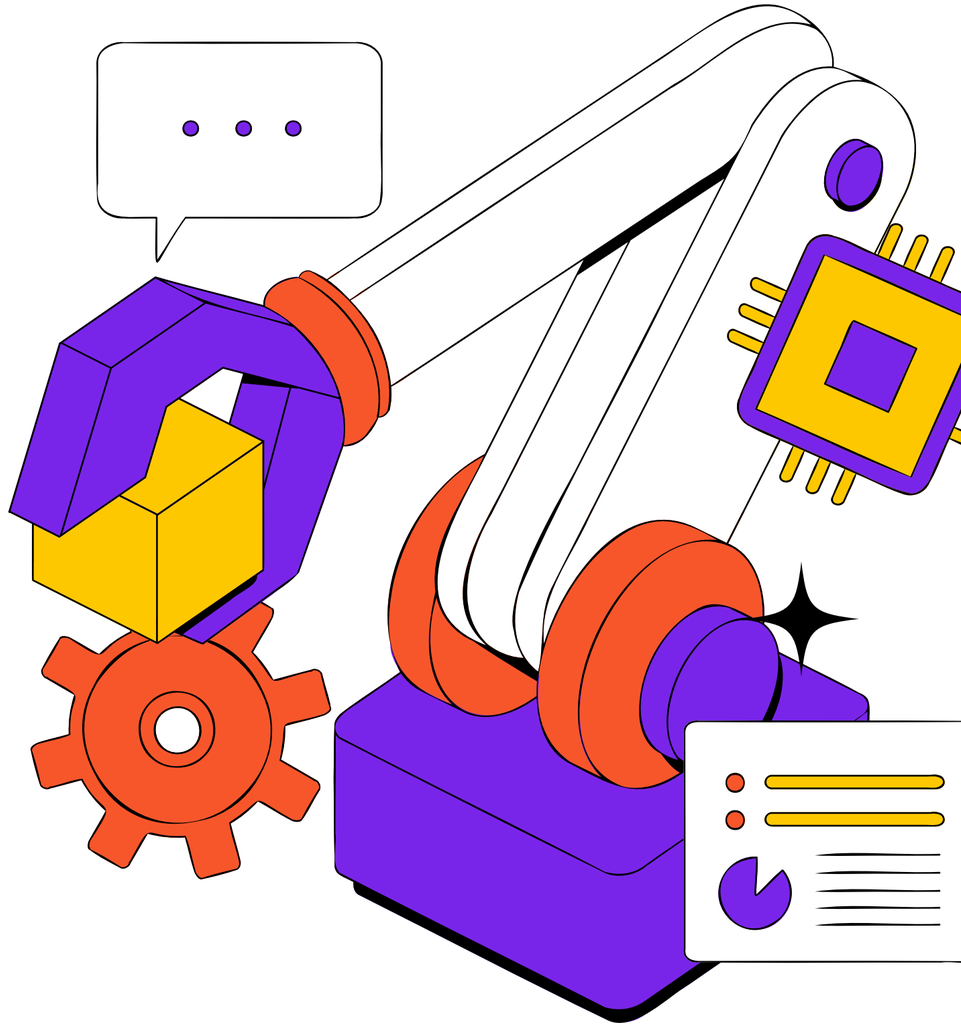
PYTHON & AI INTEGRATION

Claude

CREATE YOUR FIRST MCP SERVER



WORKSHOP OUTLINE

01. 9:30 - 12:00

GETTING FAMILIAR

explain the basic
concepts and develop
a simple mcp server

02. 13:30 - 15:00

PRACTICAL USE CASES

explore the different
types of mcp serverrs,
and mcp clients

03. 9:30 - 12:00

DIVING DEEPER

more use cases for
developer
discuss limitations and
security concerns

WORKSHOP OUTLINE

01.

9:30 - 12:00

GETTING FAMILIAR

explain the basic
concepts and develop
a simple mcp server

01. INTRODUCTION

This session explores how we can extend ai models using mcp servers. to interact with data, local resources, and external APIs

this is an intermediate workshop , you should have a foundational understanding of Python programming and basic familiarity with how APIs work.

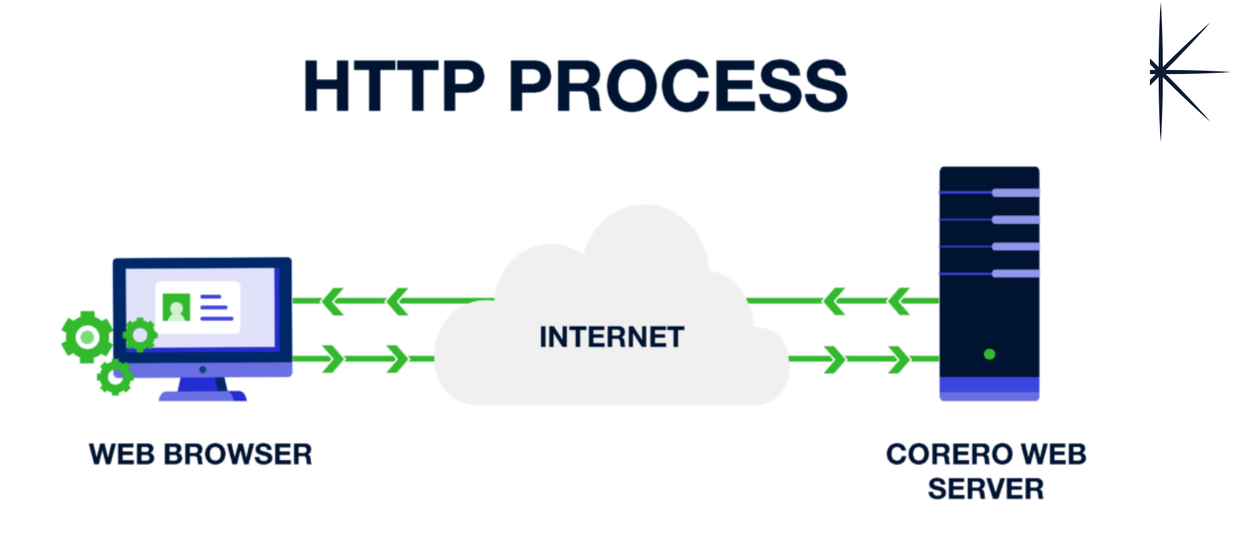
WHAT IS MCP

The Model Context Protocol (MCP) is a standardized communication protocol designed to bridge the gap between AI and the real world. MCP provides a uniform way for Large Language Models (LLMs) to communicate with existing systems.

