

Templating & Prompt Workflows

TIM 175 WEEK 4 PRELAB

Now that we understand how to craft and refine prompts, we can use prompt engineering workflows to break down complex tasks into a series of steps and even automate complex tasks. To improve and automate the process of thematic analysis from previous weeks, we will now experiment with workflows and using parameters for templating. **This individual prelab is due Tuesday 11:59pm.**

Readings: We mark up to two readings with a ★ that we suggest you read

- [Concept Induction: Analyzing Unstructured Text with High-Level Concepts Using LLoM](#) ★
- [Chain complex prompts for stronger performance - Anthropic](#) ★
- [Designing LLM Chains by Adapting Techniques from Crowdsourcing Workflows](#)
- [LLMs as Workers in Human-Computational Algorithms? Replicating Crowdsourcing Pipelines with LLMs](#)
- [Least-to-Most Prompting Enables Complex Reasoning in LLMs](#)
- [Prompt chaining guide for beginners](#)

Submission Link

[Week 4 TIM 175 Submission Form \(Spring 2025\)](#)

Brief Task Overview

Complete the following activities to understand methods for evaluating prompts and outputs:

1. Activity 1: Templating and Workflows in LastMileAI
2. Activity 2: Templating and Workflows in Google Colab

You can use ChatGPT or other GenAI tools to inform any part of the assignment but: (1) you need to first form your own independent thoughts, (2) every word included in the submission needs to be something you've read, thought about, and decided to include, and (3) you should strive towards submitting the highest quality work you can rather than mediocre work that meets the requirements.

Templating & Workflows

Workflows: A workflow is a series of interconnected prompts, where each prompt takes the output of the previous one as input, allowing for a structured, multi-step process. To adapt these workflows for different inputs, we use prompt templates instead of fixed prompts. This approach, called templating, enables flexibility by allowing us to customize prompts dynamically based on variable input.

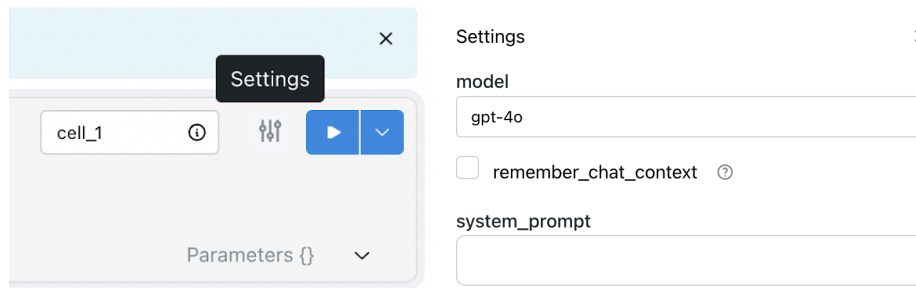
Templating. A template is a prompt with replaceable variables. Prompt templates enable you to test how different prompt formats perform with different prompt data, without requiring you to write multiple individual prompts

Activity 1: Templating and Workflows in LastMileAI

Set Up LastMileAI:

To try out different prompt engineering techniques we will be using the following platform: [LastMileAI](#).

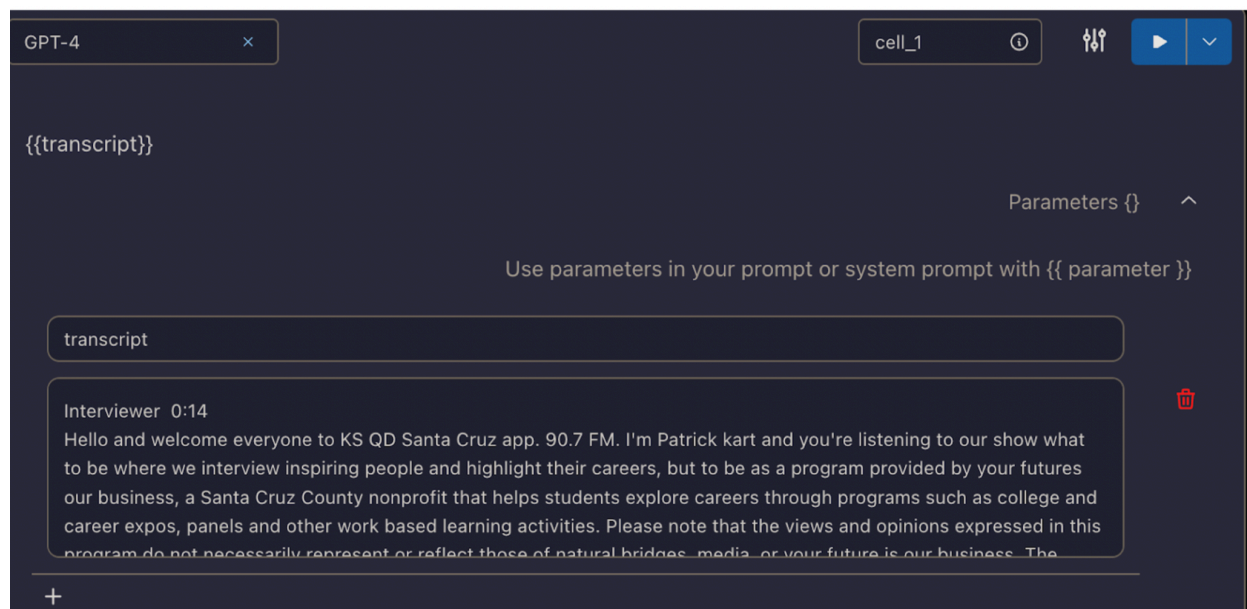
1. Simply Sign in to the platform using your Google Account
2. Click on Workbooks and then “New Workbook”
3. You can experiment with different models using the dropdown on the top left. By default it is set to “ChatGPT”. For this assignment, **please change it to GPT-4**.



