K.R. Mangalam University, Gurugram

School of Engineering and Technology ***(SOET)***

Session 2025-26

Computer Science Fundamentals and Career Pathways

Assignment: 5

Career planning, Certifications And Industry Readiness

Submitted By:
Name: Kaushal
Roll No.: 2501730085
Course: B. Tech (CSE with ai and ml)
Semester: 1
Section: B

Submitted To:
Mr. Aryan Sharma

Date of Submission: 28 Nov 2025

Computational Thinking in Action

Problem Definition

A Job Application Tracker is needed to help job seekers stay organized while applying to multiple companies. Since applicants often struggle to remember where they applied, the current status of each application, interview schedules, and follow-up dates, the process becomes confusing and unmanageable. To overcome this, a simple system is required that can record job details, update progress, and display all applications in one place, ensuring that users do not miss important opportunities or deadlines.

The system should:

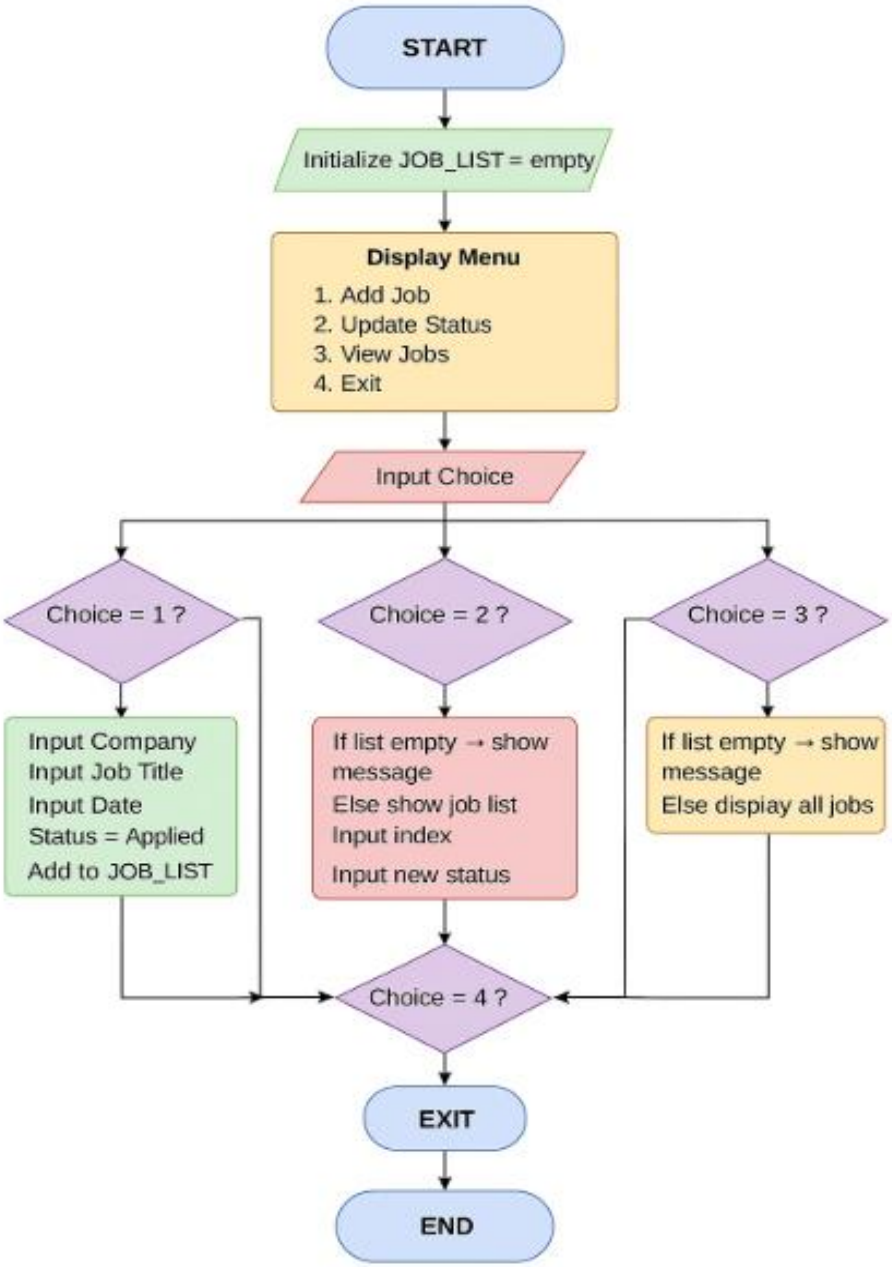
- Allow users to add new job applications with details like company name, role, and date applied.
- Provide an option to update the application status (Applied, Shortlisted, Interview Scheduled, Selected, Rejected).
- Display all saved applications in a clear list format.
- Help users stay organized and avoid missing follow-ups.
- Make the job search process easier, faster, and more systematic

