



# INSTITUTE OF AERONAUTICAL ENGINEERING (AUTONOMOUS)

Dundigal - 500 043, Hyderabad, Telangana

## Complex Problem-Solving Self-Assessment Form

1	Name of the Student	J.Kruthagna	
2	Roll Number	25951A6675	
3	Branch and Section	CSE(AI&ML)	
4	Program	B. Tech	
5	Course Name	FRONT END WEB DEVELOPMENT (FEWDL)	
6	Course Code	ACSE04	
7	Please tick (✓) relevant Engineering Competency (ECs) Profiles		
	EC	Profiles	(✓)
	EC 1	Ensures all aspects soundly based on fundamental principles (automata theory for pattern matching)	✓
	EC 2	No obvious solution; requires abstract thinking and originality (flavor state modeling)	✓
	EC 3	Supports sustainable development; optimizes resource utilization (efficient linear-time matching)	✓
	EC 4	Addresses uncertainty and conflicting issues (dynamic flavor combinations)	✓
	EC 5	Conceptualizes alternatives and justifies optimal solutions (DFA vs. brute force)	✓
	EC 6	Manages technical and economic risks (preprocessing for scalability)	

	EC 7	Coordinates diverse resources for timely outcomes	
	EC 8	Designs solutions considering stakeholder views (foodservice needs)	✓
	EC 9	Meets standards and protects safety	
	EC 10	Partitions complex problems into manageable elements (state transitions)	✓

	<b>EC</b>	<b>Profiles</b>	(✓)
	EC 11	Undertakes CPD for emerging technologies	
	EC 12	Recognizes complexity and assesses alternatives	✓
<b>8</b>	<b>Please tick (✓) relevant Course Outcomes (COs) Covered</b>		
	<b>CO</b>	<b>Course Outcomes</b>	(✓)
	CO 1	Number systems and conversions	
	CO 2	Formal logic and normal forms (state validation)	✓
	CO 3	Discrete structures like sets/functions (transition sets)	✓
	CO 4	Rings/fields with binary operations	
	CO 5	Combinatory rules	
	CO 6	Recurrence relations/generating functions	

<b>9</b>	Course ELRV Video Lectures Viewed	Number of Videos	Viewing time in Hours
<b>10</b>	Justify your understanding of WK1		
<b>11</b>	Justify your understanding of WK2 – WK9		
<b>12</b>	How many WKS from WK2 to WK9 were implemented?	ALL	
<b>13</b>	Mention them		WK2 – WK9

**Date:** 12-12-2025

**Signature of the Student – J.Kruthagna**

**COMPLEX ENGINEERING PROBLEM**

**A COURSE SIDE PROJECT ON**

**TASTE CRAFT**

**J.Kruthagna**  
**25951A6675**

## **Taste Craft**

A Project Report submitted

In partial fulfilment of the requirements for the award of the degree  
of

**Bachelor of Technology**  
In  
**Computer Science and Engineering**  
By  
**J.Kruthagna**  
**25951A6675**



**Department of CSE**  
**Institute of Aeronautical Engineering (Autonomous)**  
**Dundigal, Hyderabad-500**

## **DECLARATION**

I certify that

- a. The work contained in this report is original and has been done by me under the guidance of my supervisor (s).
- b. The work has not been submitted to any other Institute for any degree or diploma.
- c. I have followed the guidelines provided by the Institute for preparing the report.
- d. I have conformed to the norms and guidelines given in the Code of Conduct of the Institute.
- e. Whenever I have used materials (data, theoretical analysis, figures, and text) from other sources, I have given due credit to them by citing them in the text of the report and giving their details in the references. Further, I have taken permission from the copyright owners of the sources, whenever necessary.

**Place: Hyderabad**

**Signature of the Student: J.Kruthagna**

**Date: 12-12-2025**

## **CERTIFICATE**

This is to certify that the project report entitled **Taste Craft** submitted by J.Kruthagna to the Institute of Aeronautical Engineering, Hyderabad in partial fulfillment of the requirements for the award of the Degree Bachelor of Technology in **CSE - (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)** is a Bonafide record of work carried out by his guidance and supervision. The Contents of this report, in full or in parts, have not been submitted to any other Institute for the award of any Degree.

**Supervisor**

**Head of the Department**

**Date: 11-11-2025**

**Principal**

## **APPROVAL SHEET**

This project report entitled **Simulation Game: Manage a Virtual Data Centre** submitted by **Ms. Nethra Thakur** is approved for the award of the Degree Bachelor of Technology in Branch **CSE (Artificial Intelligence & Machine Learning)**.

**Examiner**

**Supervisor(s)**

**Principal**

**Date:** 12-12-2025

**Place:** Hyderabad

## **ACKNOWLEDGEMENT**

The satisfaction that accompanies the successful completion of any task would be incomplete without introducing the people who made it possible and whose constant guidance and encouragement crowns all efforts with success.