Let's start by taking a look at a templating example:

For incorporating variable input, we want to create parameters in LastMileAI. The parameter can then be used within the prompt by using: `{{ parameter }}`. See image for a simple parameter example.

See the [Setting up Parameters Tab](#) for a more detailed walkthrough of creating parameters.



Here we have a specific prompt with variable inputs. Try it on LastMileAI!

“Find a recipe for {{dish_name}} that doesn’t include {{allergen}} and is suitable for {{dietary_preference}}.” Experiment with creating parameters.

Now let's experiment with creating a series of prompts where the output of the previous prompt can be used as a parameter for the next prompt. LastMileAI creates parameters for each cell's input and output using the cell name with input or output which you can use to give to the next cell, as shown below.

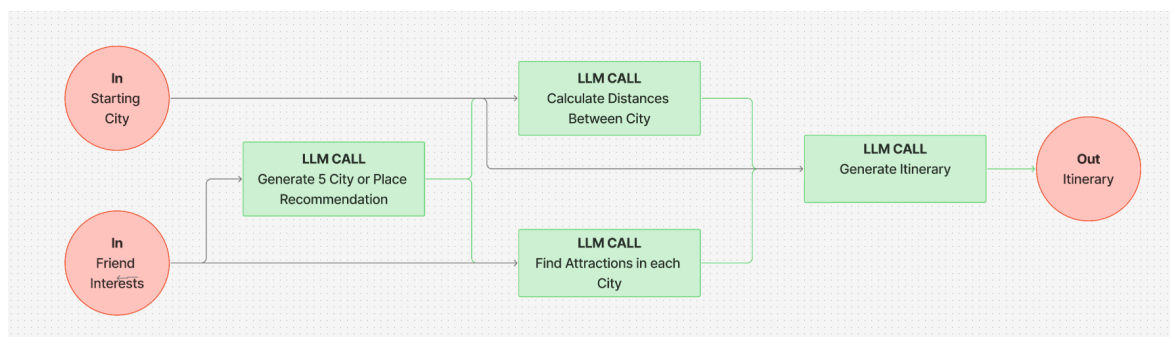
Type a prompt / reference others above: {{cell_1.input}}, {{cell_1.output}}

Task: Road Trip Planning Using LastMile AI

You and your friends are planning a road trip where you aim to visit at least five cities across the US. Your objective is to use LastMile AI to generate recommendations for cities or places to visit, create an itinerary, and outline activities for each location. This task will demonstrate how to break down the planning into steps, feeding outputs from one step as inputs into the next using the LastMile AI platform. Here are the details:

- Andrew lives in Santa Cruz California and wants to visit the Vegas Sphere
- Beth lives in San Diego and loves Harry Potter and Super Mario Brothers
- Carlos lives in San Jose is interested in Outdoors & Nature and Hiking
- Diana lives in San Francisco loves sea animals and wants to see whales and dolphins

Road Trip Planning Workflow on LastMile AI



- Generate 5 City or Place Recommendations:
 - Ask LastMileAI to recommend 5 cities and places to visit based on the above interests.
- Calculate Distances Between Cities:
 - Set a parameter for the starting city and keep it as Santa Cruz

- Action: Retrieve driving distances between the recommended cities using LastMile AI.
- Find Attractions in Each City:
 - Action: Obtain top attractions in each recommended city, tailored to the specific interests provided, using LastMile AI.
- Generate Itinerary:
 - Generate a 6 day itinerary for the trip that covers all the recommended cities, top attractions and takes into account the driving time between them.
- Determine the Meeting point:
 - All friends live in different cities and you must choose one city to be the starting meeting point of the road trip. Repeat the above steps based on all the possible starting points (Santa Cruz, San Diego, San Jose, San Francisco) by changing the starting city parameter. You can determine the meeting point manually by looking at the results of all starting points.