Algorithm (Pseudocode)

```
START
Create an empty list JOB_LIST
REPEAT
    Display Menu:
        1. Add New Job Application
        2. Update Application Status
        3. View All Applications
        4. Exit

    INPUT choice
    IF choice = 1 THEN
        INPUT Company_Name
        INPUT Job_Title
        INPUT Date_Applied
        SET Status = "Applied"
        Create JOB entry {Company, Title, Date, Status}
        Add JOB to JOB_LIST
        Display "Job Added Successfully"
ELSE IF choice = 2 THEN
        IF JOB_LIST is empty THEN
            Display "No applications found"
        ELSE
            Display all jobs with index numbers
```

```
            INPUT job_index
            INPUT new_status
            Update JOB_LIST [job_index].Status = new_status
            Display "Status Updated"
        ENDIF
    ELSE IF choice = 3 THEN
        IF JOB_LIST is empty THEN
            Display "No applications to show"
        ELSE
            For each job in JOB_LIST
                Display Company, Title, Date, Status
            EndFor
        ENDIF
    ELSE IF choice = 4 THEN
        Display "Exiting System"
        EXIT LOOP
    ELSE
        Display "Invalid Choice"
    ENDIF
UNTIL choice = 4
END
```

Flow chart


START
Initialize JOB_LIST = empty
Display Menu
1. Add Job
2. Update Status
3. View Jobs
4. Exit
Input Choice
Choice = 1 ?
Choice = 2 ?
Choice = 3 ?
Input Company
Input Job Title
Input Date
Status = Applied
Add to JOB_LIST
If list empty → show message
Else show job list
Input index
Input new status
If list empty → show message
Else dispiay all jobs
Choice = 4 ?
EXIT
END

Linux and Automation Practice

File and Directory Management

1. `mkdir`

- **Syntax:** `mkdir [options] directory_name`
- **Description:** Creates a new directory.
- **Example:** mkdir `Projects`
- **Sample Output:**
  (No output if successful)
- **Explanation:** Used to organize files into directories.

---

2. `touch`

- **Syntax:** `touch filename`
- **Description:** Creates an empty file or updates file timestamp.
- **Example:** touch `file2.txt`
- **Sample Output:**
  (No output; file created in current directory)
- **Explanation:** Quick way to create files for editing or scripts.

3.`cp`

- **Syntax:** `cp [source] [destination]`
- **Description:** Copies files or directories.
- **Example:** cp `file1.txt file1_copy.txt`
- **Sample Output:**
  (No output; file copied)
- **Explanation:** Used to duplicate files or backup important data.

---

4 .`mv`

- **Syntax:** `mv [source] [destination]`
- **Description:** Moves or renames files/directories.
- **Example:** mv `file1_copy.txt Archive/`
- **Sample Output:**
  (No output; file moved)
- **Explanation:** Useful for organizing files or renaming them.

5.rm

- **Syntax:** `rm [options] filename`
- **Description:** Removes/deletes files or directories.
- **Example:** rm `file2.txt`
- **Sample Output:**
  (No output; file deleted)
- **Explanation:** Used to clean up unnecessary files. Use `rm -r` for directories.

