You need to restart your terminal or reinstall

2.Update n8n

npm update n8n -g

***This Installation guide only applicable for windows**

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n8n Nodes

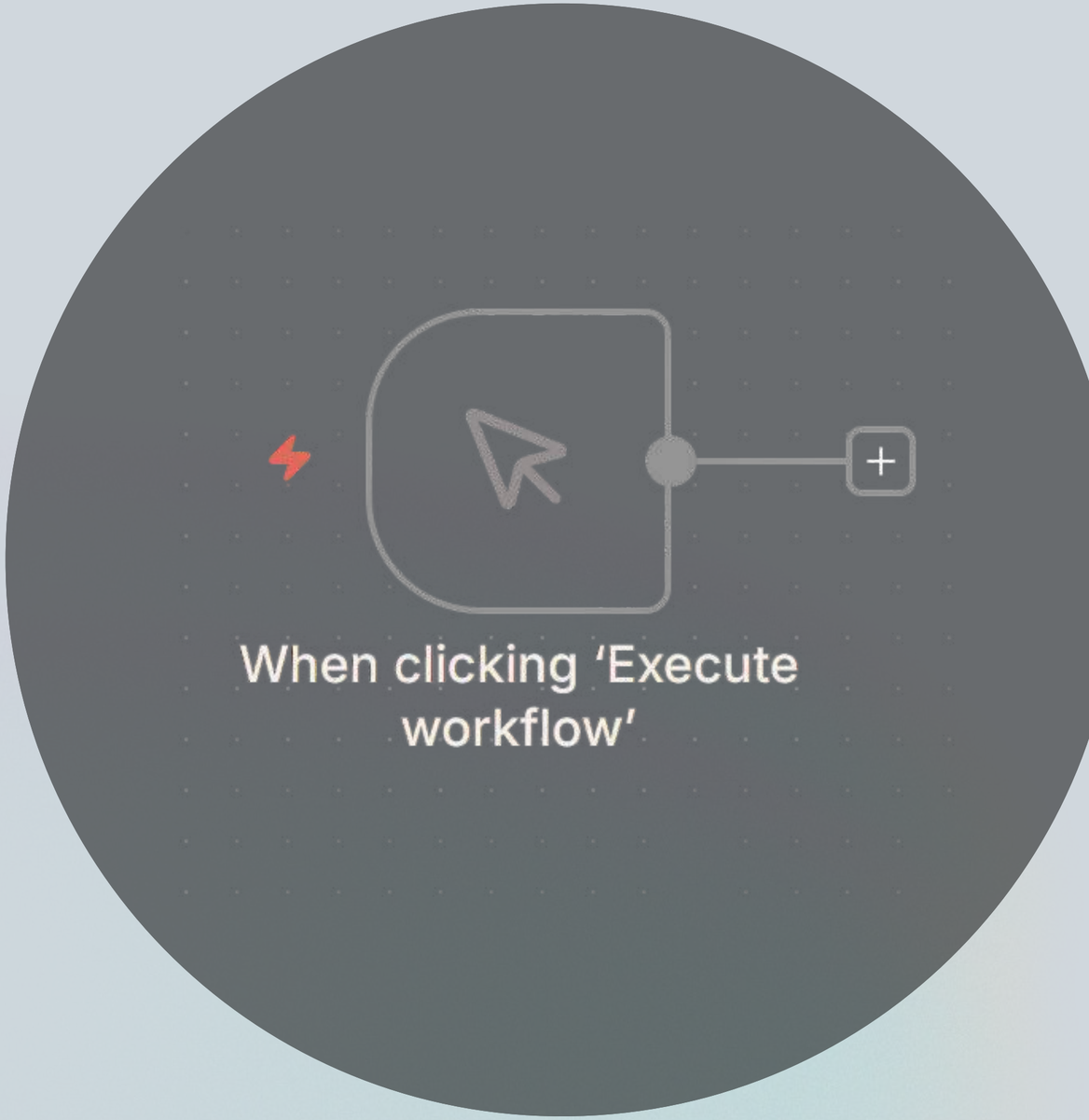
Triggers

1.Manual Trigger

- You start the workflow by clicking the “Execute Workflow” button.
- Perfect for testing, learning, and checking if your workflow is working correctly.

Example:

You build a workflow that sends an email. You click Execute, and it sends one test email.



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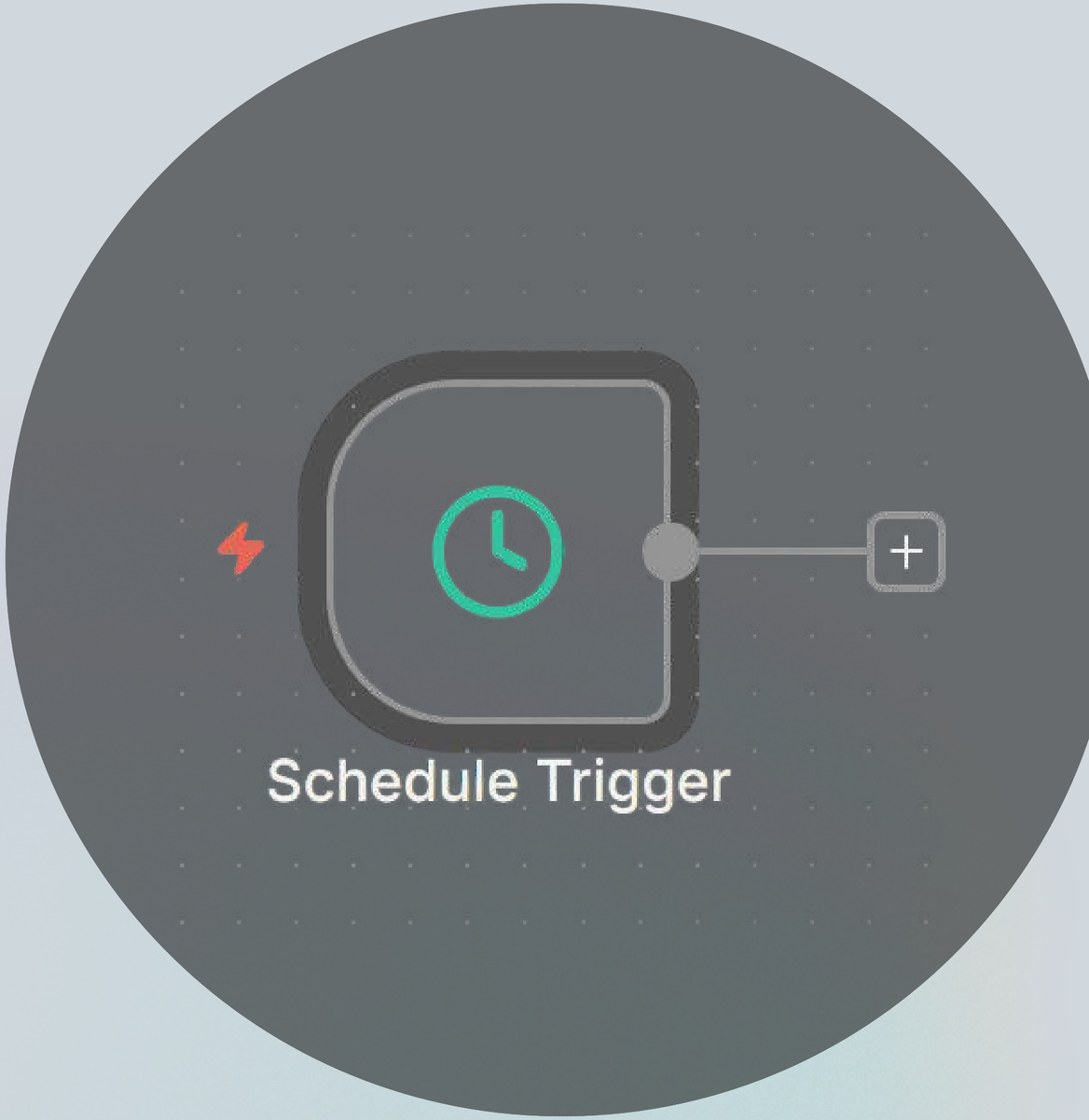
n8n Nodes

2.Schedule Trigger

- The Schedule Trigger automatically starts your workflow at a specific time or repeated interval.
- Perfect for tasks that repeat regularly.

Example:

Every morning at 8 AM send a report



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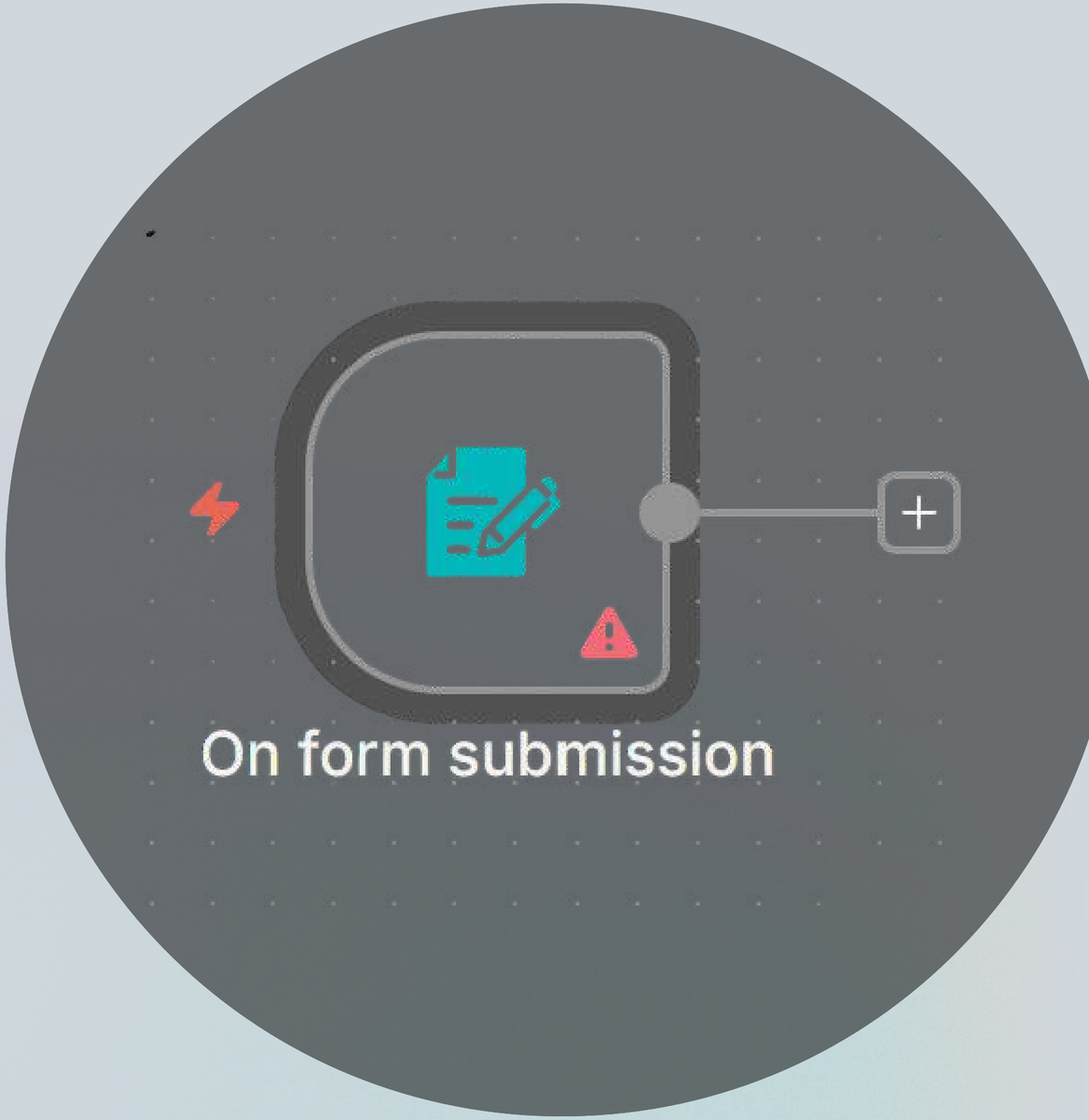
n8n Nodes

3.On form Submission

- Creates a web form from n8n. When someone fills the form, the workflow runs
- Collect responses easily without needing Google Forms or Typeform.
- This trigger creates a webform using n8n and starts your workflow whenever someone submits that form

Example:

A form asks for user feedback. When submitted, n8n saves it and sends a thank-you email.