By using this "universal language," an LLM is no longer confined to its training data; it can securely reach out to local files, databases, and third-party APIs. Instead of building complex, custom integrations for every new tool, MCP allows developers to build a single server that any AI-powered application can instantly understand and interact with.

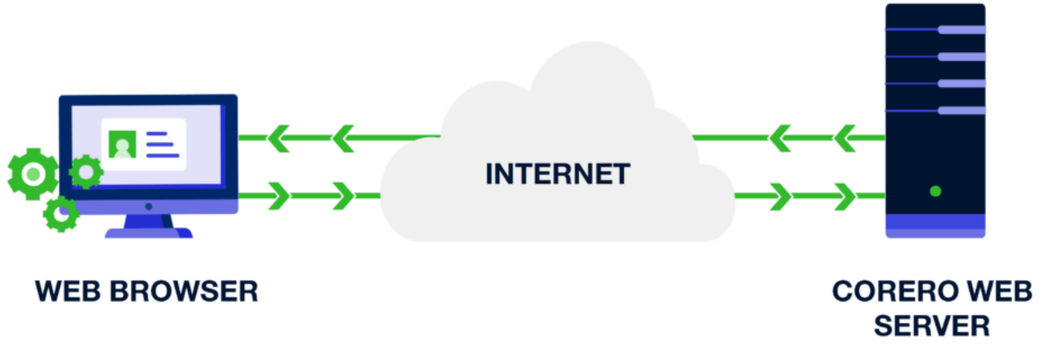
EXISTING PROTOCOLS:

HTTP (Hypertext Transfer Protocol) is the set of rules used to transfer data across the web.
It functions as a request–response system between a client (like your web browser) and a server (where the website's data lives).

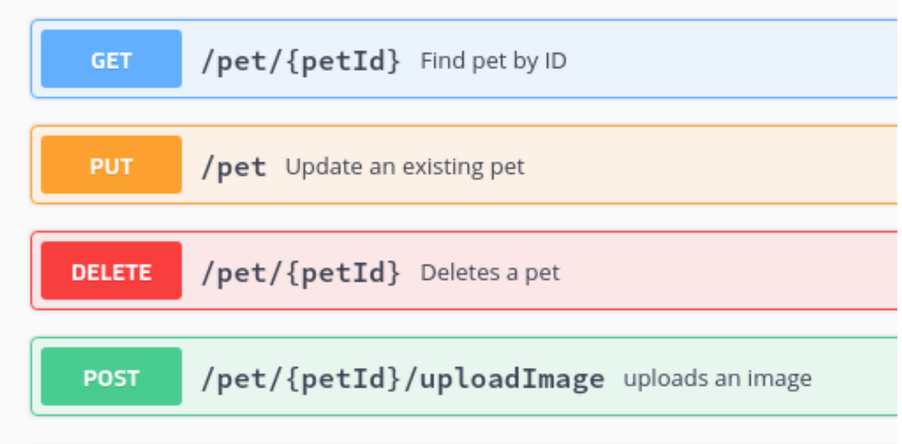


EXISTING PROTOCOLS:

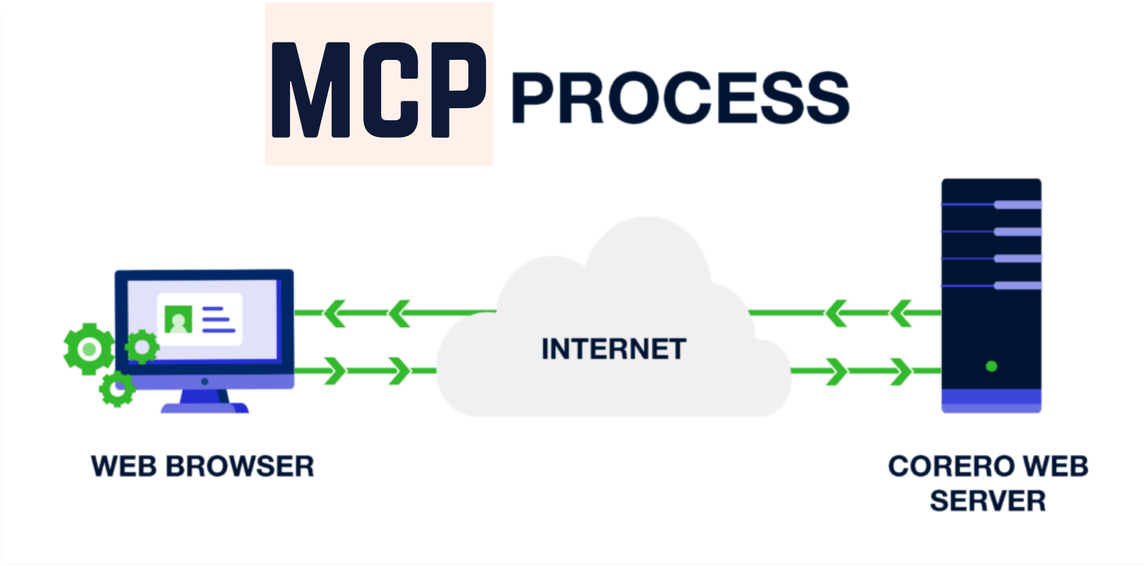
GET	/pet/{petId}	Find pet by ID
PUT	/pet	Update an existing pet
DELETE	/pet/{petId}	Deletes a pet
POST	/pet/{petId}/uploadImage	uploads an image



EXISTING PROTOCOLS:



CRUD OPERATIONS



EXISTING PROTOCOLS:

RESOURCES

PUT	/pet	Update an existing pet
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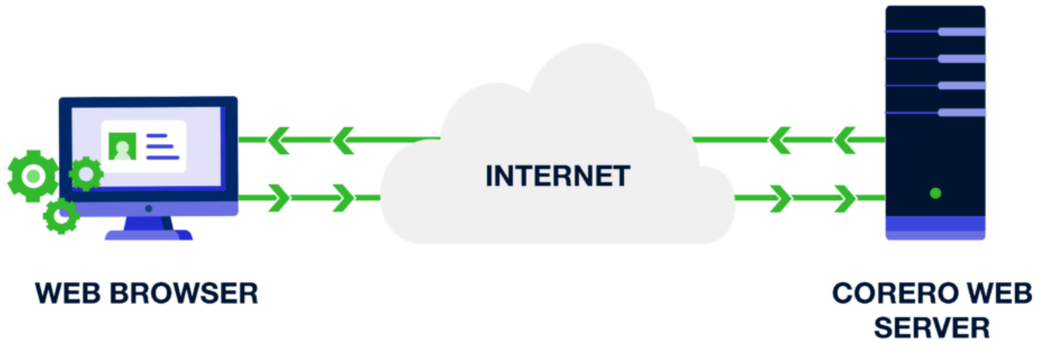
MCP PROCESS

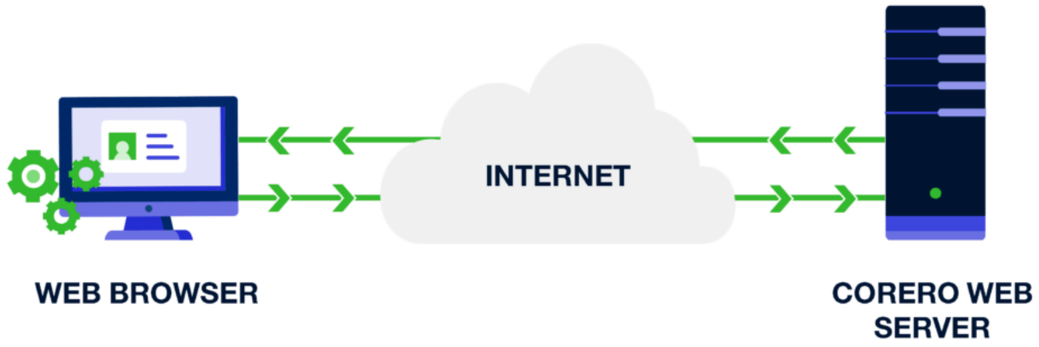


EXISTING PROTOCOLS:

RESOURCES

TOOLS

MCP PROCESS



WHY USE MCP IF WE HTTP ALREADY EXISTS ?

reason 1 : HTTP assumes the client already knows exactly what endpoint to call. But thats not the case with an ai model , an ai model is a reasoning system that can decide which next action to take , and is not pre programmed.

reason 2 : HTTP can expose endpoints, but it doesn’t explain what those endpoints mean.
mcp server is optimized to be discovered and used by an ai model

reason 3 : mcp server is not model specefic , any model can use it .

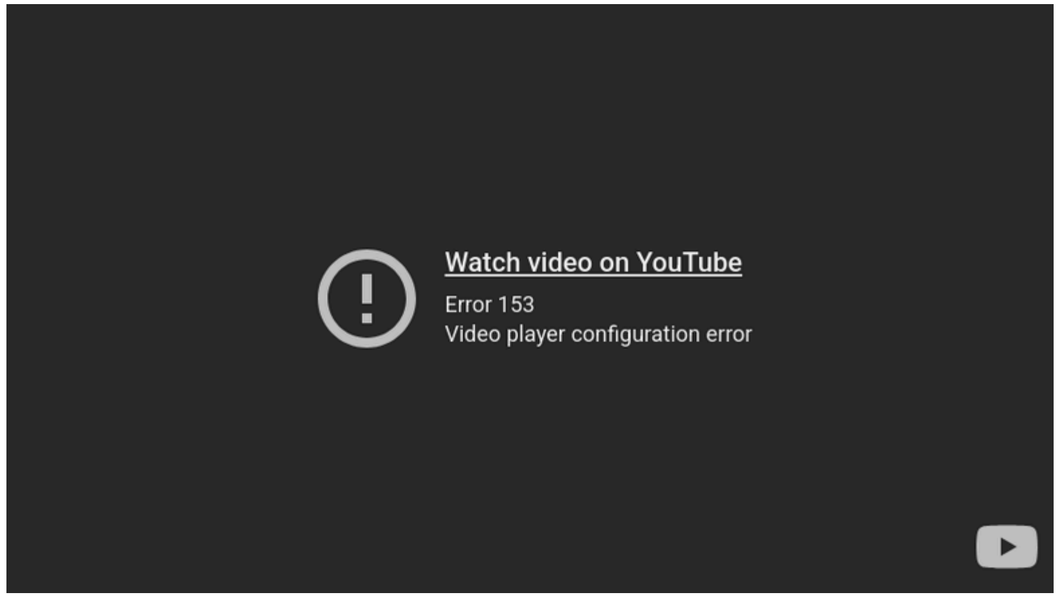
WHAT TO DO WITH AN MCP SERVER :

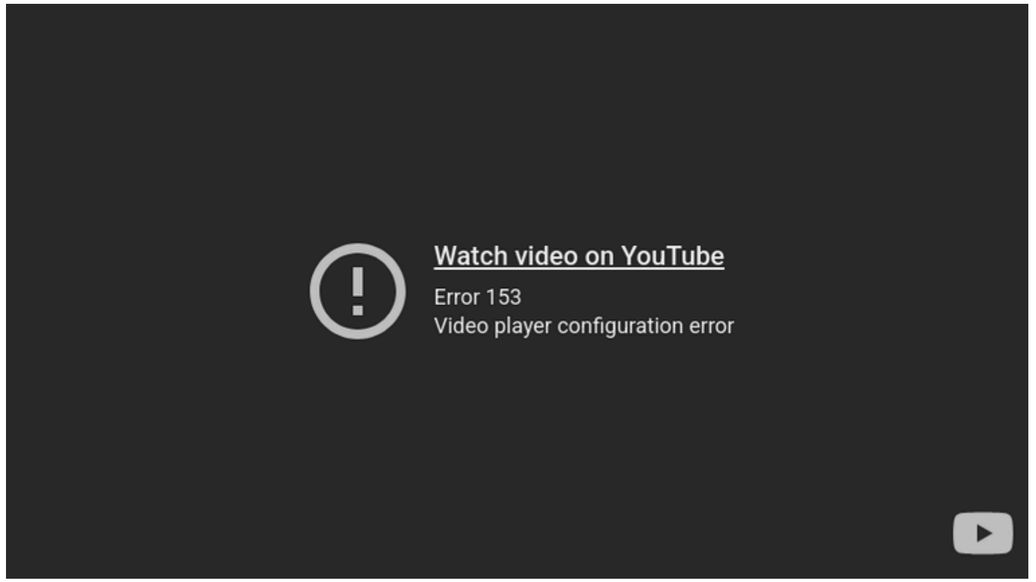
WHAT TO DO WITH AN MCP SERVER :

a lot of cool stuff

WHAT TO DO WITH AN MCP SERVER :