6.cat

- **Syntax:** i. `cat > [file.txt]`
  ii. `cat file1.txt file2.txt > newfile.txt`
  iii. `cat file.txt`
- **Description:** Create files.
- **Example: i.** `cat file1.txt`
  ii. `cat file1.txt file2.txt > newfile.txt`
  iii. `cat newfile.txt`
- **Sample Output:**

```
taruna-tewatia@taruna-tewatia-VMware20-1:~$ cat > file1.txt
This is yhe content of file 1.
taruna-tewatia@taruna-tewatia-VMware20-1:~$ cat > file2.txt
This is the content of file 2.
taruna-tewatia@taruna-tewatia-VMware20-1:~$ cat file1.txt file2.txt > newfile.txt
taruna-tewatia@taruna-tewatia-VMware20-1:~$ cat newfile.txt
This is yhe content of file 1.
This is the content of file 2.
```

- **Explanation:** Used to open files, create files and catenate(combine) files.

7.head

- **Syntax:** `head -n [filename]`
- **Description:** Displays first n lines of the mentioned file.
- **Example:** head `-n file1.txt`
- **Sample Output:**

```
taruna-tewatia@taruna-tewatia-VMware20-1:~$ head -10 states.txt
Haryana
Punjab
Uttarpradesh
Himachal pradesh
Uttrakhand
Gujrat
Rajasthan
West Bengal
Assam
Manipur
taruna-tewatia@taruna-tewatia-VMware20-1:~$
```

- **Explanation:** Useful for getting large files introduction with the help of starting lines without opening the whole file.

8. `tail`

- **Syntax:** `tail -n [filename]`
- **Description:** Displays large n lines of the mentioned file.
- **Example:** rm `file2.txt`
- **Sample Output:**

```
taruna-tewatia@taruna-tewatia-VMware20-1:~$ tail -10 states.txt
Telangana
Karnataka
Kerala
Tamil nadu
Goa
Meghalaya
Tripura
Bihar
Mizoram
Nagaland
taruna-tewatia@taruna-tewatia-VMware20-1:~$
```

- **Explanation:** Used to get last lines of a file without opening the whole file.

Permissions Management

9. `chmod`

- **Syntax:** chmod [options] mode filename
- **Description:** Changes file or directory permissions.
- **Example:** chmod 755 script.sh
- **Sample Output:**
  (No output; permissions updated)
- **Explanation:** Important for controlling who can read, write, or execute files.

---

10. `chown`

- **Syntax:** chown [owner][:group] filename
- **Description:** Changes file or directory owner and group.
- **Example:** chown user:user file1.txt
- **Sample Output:**
  (No output; ownership changed)
- **Explanation:** Useful when managing multi-user environments.