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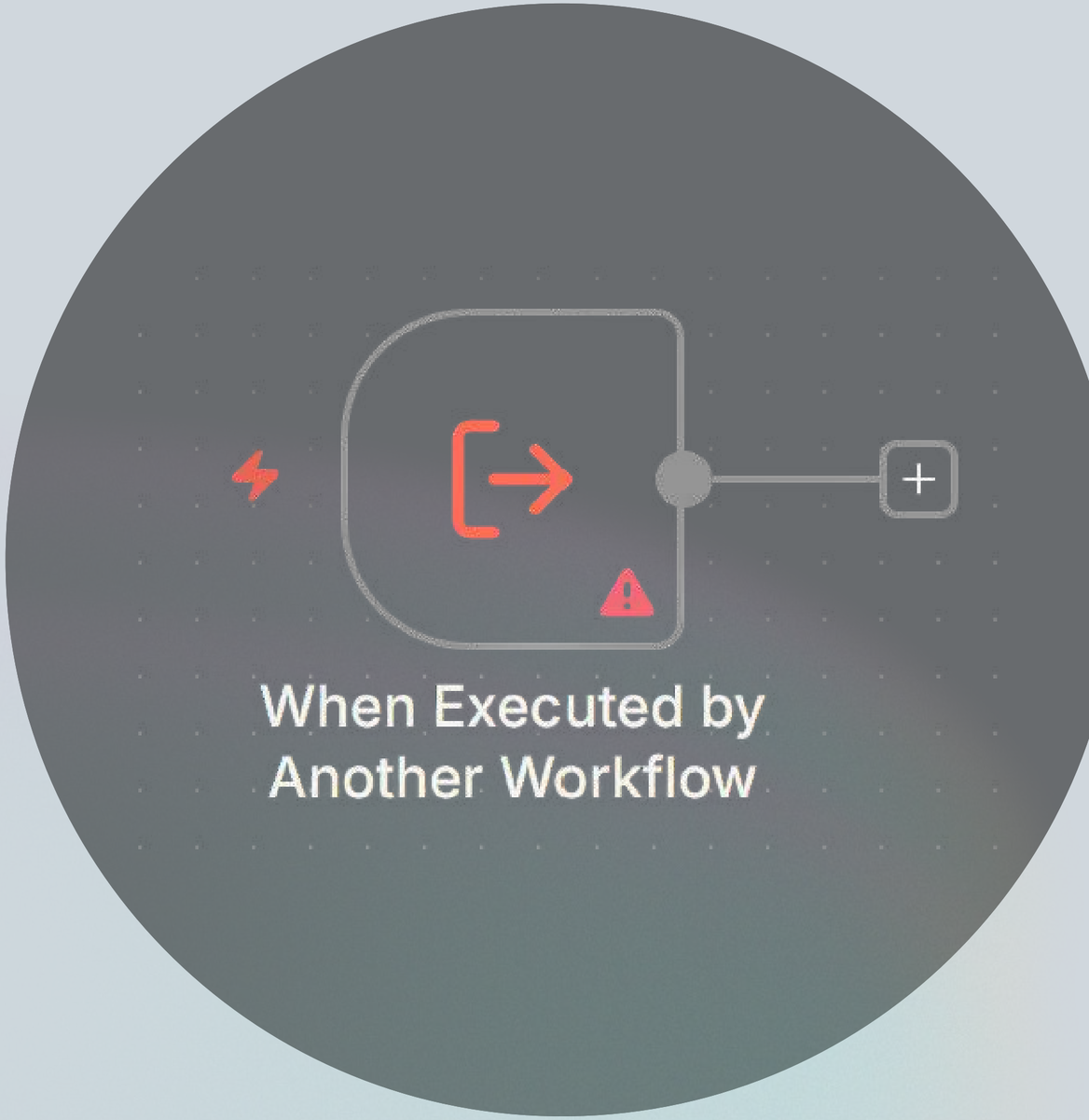
n8n Nodes

4.When Executed by Another Workflow

- This trigger starts a workflow only when another workflow calls it.
- Allows one workflow to call another workflow.

Example:

- ★ Workflow A collects data
- ★ Workflow B sends an email
- ★ Workflow A triggers Workflow B to send the email whenever needed.



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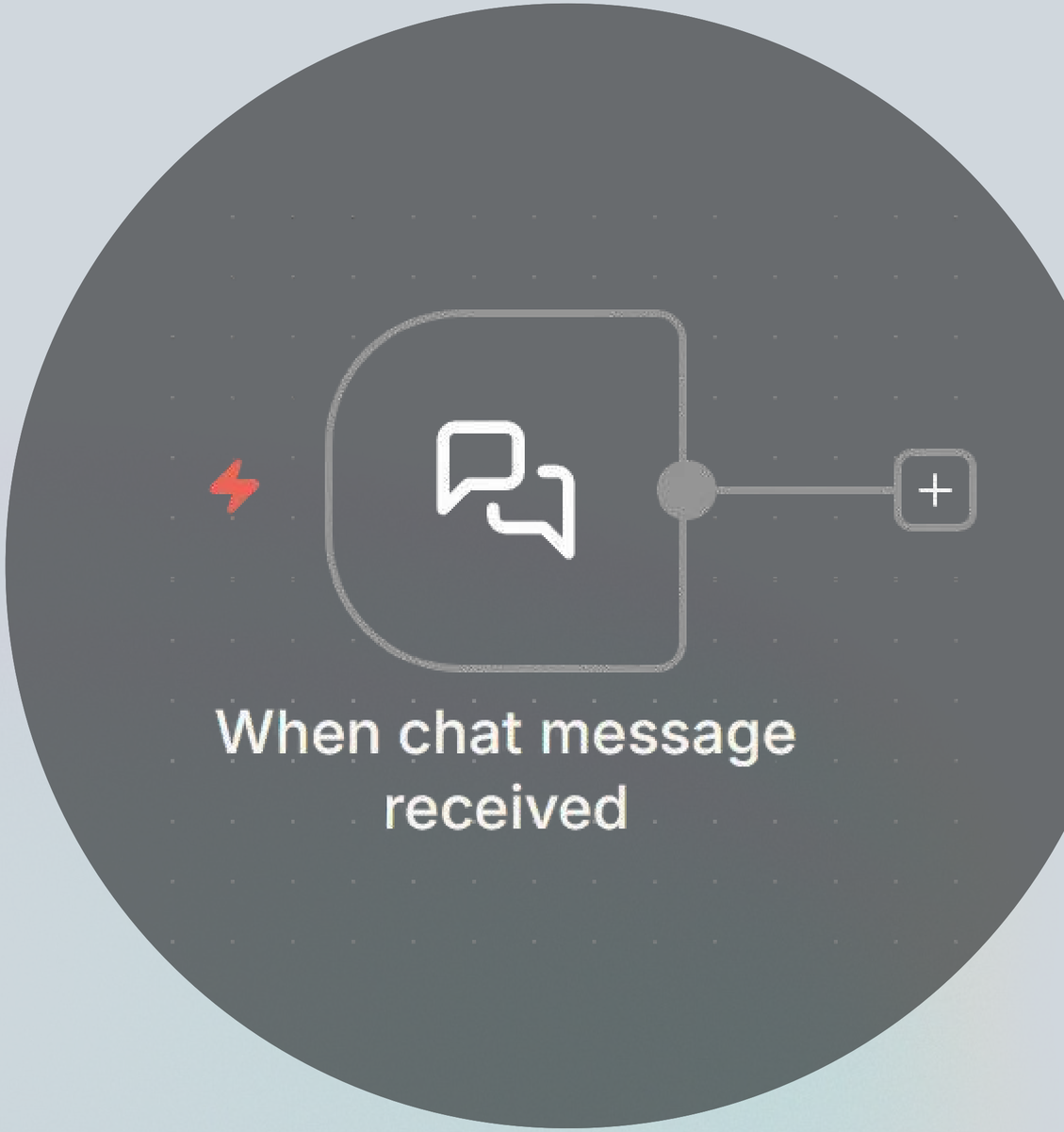
n8n Nodes

5.On chat Message

- Runs the workflow when a user sends a chat message to an AI/chat interface
- This trigger starts your workflow whenever a user sends a message in a chat interface powered by n8n

Example:

User sends: “Tell me today’s weather.”
Workflow triggers, fetches weather data, returns the answer.



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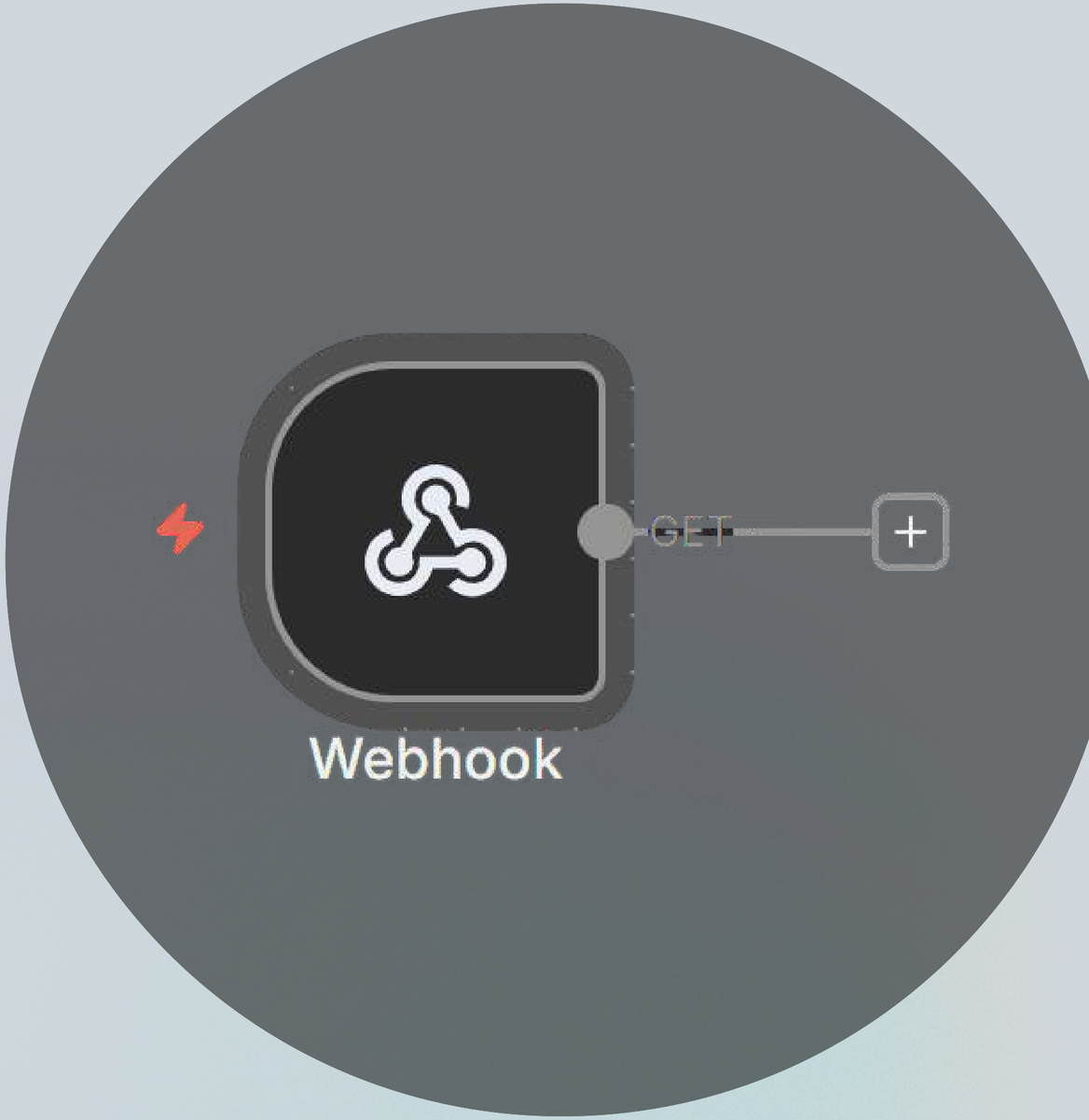
n8n Nodes

6.Webhook Trigger

- Starts the workflow when an external system sends an HTTP request to your n8n webhook URL.
- This is one of the most powerful triggers in n8n because it lets anything that can make an HTTP request talk to your workflow

Example :

A website form sends data to your webhook. n8n receives it and stores it in Google Sheets.



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{.json}

JSON Basics & Expressions

JSON

- JSON means **JavaScript Object Notation**
- It's a lightweight format used to store and share data between apps, websites, servers, or APIs.

How JSON Works:

It Always starts with :

- Curly braces { }
- Key : value pairs
- Double quotes around keys and strings

```
{
  "name": "Treuno",
  "age": 20,
  "skills": ["Python", "n8n", "ESP32"],
  "isStudent": true
}
```

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JSON in n8n

{.json} x

JSON in n8n – How JSON Works in n8n ?