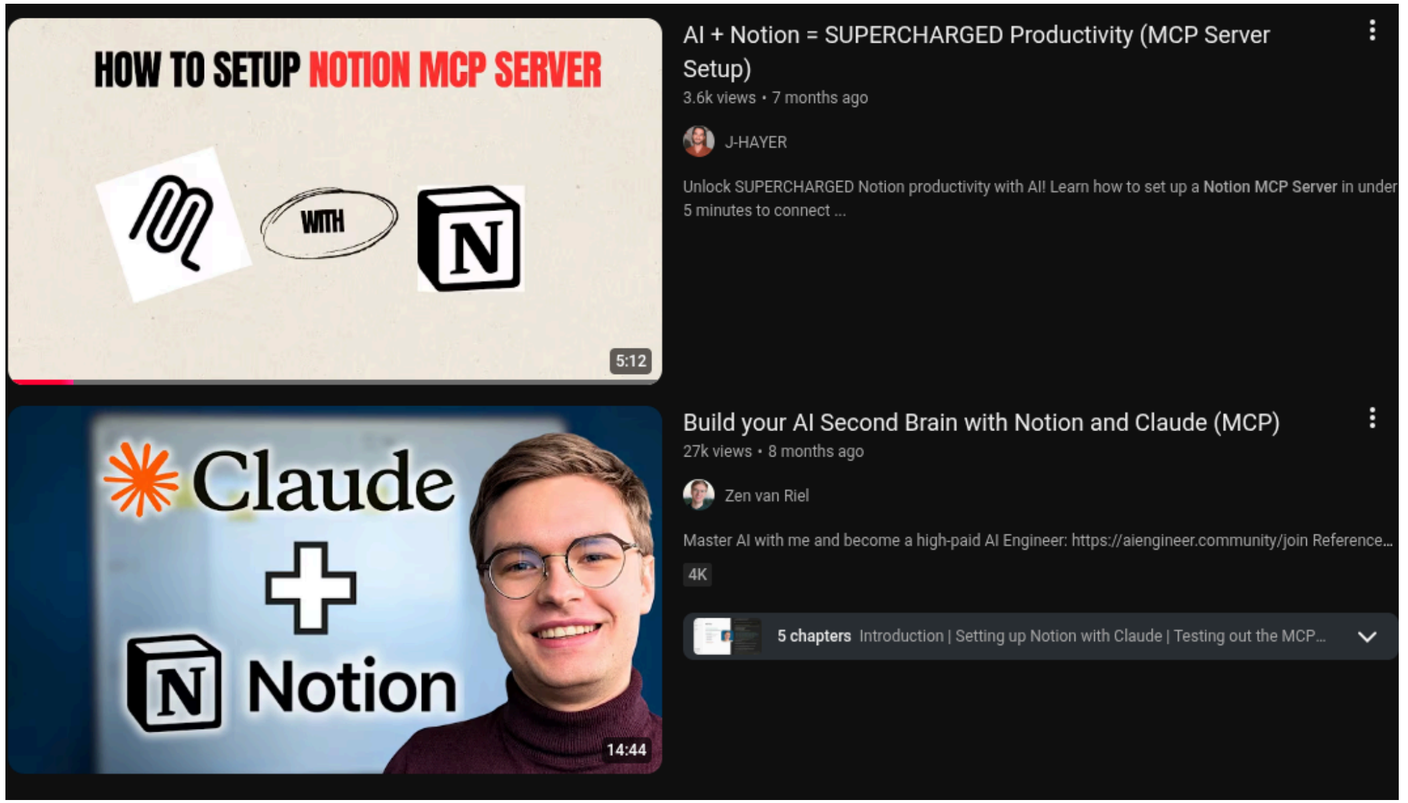
3D design (blender)





WHAT TO DO WITH AN MCP SERVER :

make it you personal manager (notion)