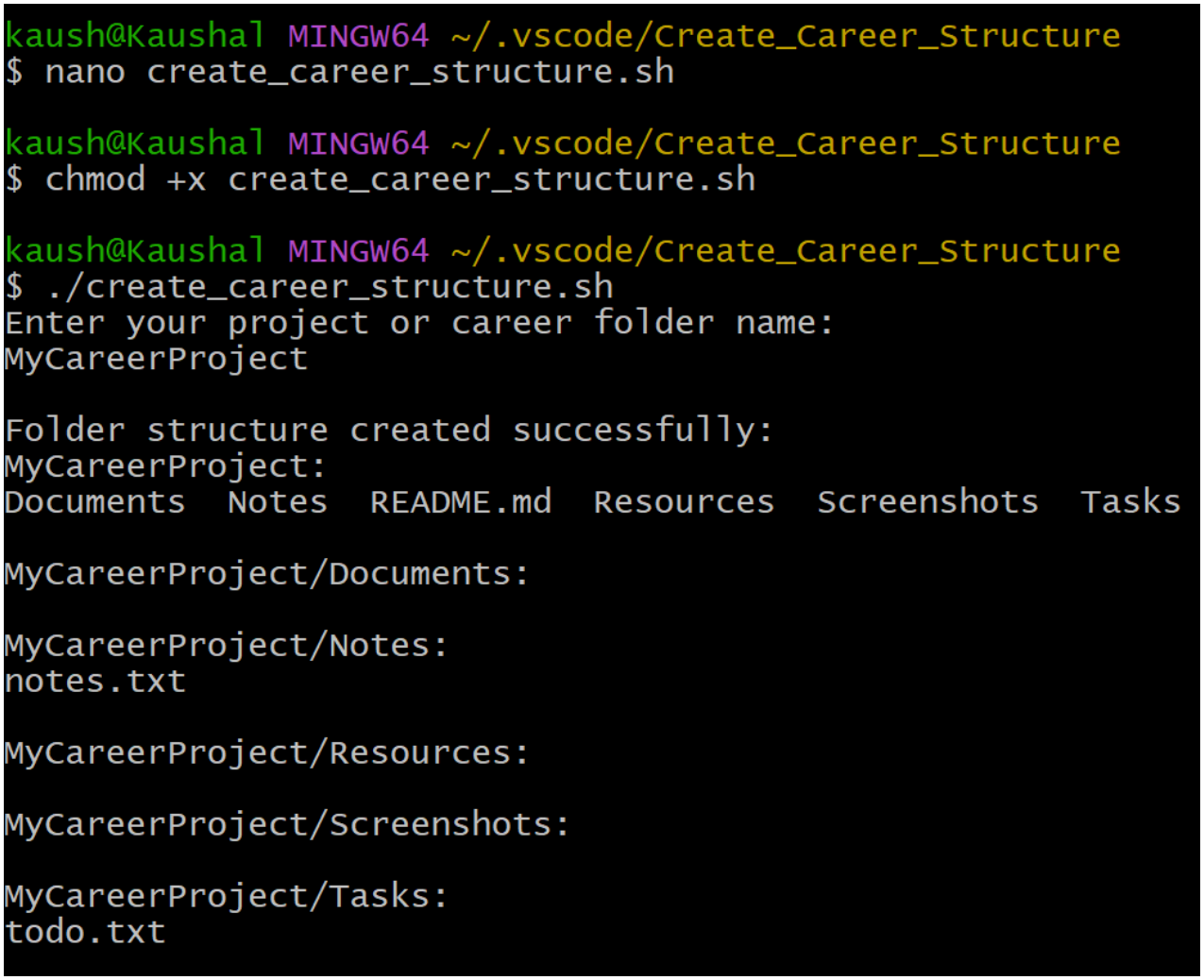
Script

Screenshot of create_Career_structure.sh file:

$ create_career_structure.sh

```
#Name: Kaushal
#Roll no: 2501730085
#Course: B.Tech CSE (AI & ML)
#Section: B


#!/bin/bash

# Script to automatically create a career or project folder structure

echo "Enter your project or career folder name:"
read folder

# Create main folder
mkdir -p "$folder"

# Subfolders
mkdir -p "$folder/Documents"
mkdir -p "$folder/Notes"
mkdir -p "$folder/Resources"
mkdir -p "$folder/Tasks"
mkdir -p "$folder/Screenshots"

# Starter files
echo "# $folder Project" > "$folder/README.md"
echo "Notes for $folder" > "$folder/Notes/notes.txt"
touch "$folder/Tasks/todo.txt"

# Display structure
echo
echo "Folder structure created successfully:"
tree "$folder" 2>/dev/null || ls -R "$folder"
```

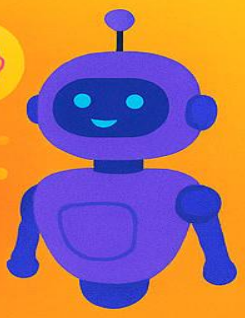
Screenshot of SCRIPT EXECUTION:



Exploring Emerging Technology Domain

Artificial Intelligence

AI DOMAIN



TECHNOLOGY OVERVIEW

AI is computer systems that perform tasks normally requiring human intelligence.

KEY CAPABILITIES

- Machine Learning
- Deep Learning
- Natural Language Processing (NLP)
- Computer Vision
- Robotics
- Expert Systems

APPLICATIONS

- Google AI Fundamentals
- IBM Applied AI Professional Certificate
- Microsoft AI Fundamentals (AI-900)

CERTIFICATIONS RELATED TO AI

Beginner

- Google AI Fundamentals
- IBM Applied AI Professional Certificate
- Microsoft AI Fundamentals

JOB ROLES & SALARY TRENDS (INDIA)

Entry-Level Roles (0–2 years)

• AI/ML Engineer	₹5–10 LPA
• Data Scientist	₹6–12 LPA
• Data Analyst	₹4–6 LPA
• NLP Engineer	₹6–12 LPA

Mid-Level Roles (3–6 years)