JSON Expressions in n8n use dynamic values inside nodes

1.$json

```
{{ $json.email }}
{{ $json.age }}
```

2.$node["Node Name"].json

```
{{ $node["HTTP Request"].json.data }}
```

3.$items()

```
{{ $items(0).json.username }}
```

4.$now

```
{{ $now }}
```

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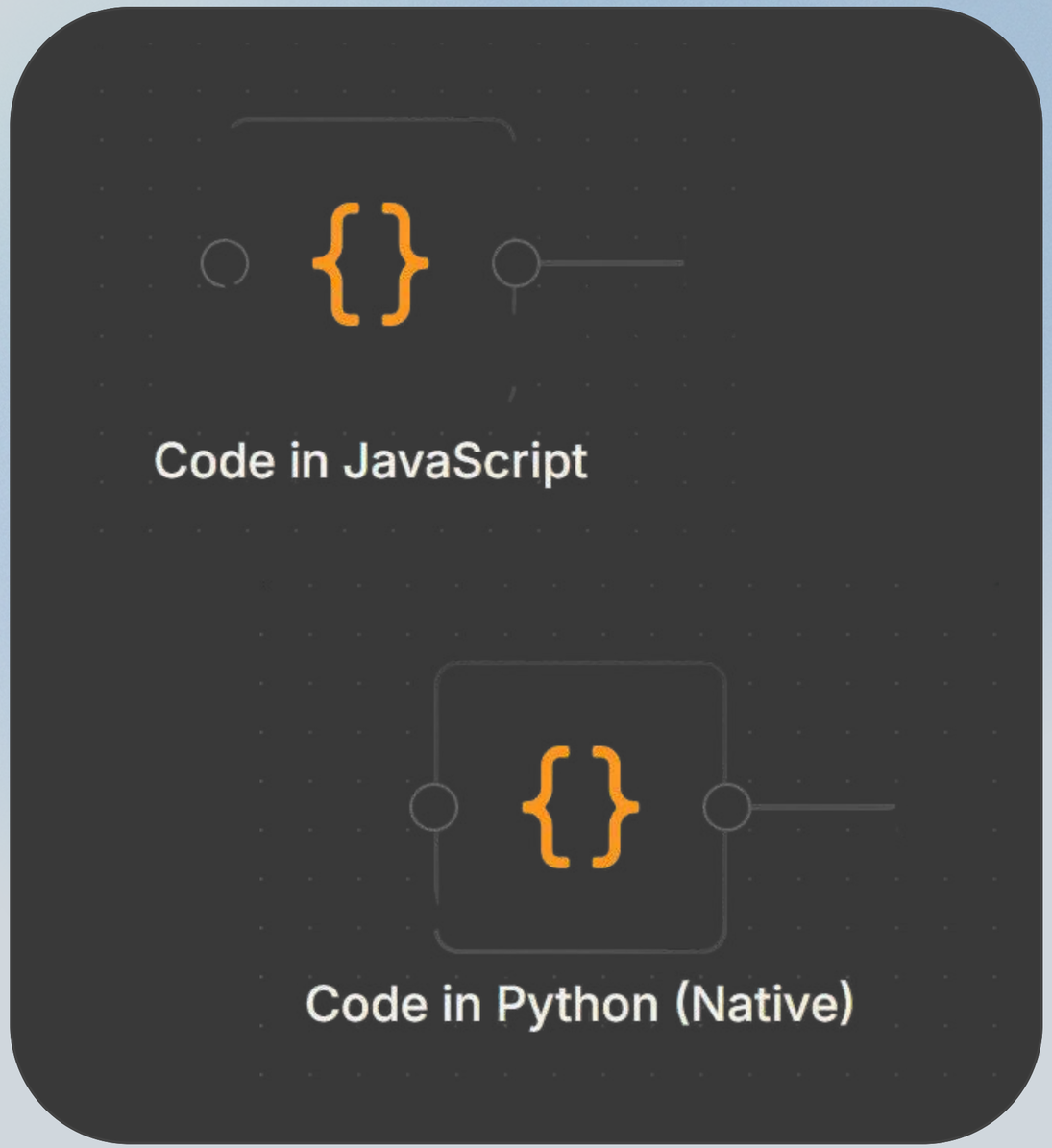
WEEK 2

Integration & Workflow logic

n8n Core Nodes

Code Node {}

- Allows you to write your own JavaScript or Python code inside the workflow.
- The Code Node lets you write (JavaScript) or (Python) inside your workflow to customize the logic.



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WEEK 2

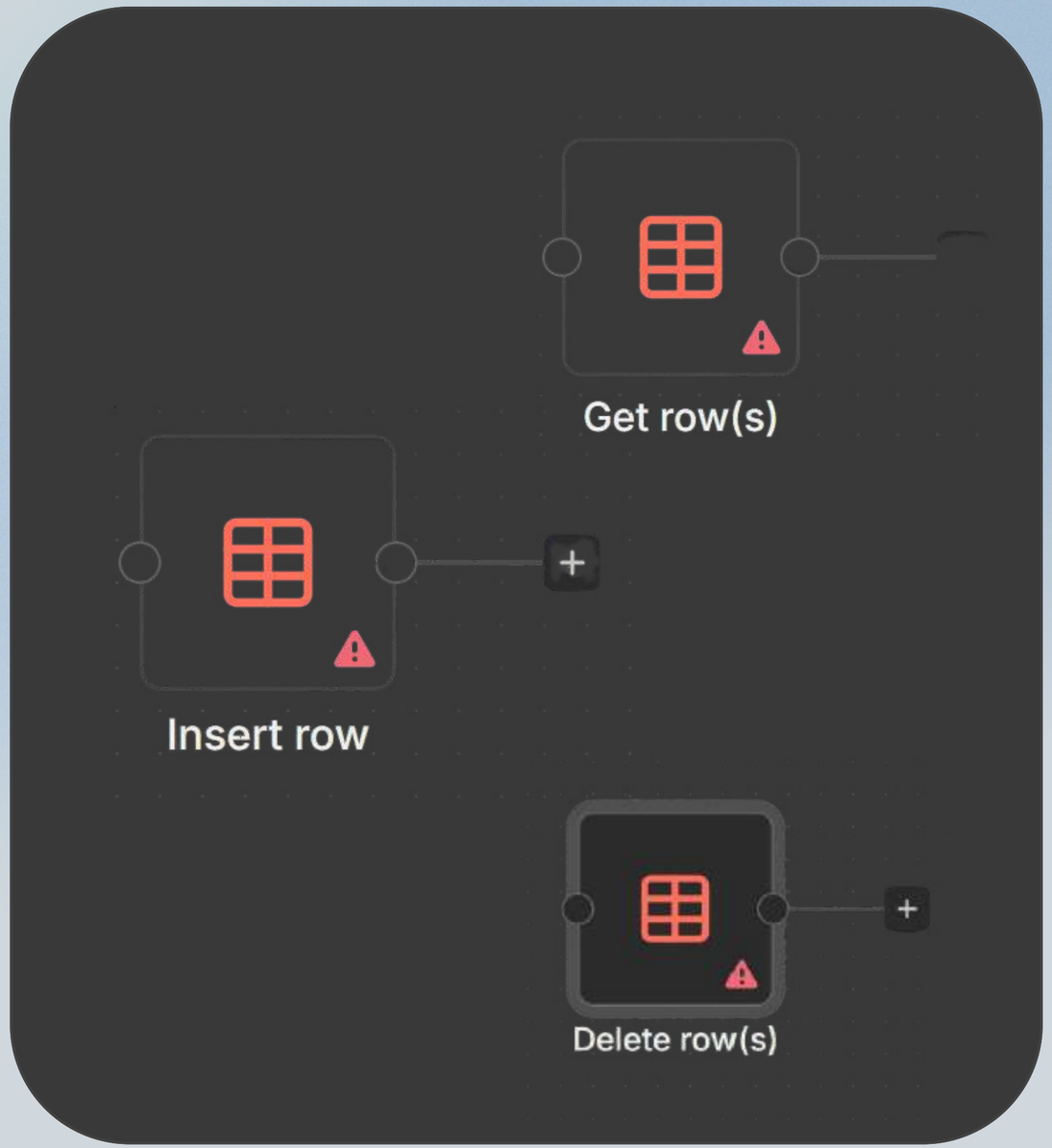
n8n Core Nodes

Data Table

- Data Table node store data permanently inside n8n
- Normal workflow data disappears after execution. Data table saves information even after the workflow stops

Types of Data table

- Delete rows
- Get rows
- Update rows
- upsert rows
- If rows exist
- If rows does not exist
- Insert rows



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WEEK 2

n8n Core Nodes

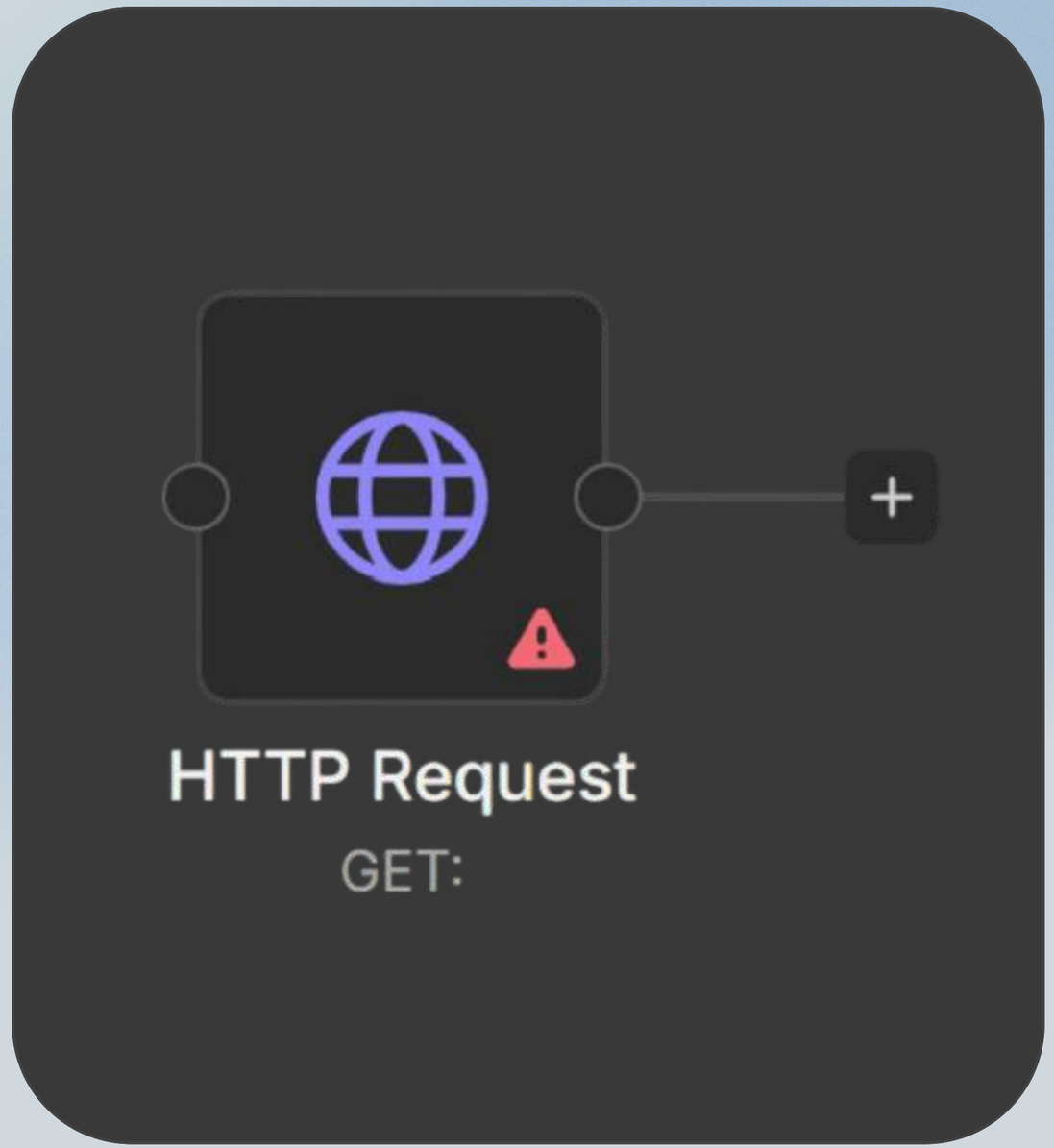
HTTP Request Node

- Sends requests to external APIs and gets data back
- It goes out, talks to another website, grabs information, and brings it back.

Where HTTP Request Node used

To connect with:

- Weather API
- Payment API
- Google Sheets API
- ChatGPT API
- Any website or online service