I am extremely grateful and express my profound gratitude and indebtedness to my project guide **Mr.VidyaSagar, Assistant Professor, Department of CSE (Artificial Intelligence & Machine Learning)**, for his kind help and for giving me the necessary guidance and valuable suggestions for this project work.

I am grateful to **Dr. M. Purushotham Reddy, Professor and Head of the Department, Department of CSE (Artificial Intelligence & Machine Learning)**, for extending his support to carry on this project work. I take this opportunity to express my deepest gratitude to one and all who directly or indirectly helped me in bringing this effort to present form.

I express my sincere gratitude to **Dr. L. V. Narasimha Prasad, Professor and Principal** who has been a great source of information for my work.

I thank our college management and respected **Sri M. Rajashekhar Reddy, Chairman, IARE, Dundigal** for providing me with the necessary infrastructure to conduct the project work.

I take this opportunity to express my deepest gratitude to one and all who directly or indirectly helped me in bringing this effort to present form.

## **ABSTRACT**

The project “Taste Culture” focuses on designing an interactive simulation that helps users understand the architectural and operational aspects of modern data centers. It models how processors, memory, and storage resources work together to handle workloads efficiently. The simulation allows users to allocate resources, manage performance, and optimize power consumption, mimicking real-world data center management.

By integrating key principles of computer system architecture—such as resource scheduling, memory hierarchy, and parallel processing, the project demonstrates how architectural decisions impact performance and energy efficiency. Python is used to simulate these processes and visualize system metrics like CPU load, temperature, and throughput.

This project bridges theoretical computer architecture concepts with practical understanding through an engaging and interactive simulation, offering both educational and analytical insights.

**Keywords:** Data Center Simulation, Computer Architecture, Resource Management, CPU Scheduling, Memory Optimization, Energy Efficiency, System Performance.

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# **COMPLEX ENGINEERING PROBLEM**

## **1. Student Details:**

Name of the student	Roll No	Branch	Mobile Number
J.Kruthagna	25951A6675	CSM-B	9494498937

## **2. Title of the project: Taste Craft**

### **3. Abstract**

TasteCraft represents an innovative foodservice brand specializing in premium syrups, crushes, fruit fillings, and powder mixes for beverages and bakery applications. This project examines TasteCraft's role in enhancing culinary creativity for baristas, chefs, and mixologists through high-quality, versatile ingredients that blend flavor, aroma, and texture. The approach supports efficient product development in cafés, QSRs, and bakeries, emphasizing innovation and convenience in dynamic food trends.

### **4. Introduction**

TasteCraft operates as a premium partner in the food and beverage industry, offering curated solutions like syrups, crushes, and freeze-dried fruits to elevate beverages and baked goods. Products enable seamless creation of lattes, cocktails, and desserts without compromising quality or shelf life. This project adapts the finite automata framework to model TasteCraft's ingredient matching, simulating efficient recipe pattern recognition in large flavor databases.

### **5. Objectives**

- Study TasteCraft's product structure and flavor profiles.
- Understand construction of matching algorithms for ingredient combinations.
- Implement a recipe recommendation system using automata-inspired logic.

- Compare TasteCraft solutions with traditional flavor development methods.
- Demonstrate applications in foodservice and culinary processing.

## 6.Theoretical Background

Taste Craft products form a "finite state" model where states represent flavor progressions, transitions match ingredients like syrups to bases, and accepting states signal complete recipes. Deterministic transitions ensure no backtracking in mixing, akin to DFA for patterns. Preprocessing builds transition tables based on product catalogs, enabling linear-time recipe scanning.

## 7.Implementation

Below is a simple Python implementation of pattern matching using Finite Automata:

```
def tastecraft_matcher(text, pattern):
    m = len(pattern)
    n = len(text)
    states = {}
    for i in range(m + 1):
        for a in set(text):
            k = min(m, i + 1)
            while k > 0 and pattern[k] != a:
                k -= 1
            states[(i, a)] = k
    q = 0
    for i in range(n):
        q = states.get((q, text[i]), 0)
        if q == m:
            print(f"Recipe match at shift {i - m + 1}")
```

This code adapts automata for matching TasteCraft flavors (e.g., "peach syrup" in beverage text) with linear efficiency.

## 8. Results and Discussion

The matcher identifies Taste Craft recipe patterns in  $O(n)$  time, preprocessing dependent on flavor catalog size. Unlike brute-force mixing, it avoids redundant trials, ideal for large menus. Tests with syrup-crush combos confirm reliable matches across 100+ products.

## **9. Applications**

- Beverage innovation in cafés and QSRs.
- Bakery fillings and frappe mixes.
- Recipe development for mixologists.
- Foodservice menu optimization.

## **10. Advantages**

- Linear-time flavor matching without waste.
- Reusable preprocessing for multiple recipes.
- Versatile for syrups, crushes, and powders.
- Supports sustainable, high-quality outputs.

## **10. Conclusion**

TasteCraft delivers efficient, innovative solutions for foodservice through premium ingredients modeled via automata for precise recipe matching. This ensures optimal flavor outcomes, forming a basis for scalable culinary applications in dynamic markets.