• Senior ML Engineer	₹12–22 LPA
• Computer Vision Engineer	₹10–20 LPA
• AI Research Engineer	₹12–25 LPA

Advanced/Leadership Roles

• AI Speciallst / Lead AI Engineer	₹26–40+ LPA
• AI Architect	₹40–60+ LPA
• Head of AI / AI Director	₹60 LPA – ₹1 Cr+

ONE INDIAN STARTUP

Haptik (Mumbai)

What they do: One of India's leading Conversational AI platforms that builds AI chatbots for companies like Jio, Tata, and Ola

Career Planning & Professional Readiness

SMART Goals

Short-term Goal (1–3 months):

Goal: Complete a Python Fundamentals course on Coursera and achieve at least 90% in all assessments by January 2026.
Specific: Learn Python basics including loops, functions, and data structures.
Measurable: Score ≥ 90% in quizzes and assignments.
Achievable: Allocate 1–2 hours daily to the course.
Relevant: Python is essential for data analysis and project development.
Time-bound: Complete within 3 months (by January 2026).

Medium-term Goal (6–12 months) – ALREADY ACHIEVED

Goal: Build and deploy a personal portfolio website showcasing at least 3 projects by July 2026.
Specific: Use HTML, CSS, JavaScript, and GitHub Pages.
Measurable: Portfolio live online with 3 projects documented.
Achievable: Dedicate weekends to development and testing.
Relevant: A portfolio will strengthen my professional profile and LinkedIn visibility.
Time-bound: Launch the website within 6–12 months.

Long-term Goal (1–3 years)

***Goal*:** Secure an internship in a data analytics or software development company by 2027.
Specific: Apply to at least 30 internship opportunities and prepare with relevant projects and certifications.

Measurable: Get at least one internship offer.
Achievable: Leverage portfolio, certifications, and skills acquired from short/medium-term goals.
Relevant: Internship experience is crucial for career readiness and skill development.
Time-bound: Achieve by 2027.

Certification Research

Certification 1: AWS Cloud Practitioner

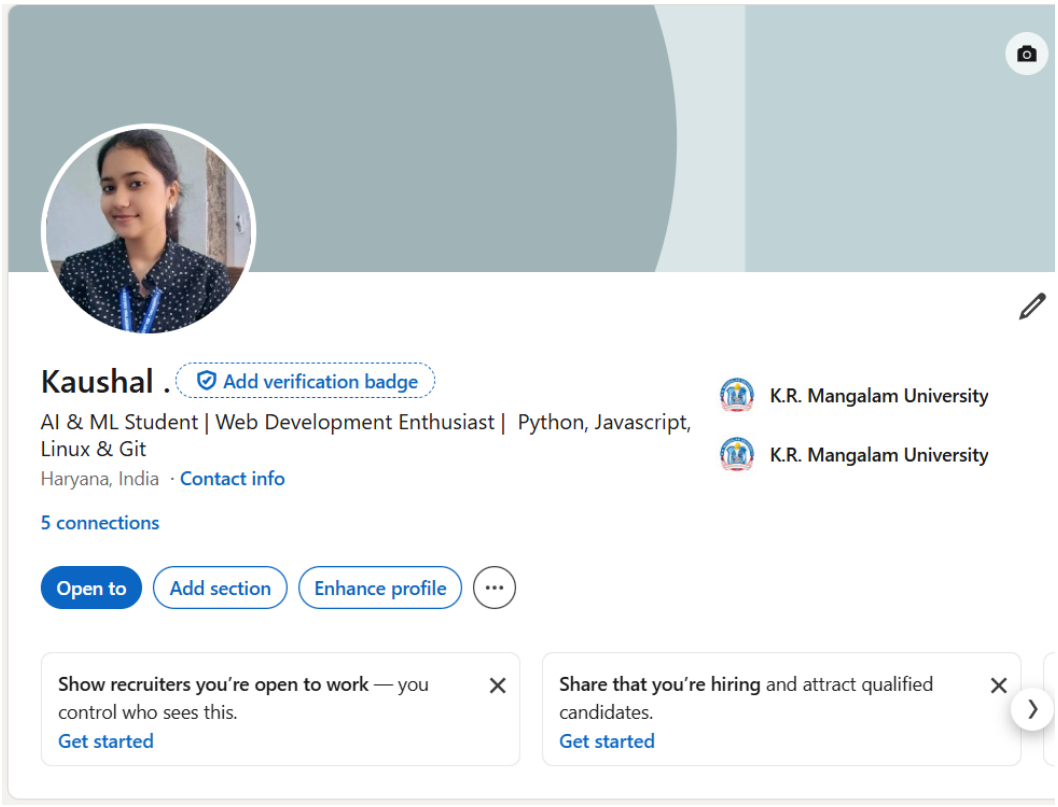
- ***Provider:*** Amazon Web Services (AWS)
- ***Duration & Cost:*** Approx. 3 months, $100 for exam
- ***Skills Covered:***
    - Cloud fundamentals
    - AWS services overview (EC2, S3, Lambda)
    - Basic cloud security and architecture
- ***Alignment with SMART Goals:***
    - Helps achieve my **long-term goal** of securing an internship in data analytics/software development by understanding cloud platforms used in real-world projects.
    - Enhances portfolio projects with cloud deployment skills.