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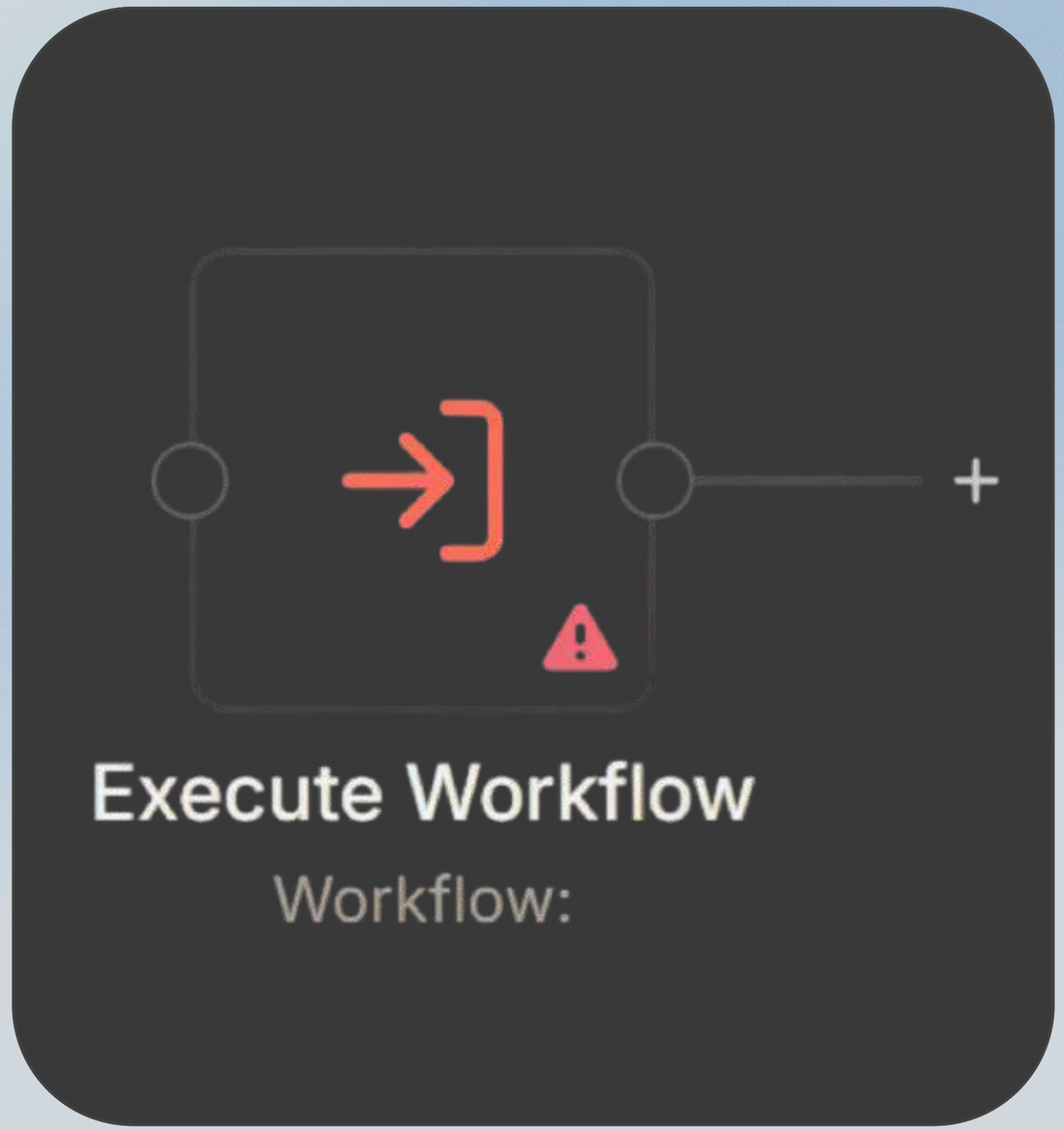
n8n Core Nodes

Execute Sub-workFlow

- Runs another workflow from inside the current workflow
- Imagine your workflow has a helper.
  Whenever it needs help, it calls another workflow to do a task.

Where it used

- One workflow for sending emails
- One workflow for cleaning data
- One workflow for generating reports
- One workflow for AI processing



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n8n Core Nodes

Execution Data

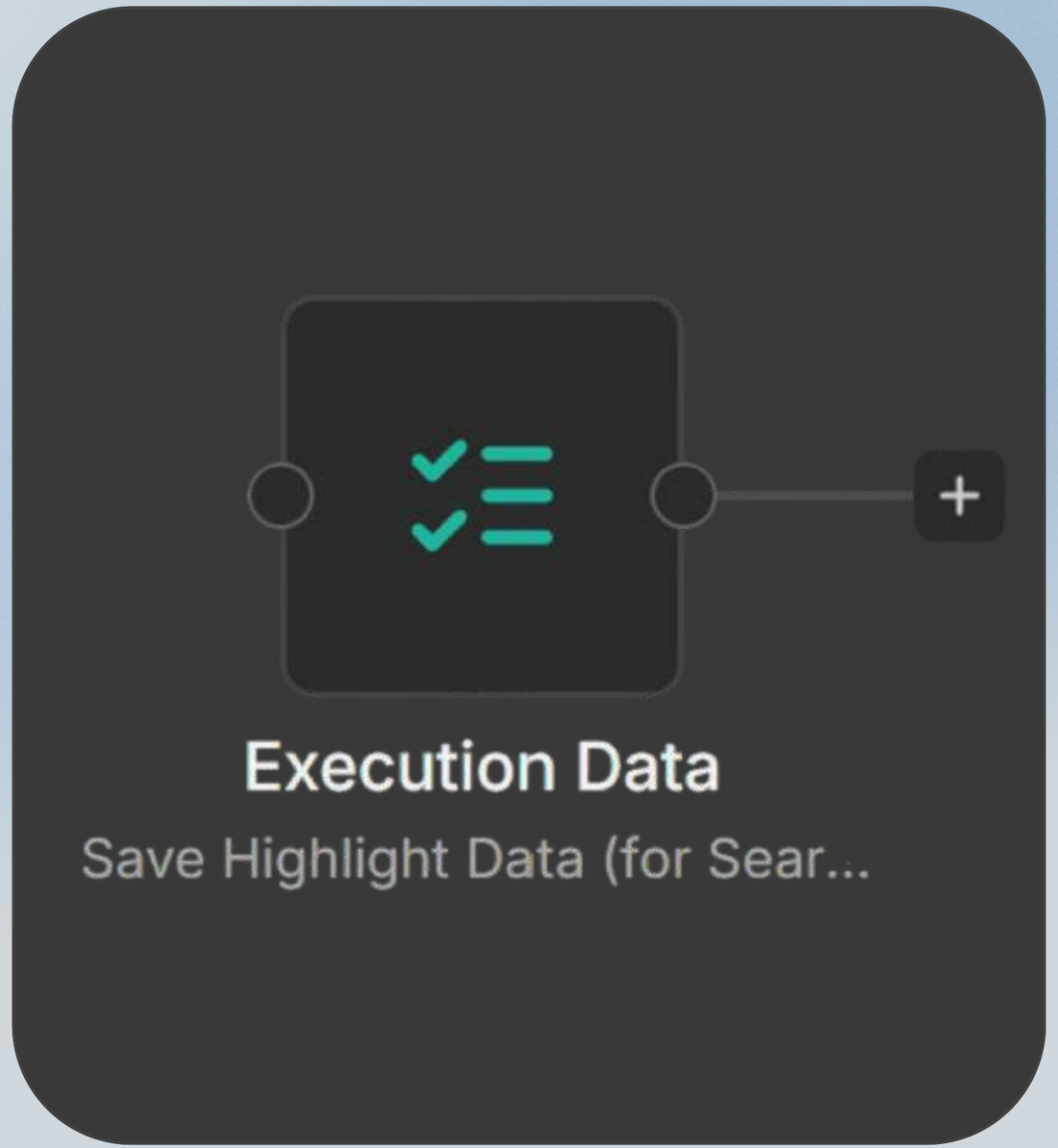
- Stores extra information inside each workflow run so that you can search, filter, or review workflows later.
- Think of this as writing a sticky note on your workflow's run. It helps you find or analyze old runs easily.

Where it used

When your workflow processes important data (order ID, user ID, error codes, etc.), you use this node to tag the execution.

```
{ "orderId": "1245", "customer": "Anand" }
```

Later, you can search:
"Show me all runs with orderId 1245"



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n8n Core Nodes

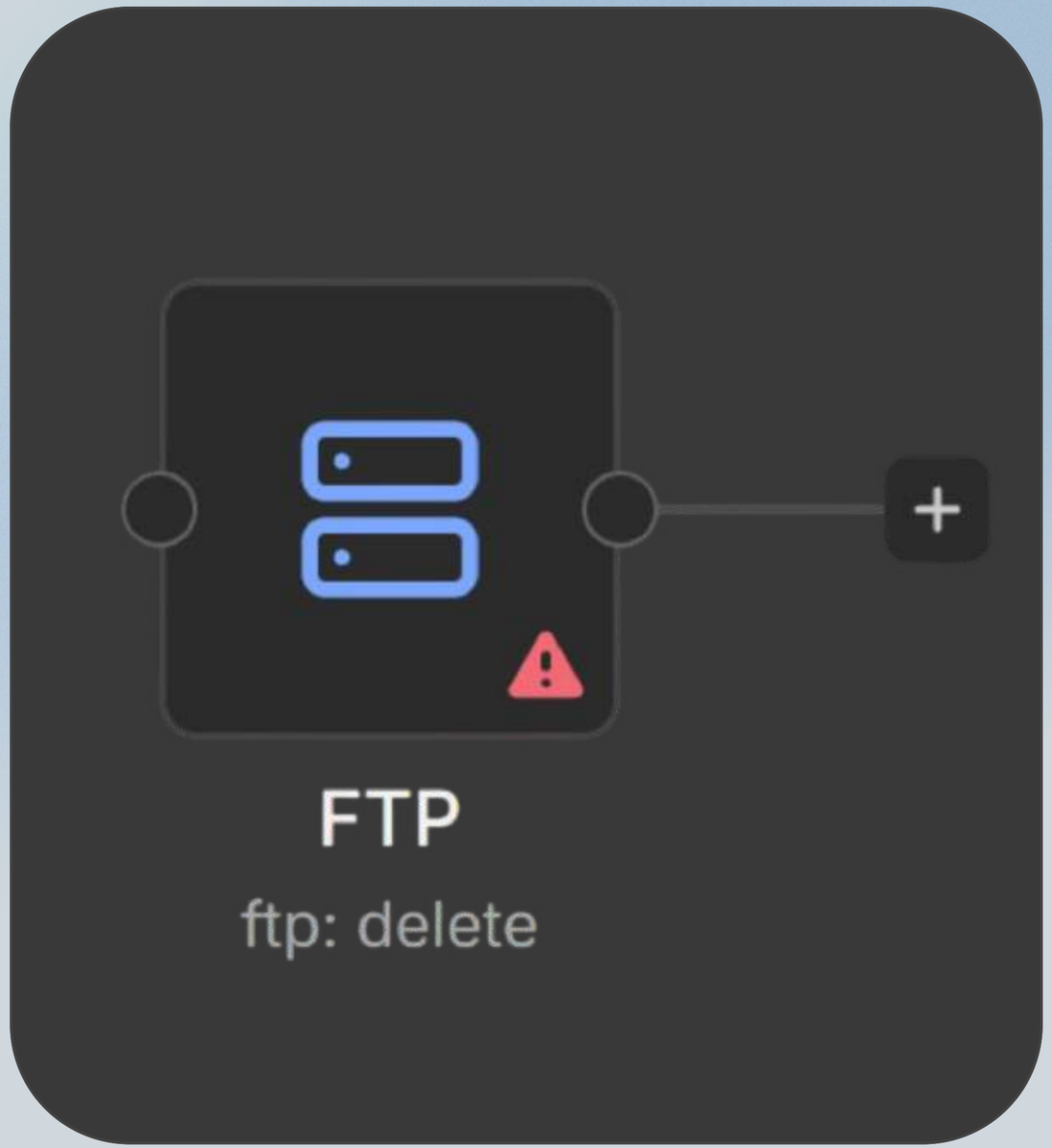
FTP – File Transfer Protocol

- This node helps to Transfer files via FTP

Where it used

Connects to a remote server and lets you:

- upload files
- download files
- list files
- delete files



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n8n Core Nodes

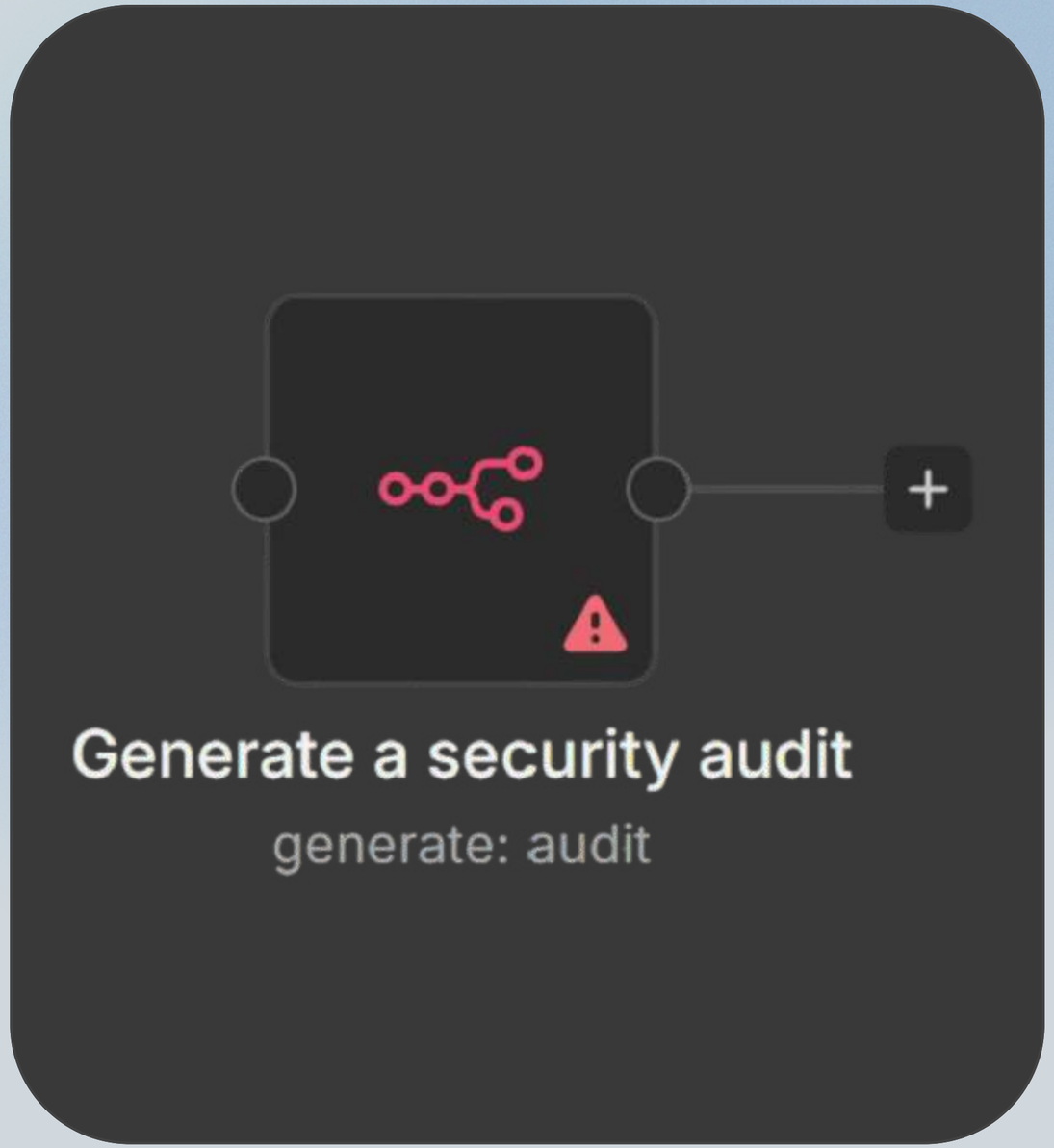
n8n Node

- The n8n Node is a special “control” node that lets your workflow interact with the n8n system itself
- Most nodes talk to other apps (Telegram, Google Sheets, APIs). But this node talks directly to n8n like giving your workflow its own remote control

Why we use this ?

