**Project Design Phase**

**Solution Architecture**

| Date | 30 July 2025 |
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| Team ID | PNT2025TMID09555 |
| Project Name | The Roadmap Generator |
| Maximum Marks | 4 Marks |

## **Solution Architecture**

### **Architecture Components:**

#### 1. Frontend – Streamlit

### **High-Level Flow:**

User Input → Streamlit Frontend → Backend (LLaMA2 + CTransformers) → Response → Streamlit Output

* Provides a user-friendly interface for input/output
* Handles:
  + Skill input (e.g., “Data Science”, “Machine Learning”)
  + Displaying generated roadmap

#### 2. Backend – Python App

* Powered by Streamlit
* Handles logic and integration with LLaMA2 via CTransformers
* Steps:
  + Receives user input from frontend
  + Passes input to the LLaMA2 model
  + Formats and displays output roadmap

#### 3. Model Integration – CTransformers + LLaMA2

* Uses a .gguf quantized version of LLaMA2 (e.g., llama-2-7b-chat.Q3\_K\_M.gguf)
* Loaded via CTransformers library
* Responds to custom prompts to generate step-by-step learning paths

#### 4. Model Setup – setup.sh

* Shell script to auto-download model from Hugging Face
* Avoids hosting large files in GitHub
* Ensures reproducibility and easy deployment

### **Folder Structure**

roadmapper/

├── app.py # Main Streamlit app

├── setup.sh # Script to download model

├── requirements.txt # Python dependencies

├── README.md # Project overview & instructions

├── .gitignore # Ignore large model file

├── utils/

│ └── model\_loader.py # Code to load LLaMA2 with CTransformers

└── model/

└── llama-2-7b-chat.Q3\_K\_M.gguf (auto-downloaded)

### **Deployment Design**

#### **Platform:**

* Streamlit Cloud (or any server with Python support)

#### **Workflow:**

1. Clone GitHub repo
2. Run setup.sh to fetch model
3. Launch with streamlit run app.py

### 

### **Dependencies**

* streamlit
* ctransformers
* transformers (optional, if using Hugging Face models)
* wget (for downloading model)

### **Prompting Logic (example)**

prompt = f"""You are an expert roadmap generator.

Create a detailed step-by-step learning path to master: {user\_input}.

Include tools, free resources, and time estimates."""