Certification2: Google Data Analytics Professional Certificate

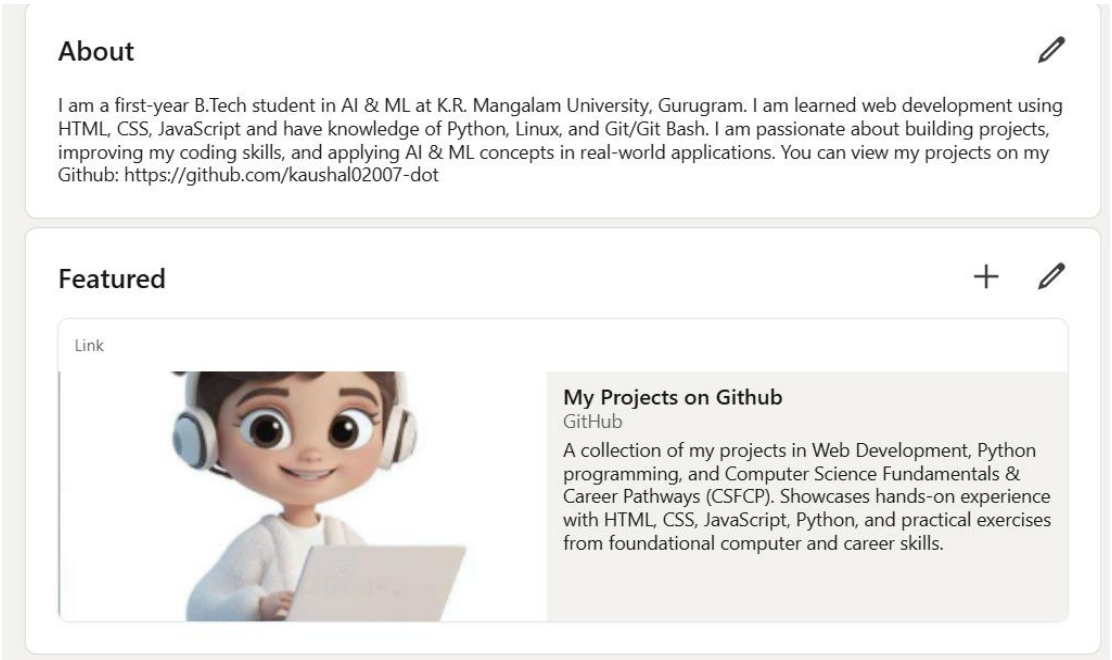
- ***Provider:*** Coursera (Google)
- ***Duration & Cost:*** Approx. 6 months, $39/month subscription
- ***Skills Covered:***
    - Data cleaning and visualization
    - SQL, spreadsheets, and R programming basics
    - Data-driven decision-making
- ***Alignment with SMART Goals:***
    - Supports **medium-term and long-term goals** by adding data analytics skills to my portfolio projects.
    - Makes me more competitive for internships in analytics or software development.