★ real automation requires: monitoring, restarting, managing, triggering other flows.

★ The n8n node becomes the admin of your automation system



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n8n Core Nodes

n8n Form

- Generate webforms in n8n and pass their responses to the workflow
- The n8n Form nodeCreates a form page that users can fill out. When submitted, the workflow continues with the provided answers.

Example :

- Feedback form
- Student registration form
- Collecting email + name
- Collecting parameters for a chatbot

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n8n Core Nodes

No operation, do nothing node

- The No operation node does not do anything

Where this node is used ?

Because sometimes you need :

- a placeholder
- a dummy connection
- an empty branch
- a temporary stop

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n8n Core Nodes

Respond to webhook node

- The Webhook Respond node Returns data back to the caller of a webhook

- When your webhook receives data, you may want to reply. This node sends that reply.

Where it is used ?

- Web apps
- Mobile apps
- Payment gateways
- Custom websites

Example :

```
{ "name": "Arjun" }
```

Webhook receives

⟷

```
message": "Hello Arjun!
```

Reply from n8n

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n8n Core Nodes

Wait Node

- Wait node is used to passes the workflow before continuing the execution

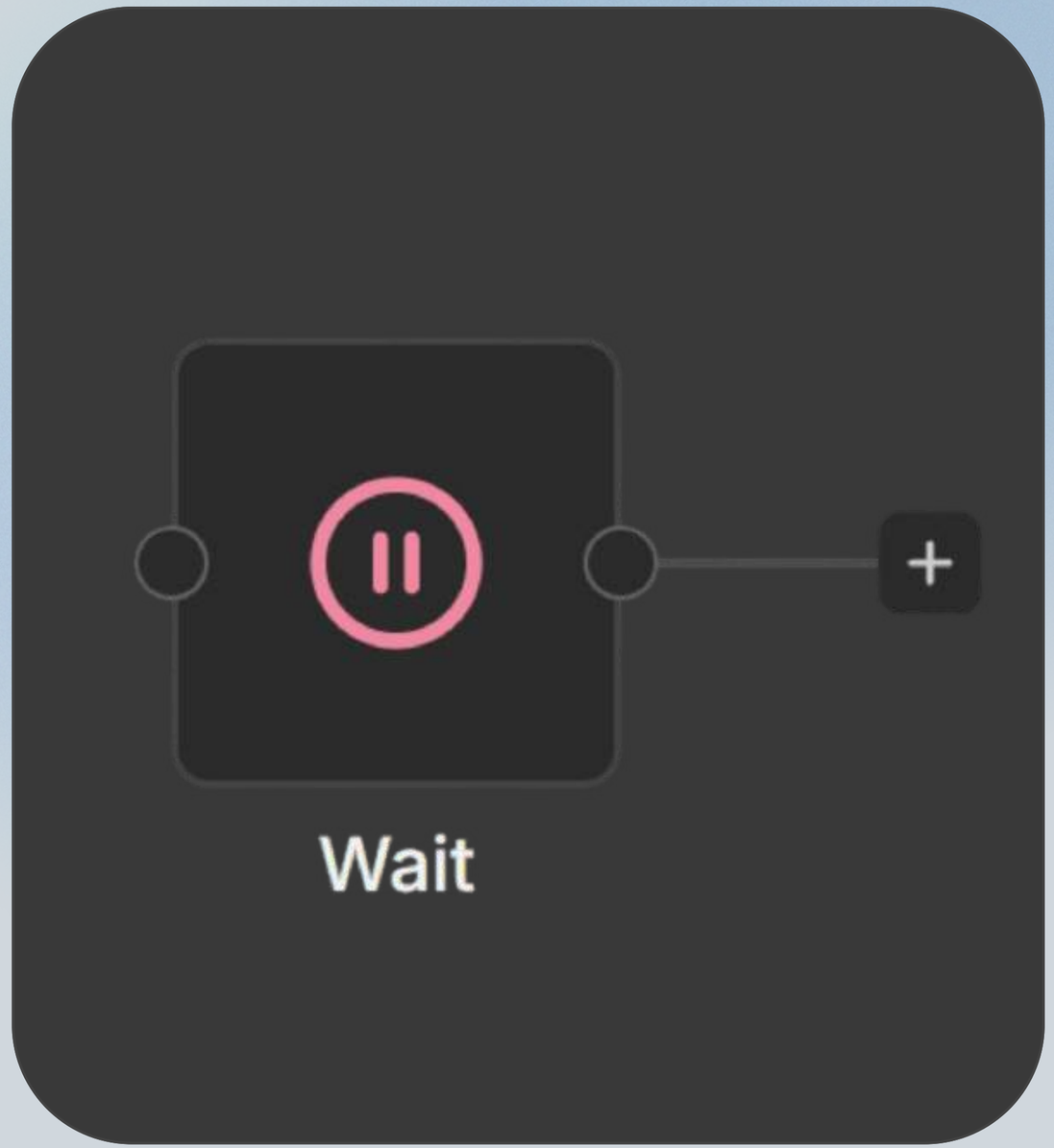
What it does ?

Pauses the workflow for:

- seconds
- minutes
- hours
- days
- until a date
- until an external event happens

Example:

User : Wait for 2 hours, then send a follow-up email.



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n8n Core Nodes

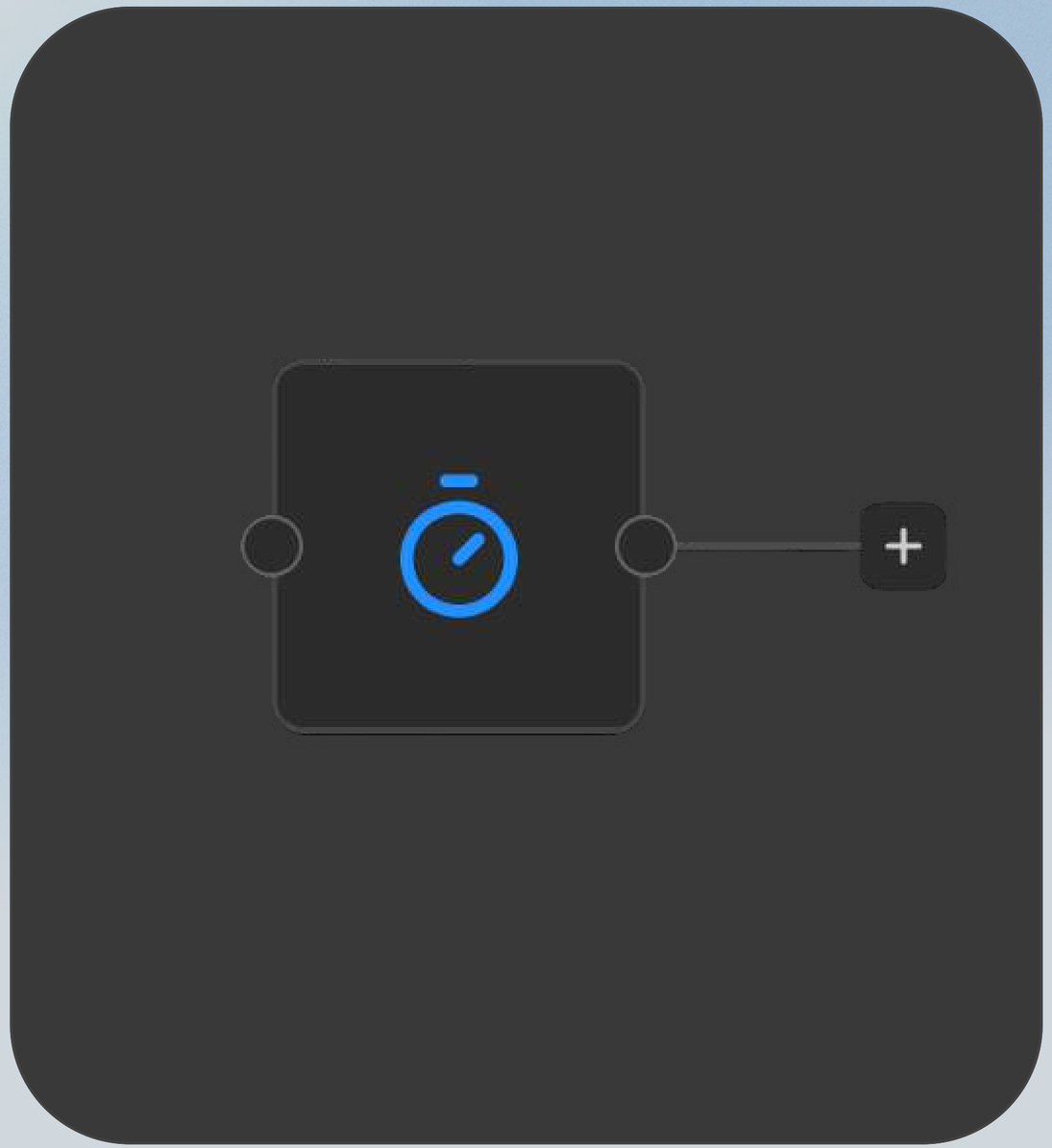
Time Saved node

- The Time Saved node is a simple core node used to measure how long a specific part of your workflow took to run

Why it is used ?

It helps you track:

- execution duration
- performance
- speed of automations
- time taken between two points in your workflow



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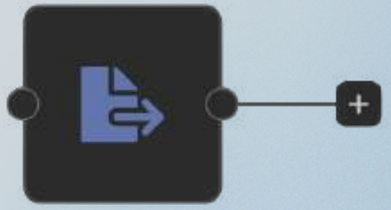
File conversion in n8n

WEEK 2

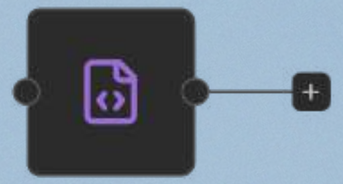
Compresion node helps to compress decompresses files: to zip, unzip, gzip

Converts text between:

- Markdown → HTML
- HTML → Markdown



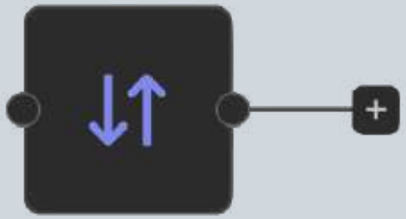
Extract from File nodeReads binary files (PDF, TXT, CSV, JSON file, etc.) and extracts their content as JSON.



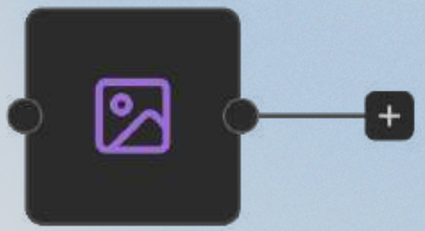
XML node Converts data to and from XML.
You can:

- Convert XML → JSON
- Convert JSON → XML

Rename node helps to rename field names inside your data.



Sort node does sorts items based on ascending, decending, alphabetical, numerical



Edit node helps to Edit, modify images directly inside n8n.

HTML nodeHelps you work with HTML content, such as:

- Extract text using CSS selectors
- Read tables or lists
- Clean or format HTML
- Parse website content

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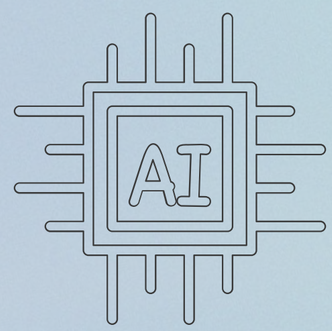
WEEK 3

AI Automation & Advanced logic



LLM & AI Agent in n8n

LLM – Large Language Model

LLM is an AI model trained on huge amounts of text so it can understand and generate human language

Example : Chatgpt, Gemini, Claude

Agentic Ai

AI that can take actions, make decisions, and complete tasks on its own.

LLM & AI Agent in n8n

AI Agent

- Ai Agent node Creates an AI agent inside your workflow
- Ai Agent can think, Plan, Decide , use tools, run actions, solve tasks step-by-step

Example:

Find today's weather, write a summary, and email it to me.