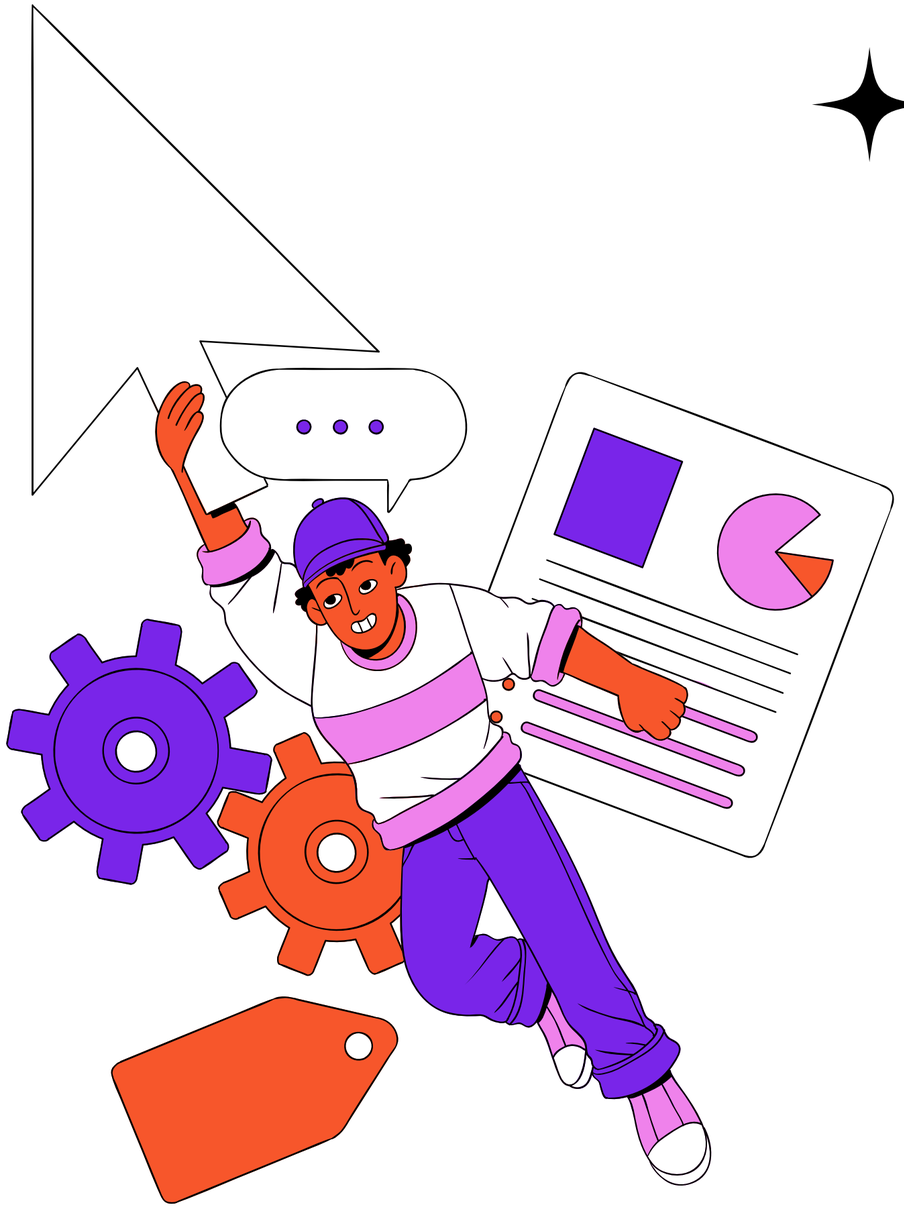


WHAT TO DO WITH AN MCP SERVER :

summerize and analyze your documents

02.

SETTING UP A PYTHON PROJECT



1 - INITIALIZE VIRTUAL ENVIREMENT

python -m venv .venv

2 - GENERATE REQUIREMENTS.TXT FILE

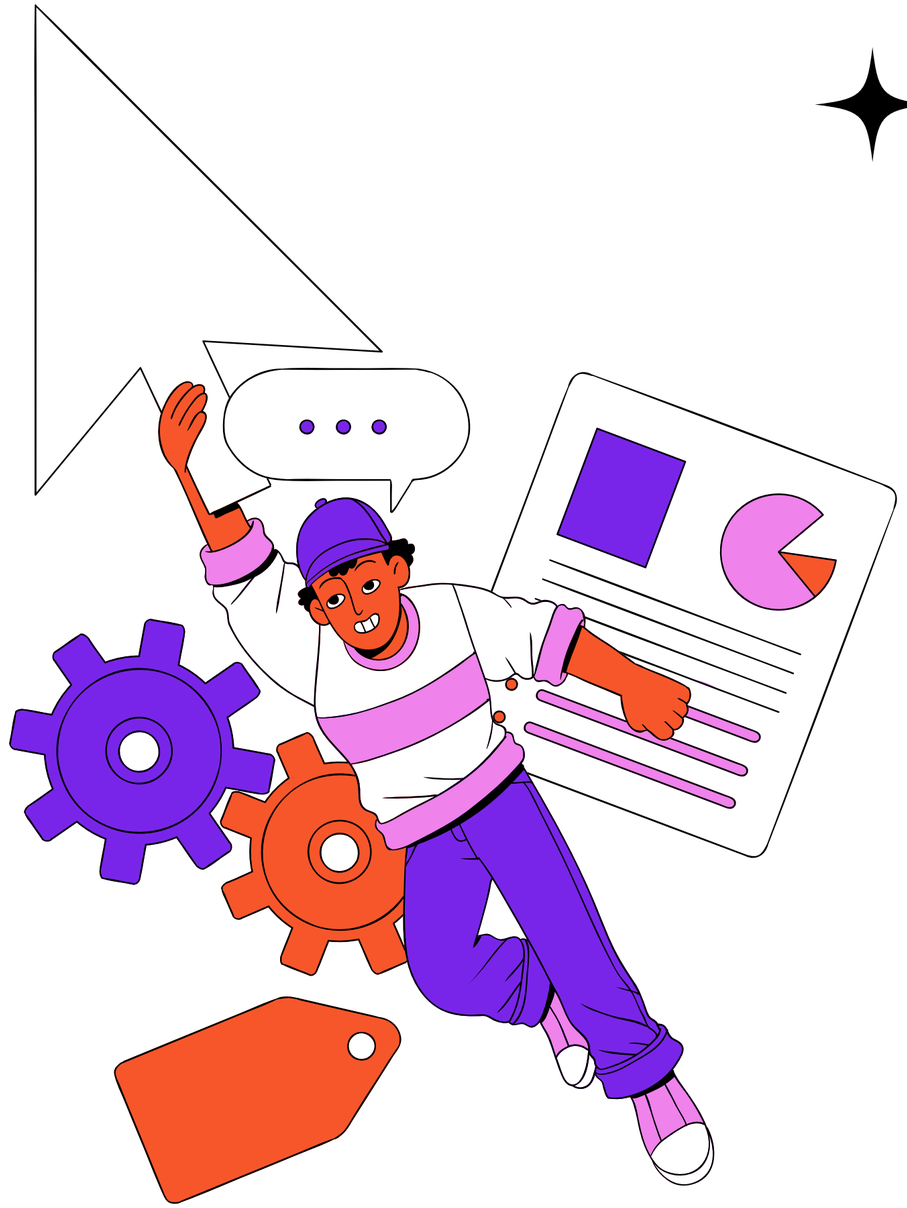
pip freeze > requirements.txt

3 - VERSION CONTROL

git init

4 - MAIN FUNCTION

if __name__ == “__main__”



UV PYTHON PACKAGE MANAGER

uv

uv is an extremely fast Python package and project manager, written in Rust.