LinkedIn Update

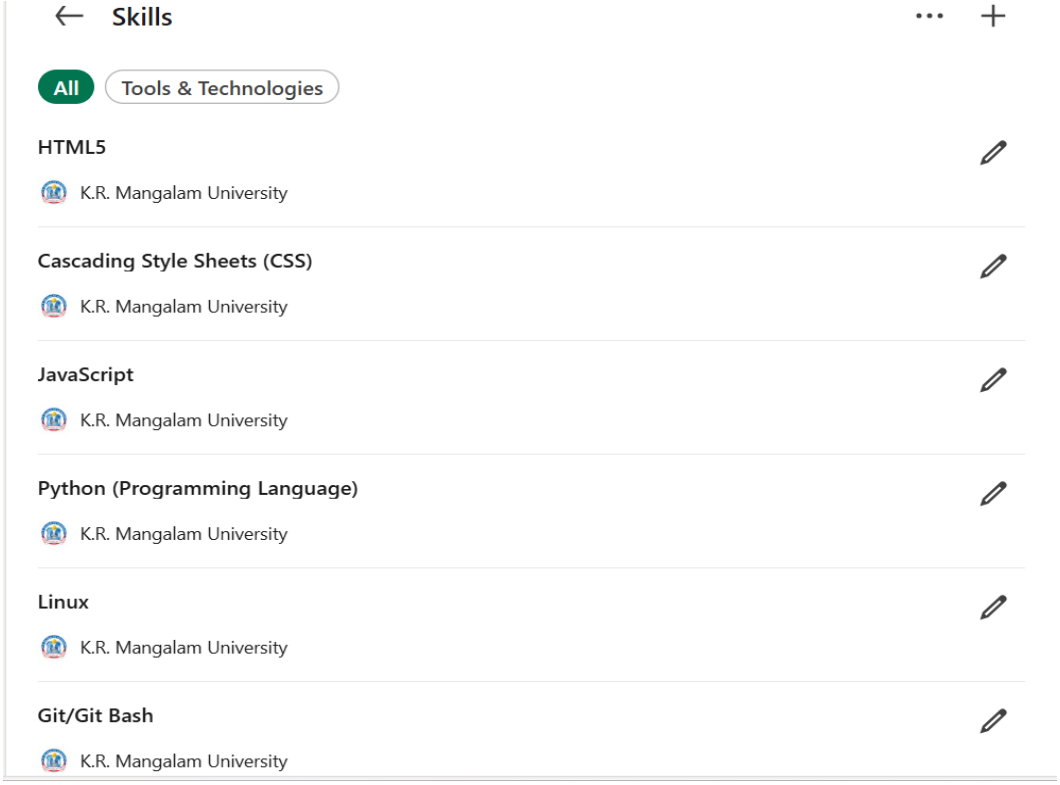
Profile Picture & Headline



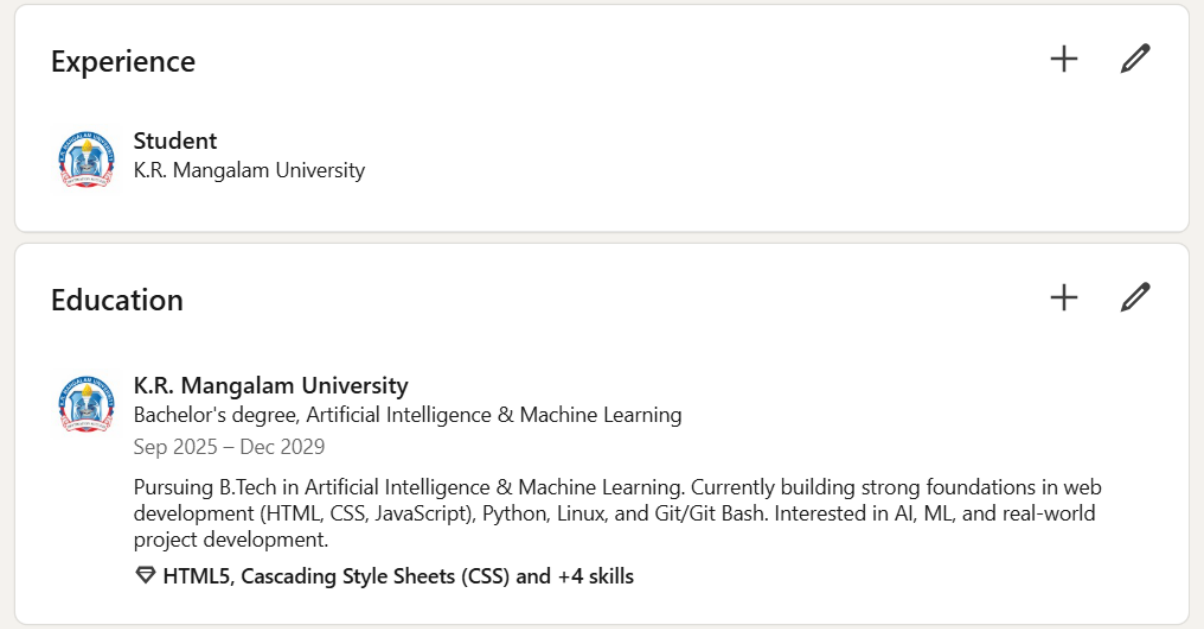
Summary & About Section



Skills



Education



LinkedIn Profile Link:

https://www.linkedin.com/in/kaushal-71813b376/

Hackathon / Contest / Open Source Plan

Event/Project Name: CodeFest 2026 (Hackathon)
Date: January 15–17, 2026
Platform/Organizer: Hosted online by CodeFest Organization

Preparation Steps:

1. Review and practice HTML, CSS, JavaScript for frontend tasks.
2. Brush up on Python for backend or logic challenges.
3. Learn basic Linux commands and Git/Git Bash for version control and collaboration.
4. Explore sample hackathon challenges and previous projects to understand expected outcomes.
5. Form a team or join online collaboration groups for project work.

Alignment with Goals:

- Participating in hackathons will help achieve short-term and medium-term SMART goals by applying web development and programming skills in real-world problem-solving.
- It also strengthens your portfolio and resume, supporting your long-term goal of securing an internship in AI/ML or software development.

Career Roadmap

As a first-year B.Tech student in Artificial Intelligence and Machine Learning at K.R. Mangalam University, Gurugram, I am focused on building a strong foundation in AI, ML, and web development. My career roadmap outlines a structured plan for skill development, certifications, projects, and internships over the next three years to achieve professional readiness.

Year 1: Building Foundations

The first year is dedicated to establishing technical skills. I have learned web development using HTML, CSS, and JavaScript and gained knowledge of Python, Linux, and Git/Git Bash. These skills provide a foundation for building projects and understanding AI/ML basics.

Key milestones:

- Build and host small web development projects on GitHub.