The AI agent do:

1. Fetches weather
2. Writes summary
3. Sends email

LLM & AI Agent in n8n

Ollama

- Ollama is a tool that lets you run AI models locally on your own computer instead of using online APIs
- The Ollama node allows n8n to talk to your local AI model

Guardrails

- Guardrails are like filters and safety rules that protect your AI from harmful inputs, unsafe prompts, inappropriate outputs, security risks
- Guardrails Node controls what the AI is allowed to read, respond and generate

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LLM & AI Agent in n8n

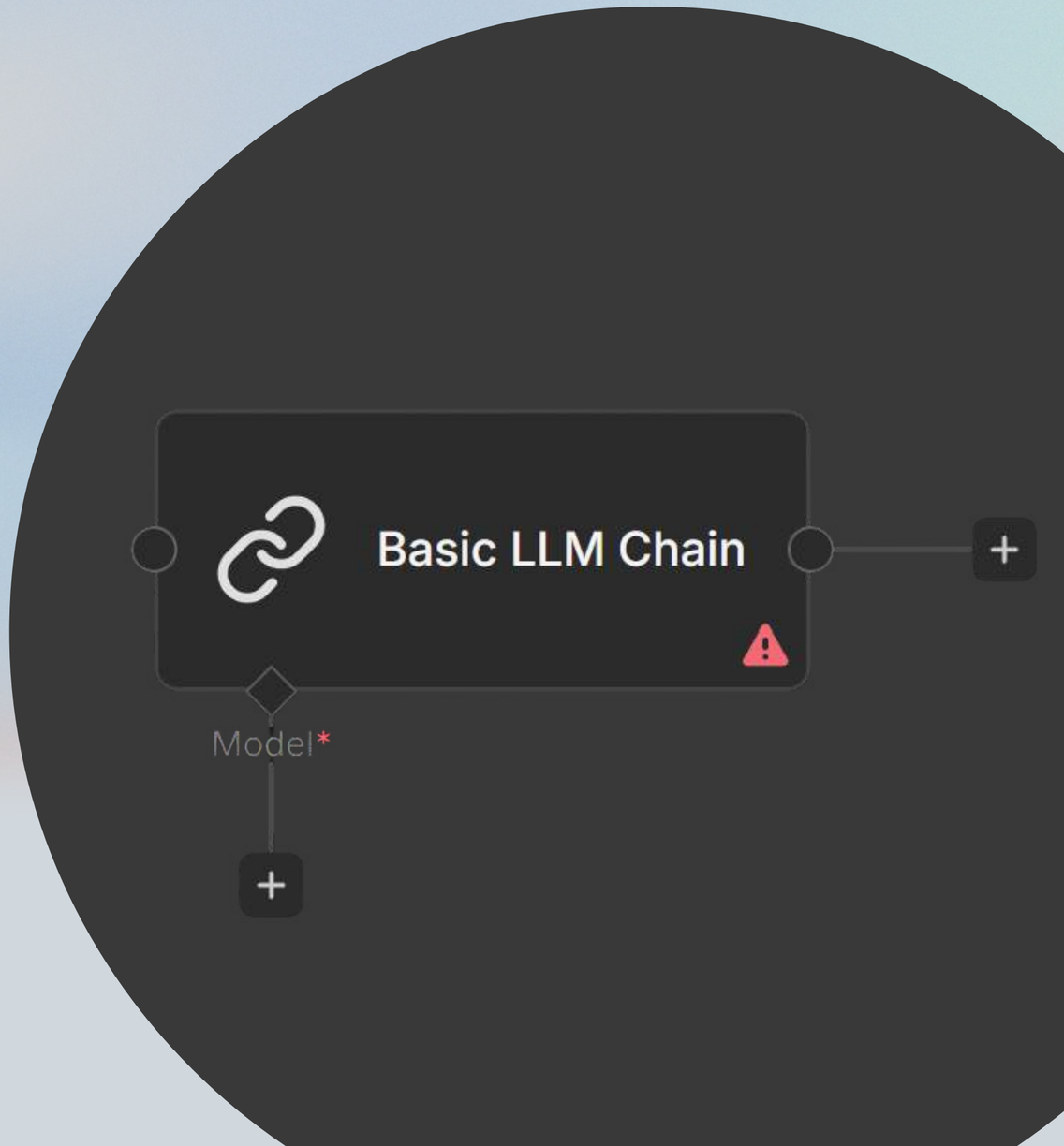
LLM chain node

- LLM chain node Sends a prompt to an AI model (like ChatGPT, Gemini, or Claude) and gets a response.

- For simple tasks where you just want the AI to answer or generate text

Examples:

- Explain Python in simple words
- Write me a poem
- Generate 10 quiz questions



LLM & AI Agent in n8n

Information Extractor

- Takes a long text and extracts specific details from it in a structured format.

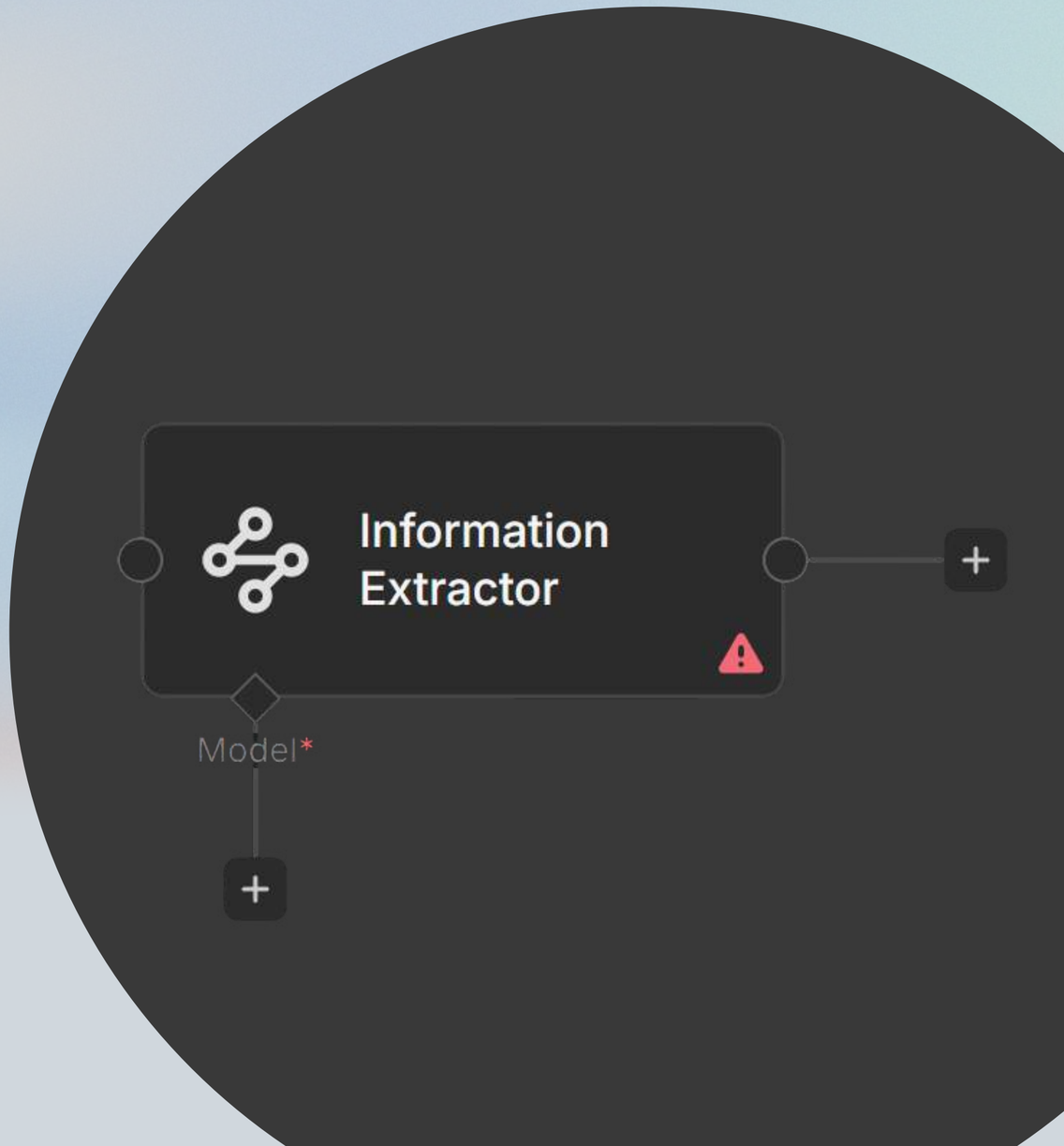
Example :

Input text from user :

John Doe, age 23, lives in Chennai... phone +91 9876543210...

Extracted output:

```
{
  "name": "John Doe",
  "age": 23,
  "city": "Chennai",
  "phone": "+91 9876543210"
}
```



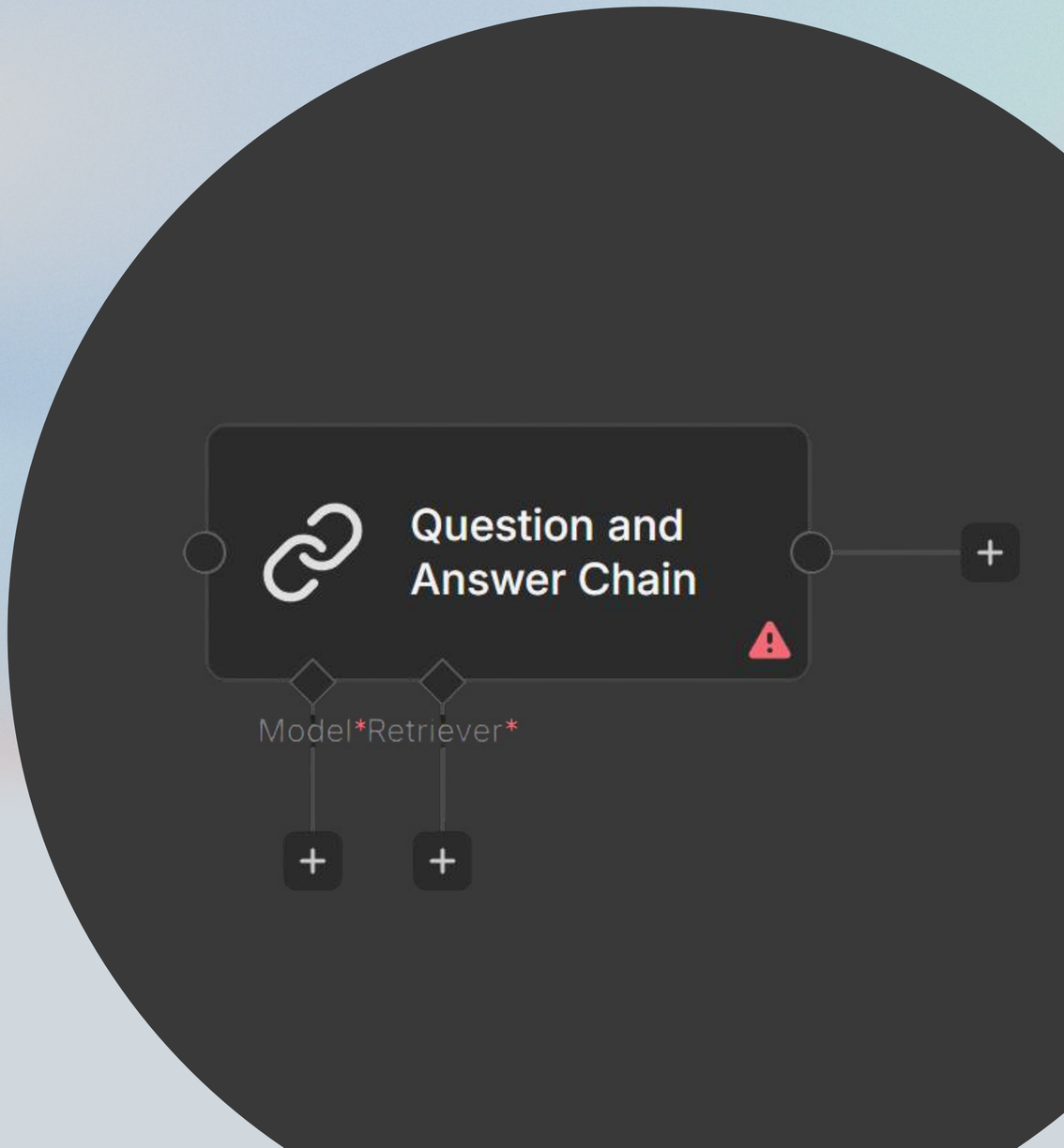
LLM & AI Agent in n8n

Question and Answer Chain

- Question & Answer chain node Helps you ask questions based on documents or retrieved text

Example :

Document: “The solar system has 8 planets...”
Question: “How many planets are there?”
Answer: “8.”