astral.sh /

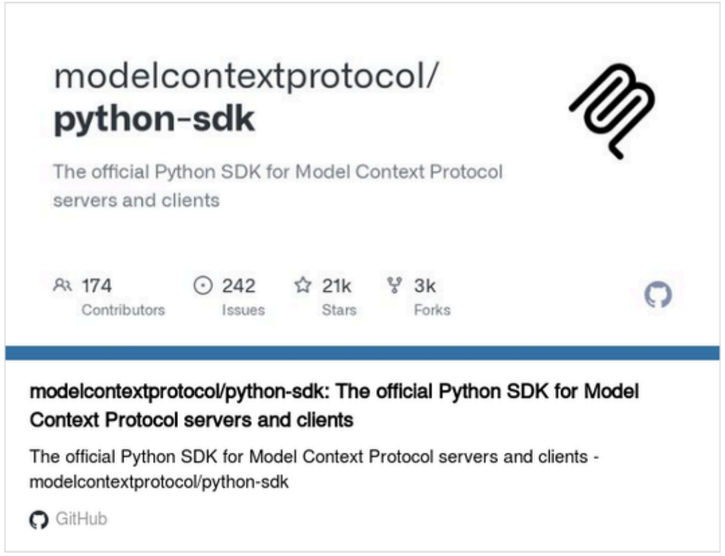
LINUX curl -LsSf https://astral.sh/uv/install.sh | sh

WINDOWS : powershell -ExecutionPolicy ByPass -c "irm https://astral.sh/uv/install.ps1 | iex"