Hint: Use built-in parameters from LastMileAI to get the input/output from previous cell

Start by selecting five city or place recommendations based on each friend's preferences, using Santa Cruz as the initial starting city. Then, calculate the driving distances between these cities. For each recommended city, find tailored attractions aligned with each friend's interests. Use all of this information, generate a 6-day itinerary that includes all cities, attractions, and accounts for travel time. Repeat the entire process using different starting cities (San Diego, San Jose, and San Francisco) to explore multiple itinerary options.

Reflection: What is the advantage of using prompt workflows over a single prompt?

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Activity 2: Templating and Workflows in Google Colab

Now that we have played around with templating and workflows on LastMileAI, let's try to implement it in code!

Set Up Google Colab

- Create a copy of [Gemini Workflow Template](#).ipynb
- Follow the detailed steps [here](#) to make an API key and add it as an access token

Go through the Gemini Workflow Template Walkthrough.

Before diving into the activity, go through the walkthrough defined within the Google Colab notebook, which will guide you in the following steps:

1. Run the cell to import necessary packages.
2. Run the cell to define the API call.
3. Run the cell for setting the Google API Key.
4. Run the cell for defining the input variables, the prompt, and for printing the prompt
5. Run the cell for calling the Gemini API and printing out the response
6. Run the cell for defining the follow-up prompt.
7. Run the cell for calling the Gemini API and printing out the response for the follow-up prompt.

Task:

Use the above notebook to automate meal planning based on individual dietary needs for a bunch of people (Data given below as json). You need to figure out how to dynamically run the workflow with the different inputs, without having to copy paste manually or alter the prompt for every person. The workflow should dynamically generate recipes, grocery lists, and estimated costs for each individual person and store it in a table/CSV file.

Steps to Follow

1. **Use Input Data**
 - Use the **JSON Data below** containing details for each person (name, diet, allergens, dislikes, favorite foods). You can copy paste this into a json list variable and access each of them one by one. (We already show in the Google Colab how you can access json data in a list).
2. **Generate a Recipe**
 - Use a **templated prompt** to create a recipe based on dietary preferences in the data.
3. **Create a Grocery List**
 - Write a prompt that takes the above recipe and provides a grocery list from the generated recipe ingredients.
4. **Estimate Grocery Costs**
 - Write a prompt that takes the generated grocery list and estimates the total cost for all grocery items.
5. **Run the Workflow for All Individuals**
 - Loop through each person's data and apply the workflow dynamically.

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- You should run the cell once and get output for each person. (See the Google Collab on how to loop through a list of inputs).

Json Data:

```
[
  {
    "name": "Alex",
    "allergens": ["peanuts", "shellfish"],
    "diet": "pescatarian",
    "food_dislikes": ["brussels sprouts", "liver"],
    "favorite_foods": ["sushi", "grilled salmon", "avocado toast"]
  },
  {
    "name": "Jordan",
    "allergens": ["dairy"],
    "diet": "vegan",
    "food_dislikes": ["mushrooms", "eggplant"],
    "favorite_foods": ["quinoa salad", "chickpea curry", "smoothie bowls"]
  },
  {
    "name": "Casey",
    "allergens": [],
    "diet": "omnivore",
    "food_dislikes": ["beets", "okra"],
    "favorite_foods": ["spaghetti bolognese", "tacos", "pizza"]
  },
  {
    "name": "Taylor",
    "allergens": ["gluten"],
    "diet": "gluten-free",
    "food_dislikes": ["celery", "radishes"],
    "favorite_foods": ["grilled chicken", "sweet potato fries", "caesar salad"]
  },
  {
    "name": "Morgan",
    "allergens": ["tree nuts"],
    "diet": "vegetarian",
    "food_dislikes": ["bell peppers", "bitter melon"],
    "favorite_foods": ["vegetable stir-fry", "pasta primavera", "stuffed mushrooms"]
  }
]
```

Screenshots: Take Screenshots and Paste your prompts for generating recipes, grocery lists, and estimating grocery costs below. Also screenshot and paste a table of your prompts results.

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Reflection: What is the advantage of using prompt workflows in Google Colab for batch runs?

Submission Instructions:

After completing all the activities, fill out the submission form including a link to your copy of **this google document** on it.