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WEEK 3

LLM & AI Agent in n8n

Sentiment Analysis

- Sentiment Analysis node Detects the emotion or feeling inside text

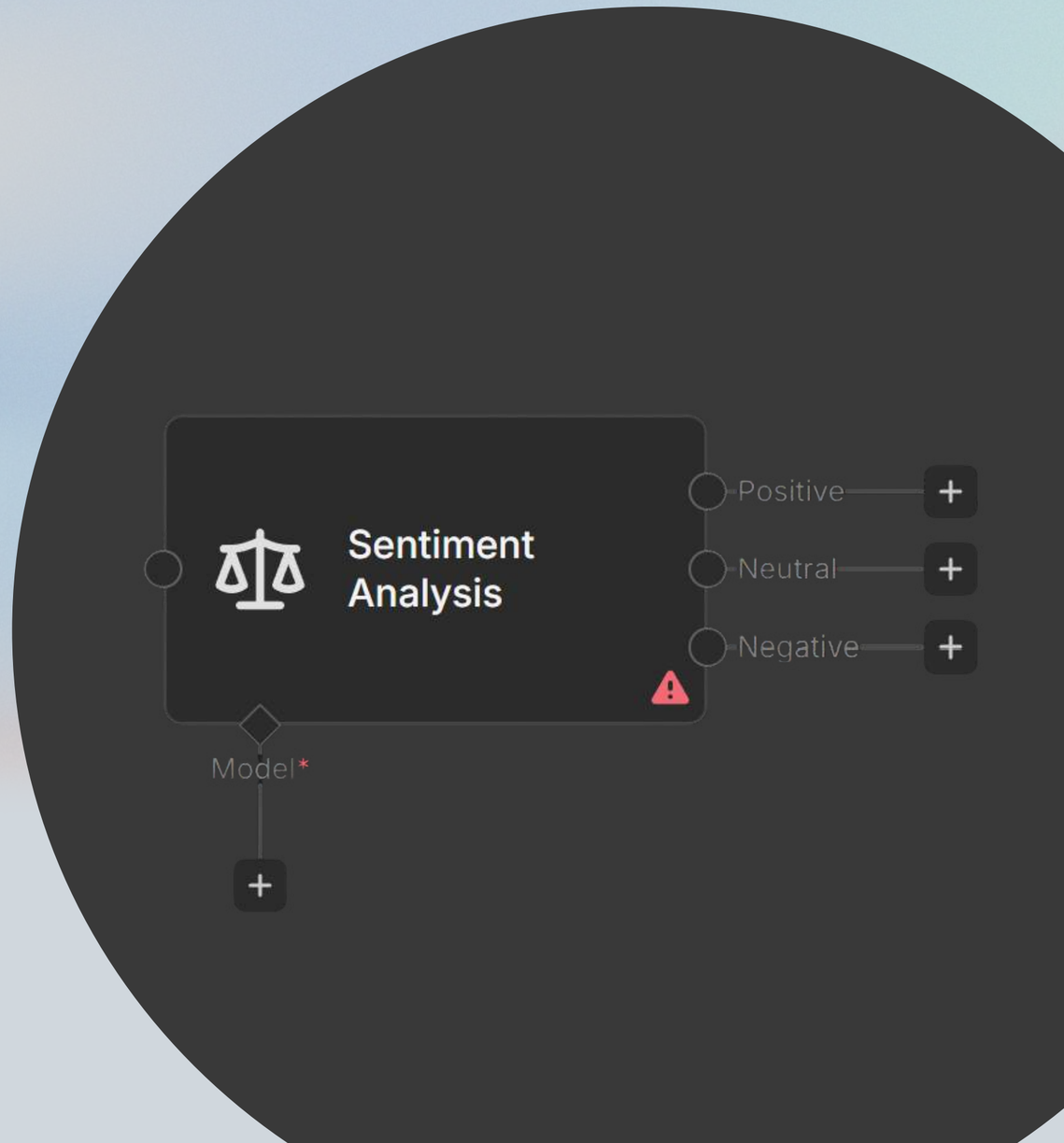
Where it used ?

It labels text as:

- Positive
- Negative
- Neutral

Example :

Text: “I love this product!” → Positive
Text: “This is terrible.” → Negative



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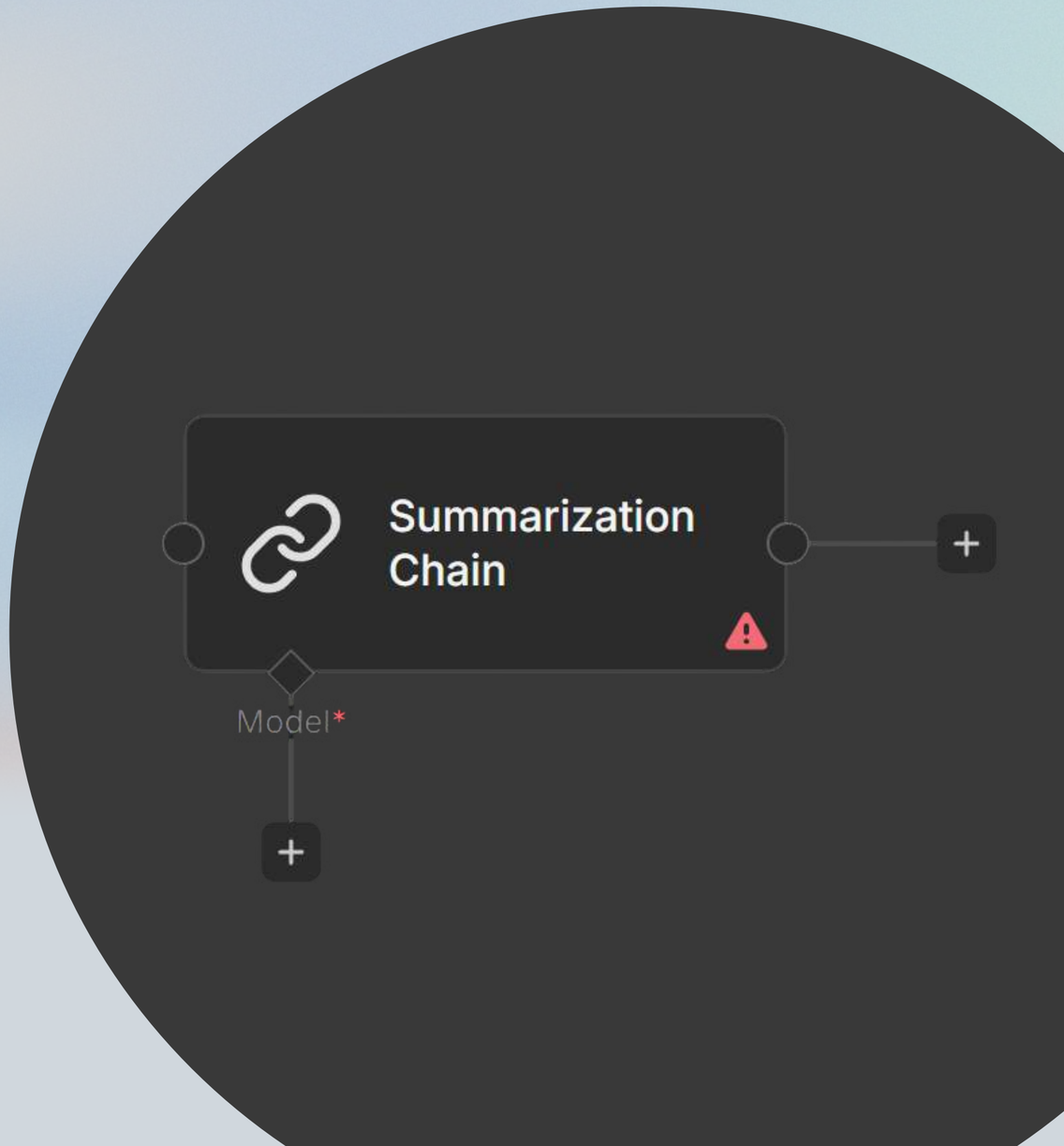
LLM & AI Agent in n8n

Summarization Chain

- Summarization chain node Takes long text and turns it into a short, clear summary.

Example :

- Essay → Summary
- News article → Key points
- Meeting notes → Short version



LLM & AI Agent in n8n

Text Classifier

- The Text Classifier is an AI node that takes any text you give it and automatically assigns a category (label) based on its meaning

How text Classifier works in n8n

You give the classifier:

- a message
- a list of labels/categories
- The AI checks the meaning of the message.
- It picks the best matching label.

Example input:

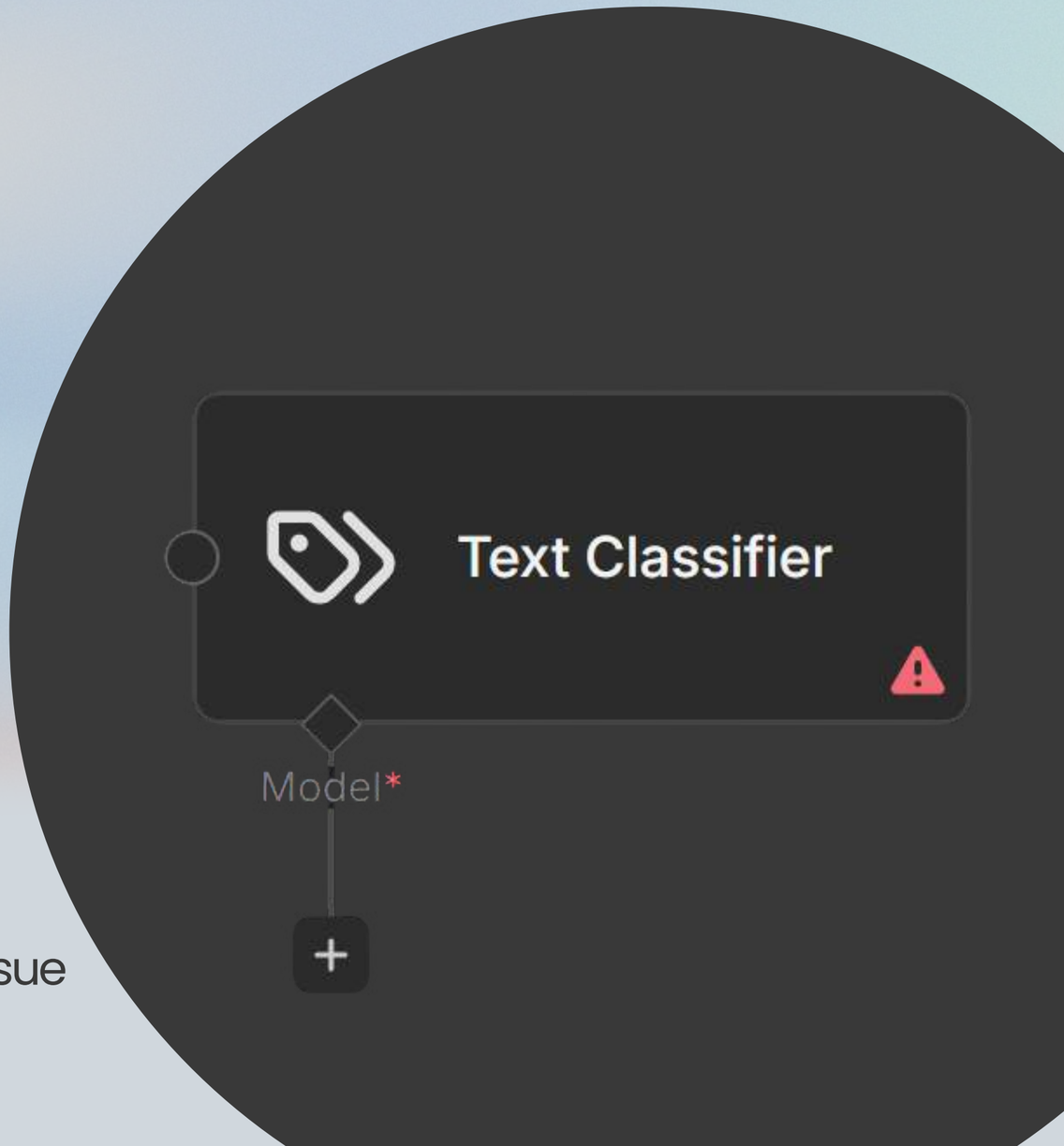
"I cannot log into my account."