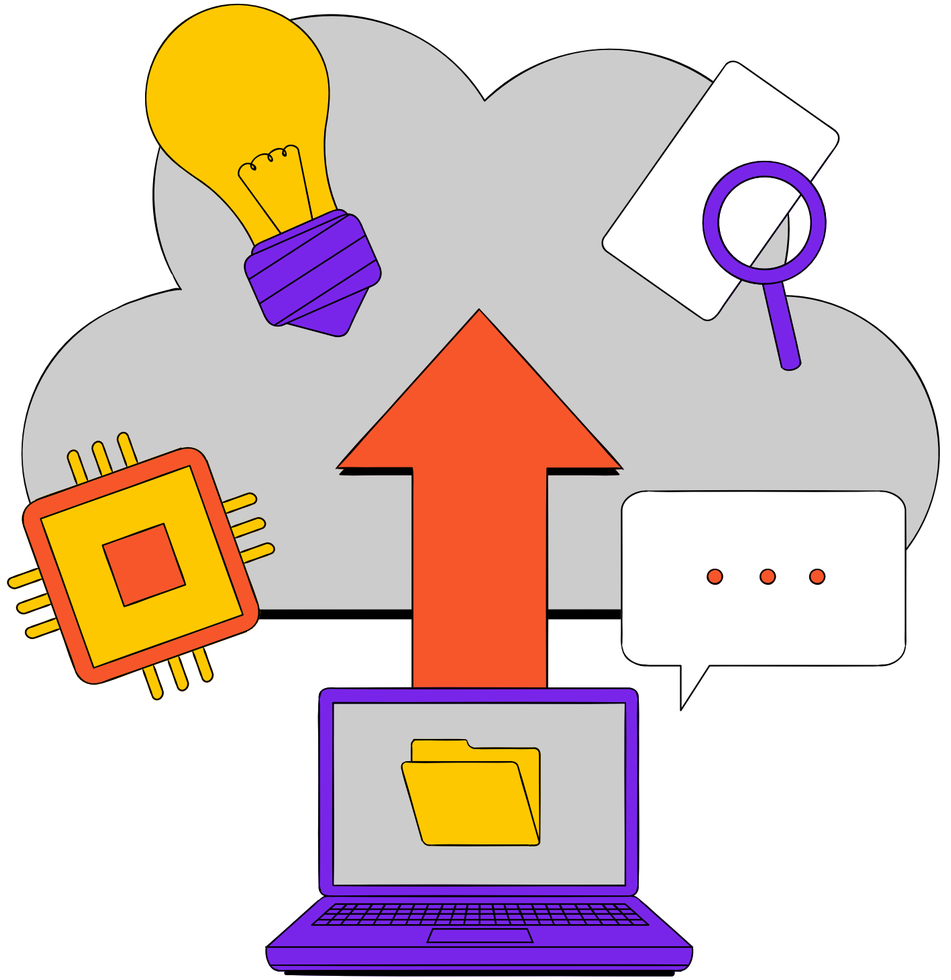
OTHER TOOLS

mcp client

mcp server

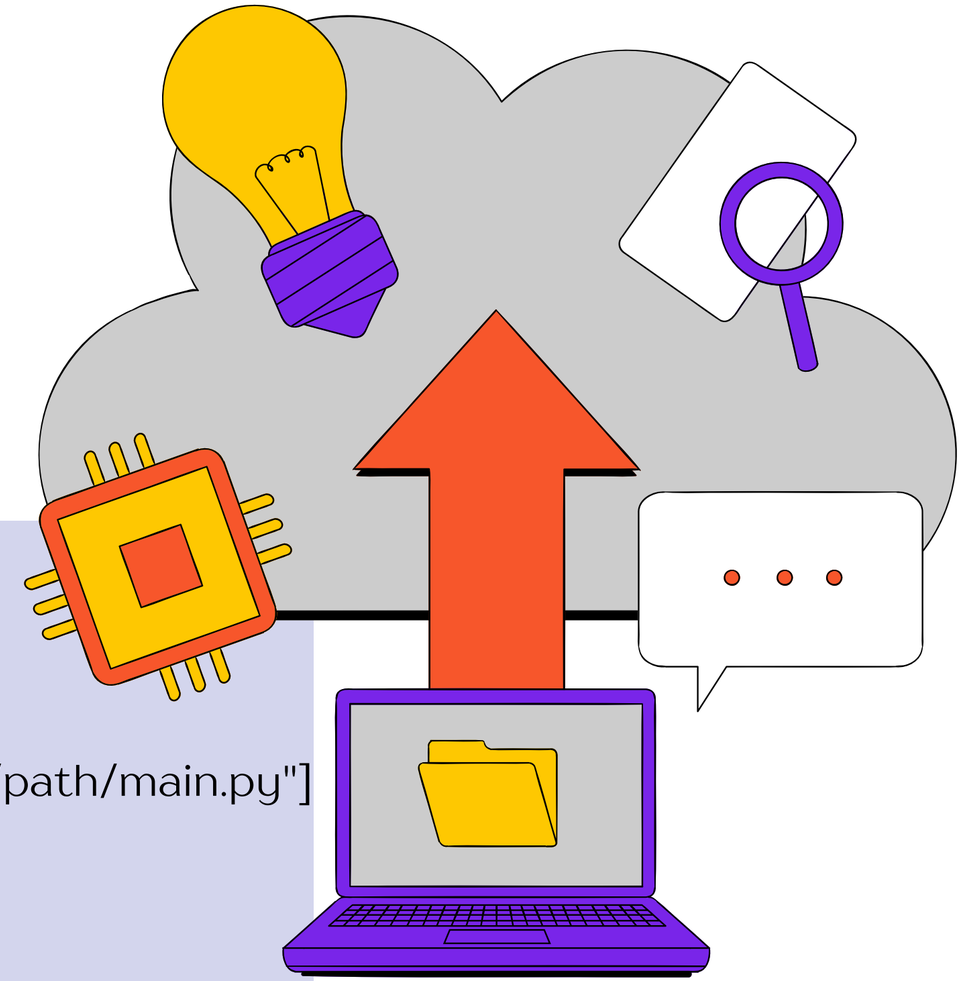


03. BUILDING OUR FIRST MCP SERVER



we are going to create a simple server containing a tool a resource and dynamic prompts

1 - configure the client



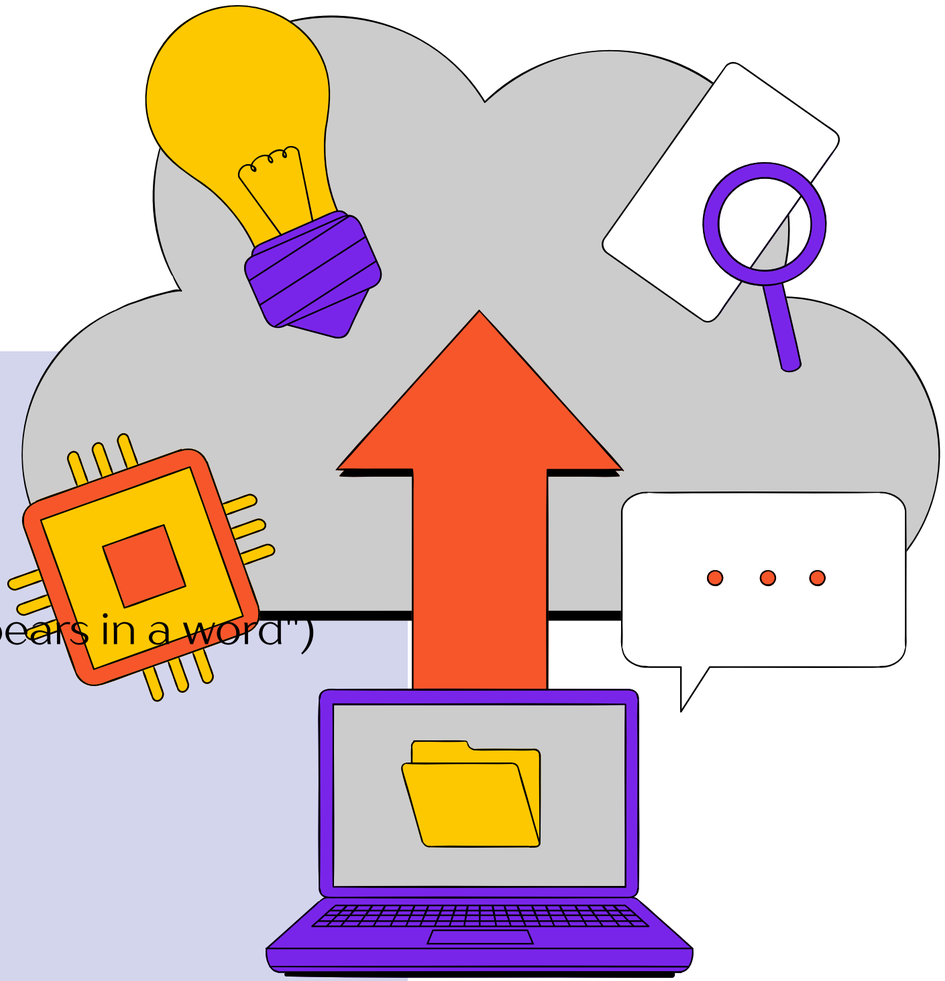
in your settings.json file try to add this :

```
"mcpServers": {
  "mcp-server-demo": {
    "command": "uv",
    "args": ["run", "--with", "mcp[cli]", "mcp", "run", "/absolute/path/main.py"]
  }
}
```

2 - add a tool

in main.py:

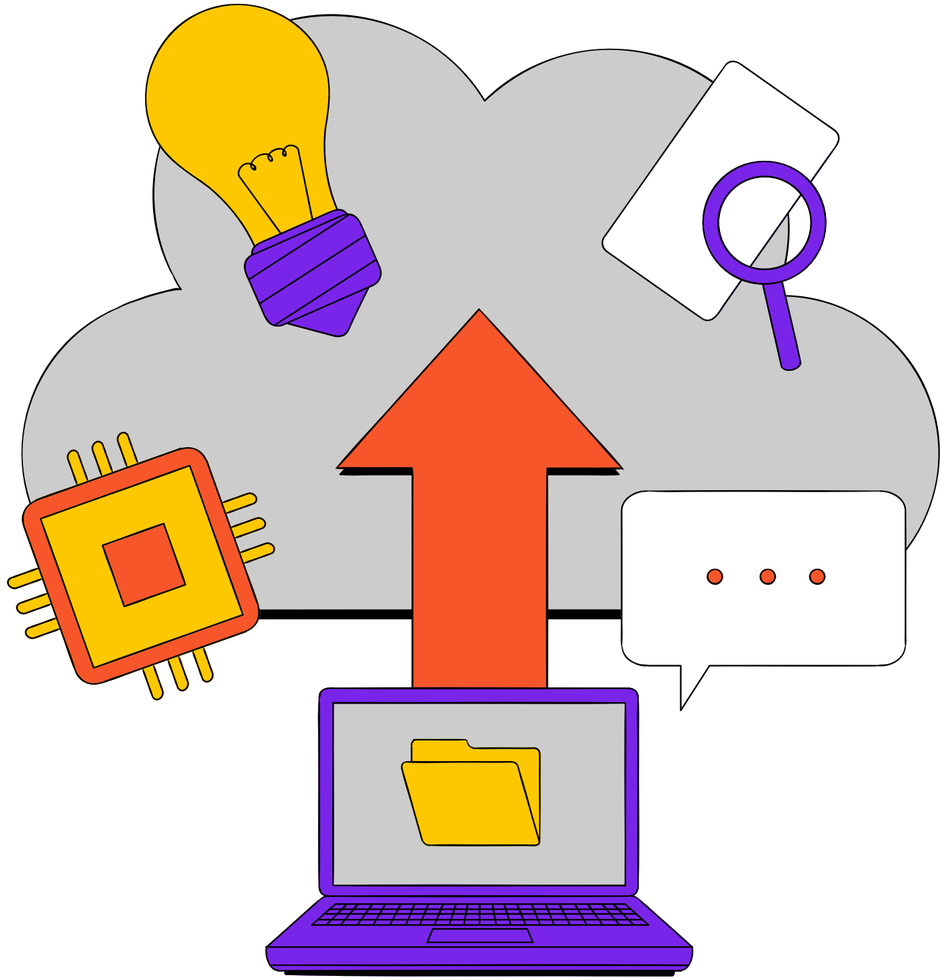
```
from mcp.server.fastmcp import FastMCP

mcp = FastMCP("demo", json_response=True

@mcp.tool(description="Count the number of times a letter appears in a word")
def count_letters_in_word(word: str, letter: str) -> int:
 return word.count(letter)

if __name__ == "__main__":
 mcp.run(transport="streamable-http")
```



2 - add a resource

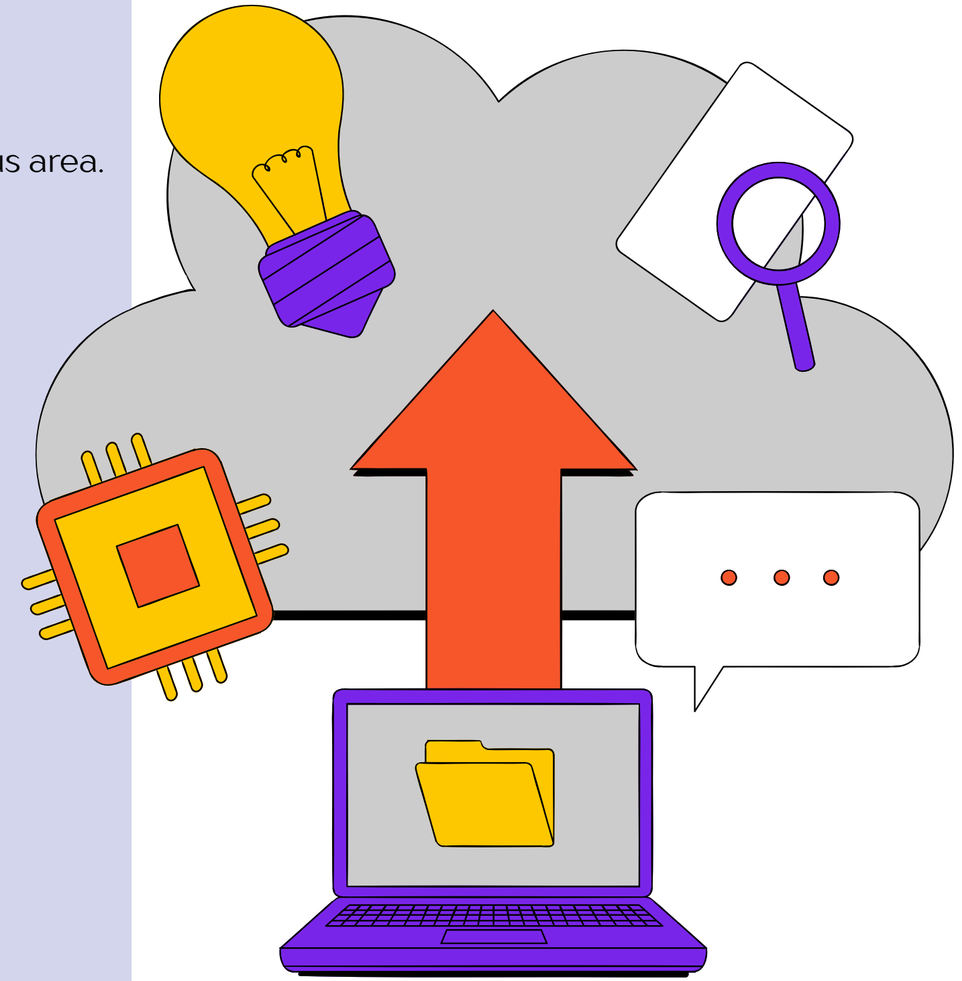
in main.py:

```
@mcp.resource("users://all")
def get_user_info() -> str:
  """Returns a formatted list of all users"""
   users = { "123": "Name: John Doe, Age: 30, Role: Developer",
"456": "Name: Jane Smith, Age: 28, Role: Designer" }
  return "\n".join(users.values())
```



3 – add a dynamic prompt

```
@mcp.prompt()
def candidate_decision(name: str, decision: str, focus: str = "general") -> str:
    """
    A prompt that tailors the response based on the decision and a specific focus area.
    """
        actions = {
        "accept": "Draft a enthusiastic offer letter",
        "reject": "Draft a professional rejection email",
    }

    reasons = {
        "technical": "mentioning their impressive coding test results",
        "culture": "highlighting how well they align with our core values",
        "experience": "noting their deep industry background",
        "general": "keeping the feedback high-level and standard"
    }

    task = actions.get(decision.lower(), "Draft a status update")
    detail = reasons.get(focus.lower(), reasons["general"])

    return f"{task} for {name}, specifically {detail}."
```



COMPANY NAME

03. OUR PROJECTS

Span a diverse array of initiatives designed to make a positive impact in various communities. From educational programs that empower underprivileged students to environmental conservation efforts aimed at preserving our natural resources, we are committed to creating meaningful change.

One of our flagship projects focuses on providing clean drinking water to rural areas, ensuring that everyone has access to this basic necessity. Another key initiative is our mentorship program, which pairs experienced professionals with young adults to guide them in their career paths and personal development.

RECAP