Classifier output:

Login Issue

Your labels:

- Payment Issue
- Login Issue
- Order Issue



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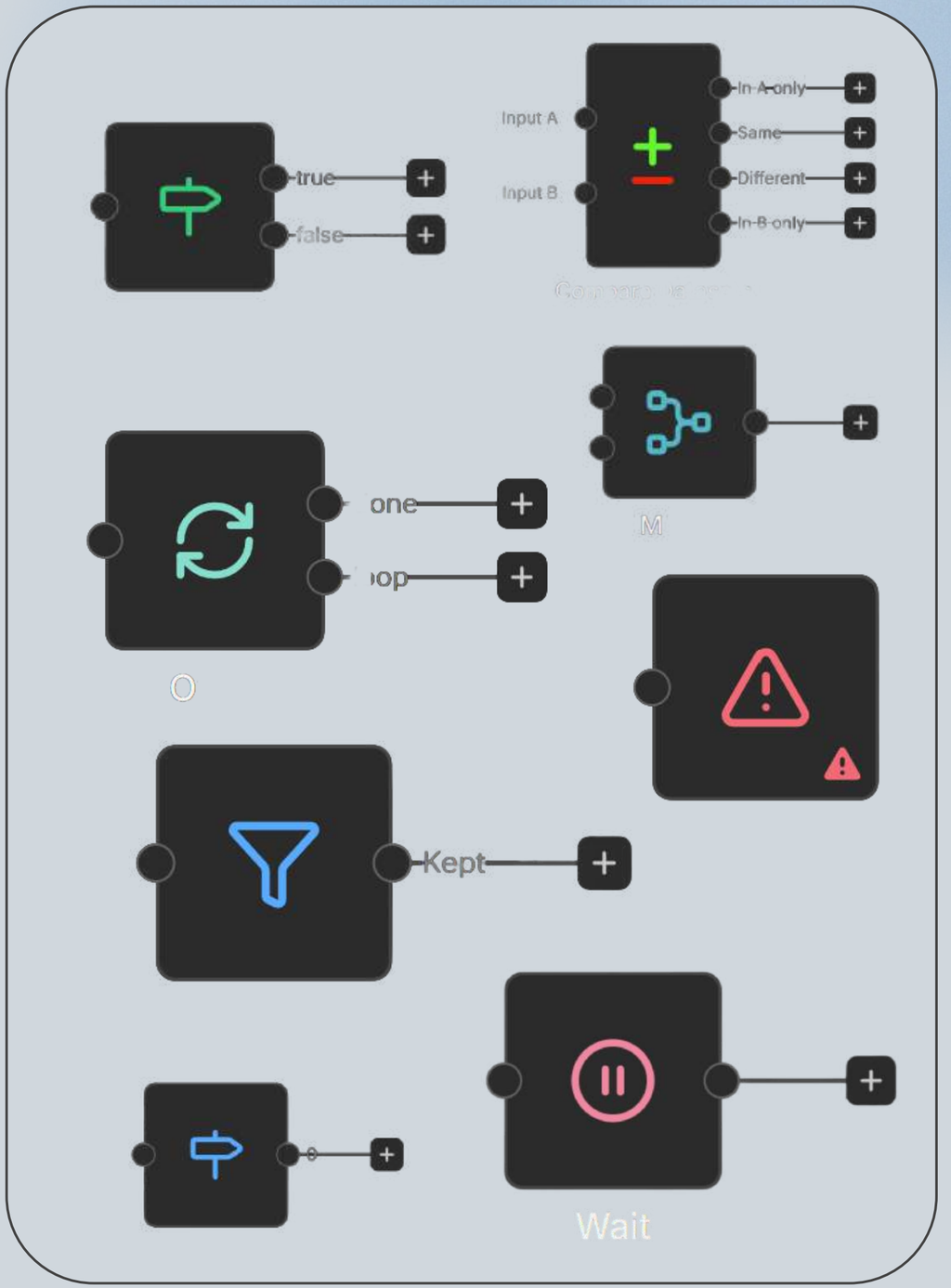
loops, batching & Parallel (Flow Nodes) Workflows

Types of loops, batching, and parallel workflows

- Flow Node
- If Node
- Loop Over Items
- Merge Node
- Compare Datasets
- Stop and Error Node
- Switch Node



WEEK 3

VISION TO VALUE

Filter Node

Filter node Removes data items that do NOT match a condition

Example:
You have a list of students:

- Only keep students who scored above 80
- Remove all others

Example (Real data) :

Input list:

- Raj, age 17
- Neha, age 20
- Karthik, age 25

Condition:

age > 18

Output:

- Neha
- Karthik

Raj (17) is removed.

How Does the Filter Node Work?

1. You give it a condition (or multiple conditions).
2. It checks each incoming item.
3. If the item matches the condition → it is kept.
4. If not → it is removed.

Only matching items go to the next node.

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If Node

Splits the workflow into two branches:

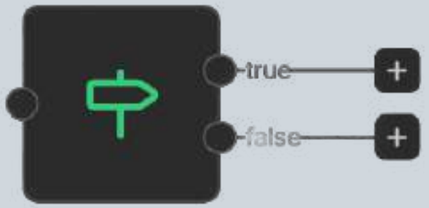
- TRUE branch (if condition is met)
- FALSE branch (if condition is not met)

Example : Age Check

Condition :

age > 18

If student age is 20 → goes to TRUE branch
If age is 16 → goes to FALSE branch



How the If Node Works ?

1. You give it a condition to check
2. It reads the incoming data
3. It compares the value with your rule
4. It sends the data into:
    - YES/TRUE path
    - NO/FALSE path

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Loop Over Items (Split in Batches)

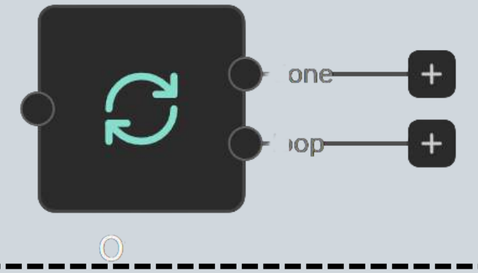
Loop Over items node lets you take a large list of items and process them in small groups (batches) instead of all at once.

Example:

You have 100 emails to send.

You process them:

- 10 at a time
- or 20 at a time
- instead of all 100 together



How It Works ?

you have 50 items.
You set:

- Batch size = 10

The node will produce batches like:

1. Batch 1 → Items 1–10
2. Batch 2 → Items 11–20
3. Batch 3 → Items 21–30
4. Batch 4 → Items 31–40
5. Batch 5 → Items 41–50

Each batch is processed separately.

The loop continues until:

- all batches are processed
- no more items left

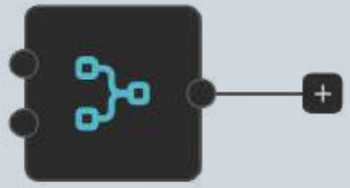
VISION TO VALUE

Merge Node

The Merge Node combines data from two different branches in your workflow into one output.

Example:

Branch A: Student details
Branch B: Student marks
Merge → Full student profile



How it works in n8n ?

- Branch A: User details
- Branch B: User order history

N8N merge node converts them into JSON :

```
{
  name: "Arun",
  email: "arun@gmail.com",
  orders: [...]
}
```

VISION TO VALUE

Compare Datasets

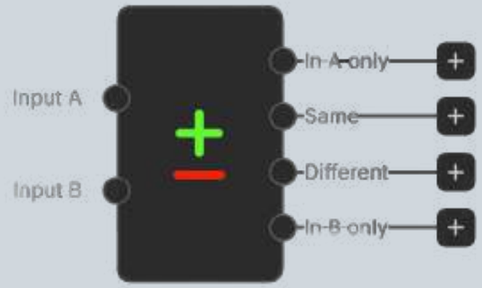
The Compare Datasets node takes two sets of data and checks what has:

- Changed
- Been added
- Been removed
- Stayed the same

Example:

Compare last week's customer list with today's list:

- new customers
- removed customers
- updated customers



How the Node Works ?

- **Dataset A (Usually old data)**

Example: (Yesterday's data)
OR last version
OR old CSV

- **Dataset B (New data)**

Example: (Today's data)
OR updated version
OR new CSV

The node compares them item by item.

VISION TO VALUE

Stop and Error Node

- The Stop and Error node is like a safety brake in your workflow.
- When this node runs, it immediately stops the entire workflow and shows an error message that you choose.

Example : Missing Email ID

check:

If $json.email is empty → Stop the workflow.

Stop and Error Node Output:

Error: Email is missing. Cannot continue.

Why Do We Need the Stop and Error Node?

Sometimes:

- required data is missing
- a user enters wrong input
- an API returns something invalid
- a condition fails

If you allow the workflow to continue, it may:

- send wrong emails
- break downstream nodes
- update wrong records
- produce wrong results
-

Stop and Error node acts as a guard.

VISION TO VALUE

Switch Node

- The Switch Node checks the value of your data and then sends it down different paths based on matching conditions.
- It's used when you want to route items into multiple categories, not just True/False.

Example (Real Data)

Student Grades :

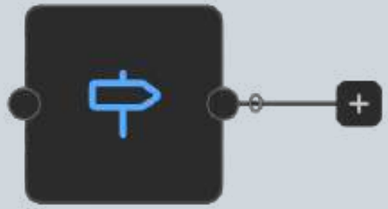
Input:

grade = "B"

Switch cases:

- A → Branch 1
- B → Branch 2
- C → Branch 3

Output goes to:
Branch 2 (because grade = B)



How It Works ?

1. You choose a value from your input data (example: $json.grade)
2. You add cases:
   - Case 1: A
   - Case 2: B
   - Case 3: C
3. The Switch Node checks the value and sends the item to the matching path.

If no case matches, it can send the item to a default output.

VISION TO VALUE

Data Tranformation

In n8n

Date & Time node

Date & Time nodes Works with dates and times.

Work of Date & time node:

- Add or subtract days
- Convert time zones
- Format timestamps
- Calculate differences

Example:

Convert :

"2025-01-04T10:00:00Z" → "04 Jan 2025, 3:30 PM IST".

VISION TO VALUE

Data Tranformation

In n8n

Edit Fields node

Edit fields node helps to Add, remove, modify, or rename fields in your data.

Examples:

- Add new field: "status": "active"
- Change "name" to "fullName"
- Remove "age" field

VISION TO VALUE

Data Tranformation

In n8n

Limit Node

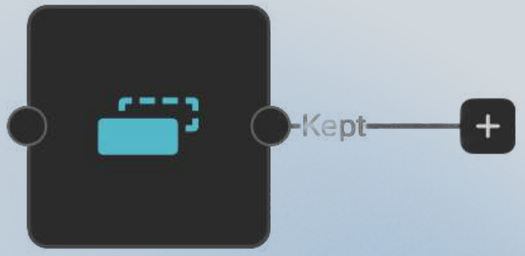
Limit Node make the Limits how many items can pass through the workflow

Example:
If you have 100 items but want only the first 10.

VISION TO VALUE

Data Tranformation

In n8n



Remove Duplicate Node

Remove duplicate node helps at a specific field and removes repeated/duplicate items.

Example:

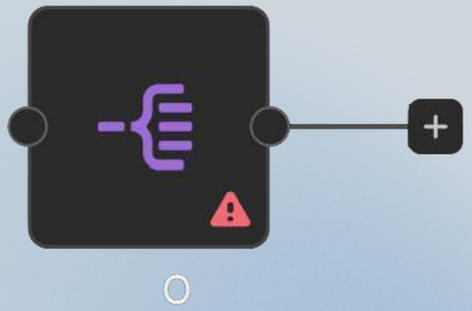
Input names:
["John", "John", "Asha", "Asha"]

Output:
["John", "Asha"]

VISION TO VALUE

Data Tranformation

In n8n



Split Out node

Split Out node Takes a list inside a single item and splits it into multiple individual items.

Example:

Input:

```
{
  fruits: ["apple", "banana", "mango"]
}
```

Output:

```
{ fruit: "apple" }
{ fruit: "banana" }
{ fruit: "mango" }
```

VISION TO VALUE

Data Tranformation

In n8n

Aggregate Node

Aggregate Node Takes a field from many items and combines them into one big list inside a single item.

Example:

Input items:

{name: "Alex"}
{name: "Riya"}
{name: "Sam"}

Aggregate Output:

```
{
    names: ["Alex", "Riya", "Sam"]
}
```

VISION TO VALUE

Data Tranformation

In n8n

Summarize node

The Summarize Node is used to calculate math-based summaries across multiple items.

It works with numbers and helps you get::

- sum
- count
- average
- minimum
- maximum
- first / last
- unique values
- grouped summaries

Example:

Sum of all values

Input:

```
[
  { amount: 10 },
  { amount: 20 },
  { amount: 30 }
]
```

output:

```
sum: 60
```

WEEK 3

VISION TO VALUE

n8n Workflow Design Patterns

Scroll next page for video →

Why we need to use Workflow Design Patterns in n8n?

- easy to understand
- easy to maintain
- reusable
- organized
- scalable

Types of Design Patterns in n8n

- Trigger → Process → Output (The Classic Pattern)
- Split & Merge Pattern
- Loop Pattern
- Routing Pattern (Using IF / Switch)
- Sub-Workflow (Modular Pattern)
- Guardrail Pattern (Safe AI workflows)
- Human-in-the-Loop Pattern
- Data Pipeline Pattern
- Error Handling Pattern
- Multi-Flow Orchestration Pattern

WEEK 4

VISION TO VALUE

motion pieces

Data transformtion in n8n : https://youtu.be/FMP7Hegx1tk?si=uwaR9KonBh1pqMX7raph text **(ENGLISH)**

https://youtu.be/IguI9Nei6cg?si=xU8mBRbXMUigD84lph text **(ENGLISH)**

Data transformtion in n8n : https://youtu.be/ImcdbbVKQmA?si=TA6htB_6-ThvccFTph text **(TAMIL)**

n8n nodes : https://youtu.be/-H-9M01OU9Y?si=3FviNPSJUx-L9TRu

https://youtu.be/tf1mnCVWJkQ?si=e_Ani0woVu9AuF3n **(ENGLISH)**

n8n : https://youtu.be/7_PeuTsx7UM?si=cIliGjiNsjdf6GoB

https://youtu.be/UIf-SImMays?si=1r35pnlp5lFvR0II **(ENGLISH) FREECODE CAMP**

https://youtu.be/GIZzRGYpCbM?si=3GGX3S9KGkcjggvc

WEEK 4

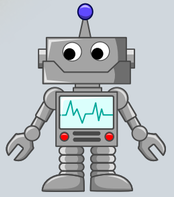
VISION TO VALUE

Designed by: 2

Thank You

for being part of the **V2V** cook book users.

BY :



Mr. COOK