- Learn introductory AI and ML concepts such as data handling, algorithms, and basic model building.
- Update LinkedIn with a professional summary, skills, education, and GitHub portfolio.
- Participate in beginner-level coding contests or hackathons for practical exposure.

By the end of Year 1, I aim to have a portfolio of projects and a clear understanding of foundational AI and web development concepts.

Year 2: Skill Enhancement and Certifications

The second year will focus on strengthening technical expertise and gaining certifications. I plan to pursue **AWS Cloud Practitioner** and **Google Data Analytics Professional Certificate** to enhance knowledge of cloud computing, data analysis, and workflow management.

Key milestones:

- Develop intermediate projects integrating Python, web development, and data analysis.
- Gain experience in Git/Git Bash for version control and collaborative coding.
- Contribute to open-source projects on GitHub.
- Participate in national-level hackathons or coding competitions.
- Apply for online internships or small projects in AI, ML, or web development.

By the end of Year 2, I aim to have a strong portfolio, hands-on experience, and certification credentials to showcase practical skills.

Year 3: Professional Exposure and Specialization

The third year focuses on advanced learning and professional exposure. I plan to work on larger AI/ML projects, participate in hackathons, and secure internships to gain industry-level experience.

Key milestones:

- Build advanced projects integrating AI/ML models with web applications.
- Contribute to and potentially lead open-source projects.
- Attend workshops or online courses on advanced AI/ML topics like neural networks, NLP, or computer vision.
- Apply for internships in AI/ML, data analytics, or web development roles.

By the end of Year 3, I aim to be professionally prepared with a strong portfolio, certifications, and practical experience.

Long-Term Vision

Beyond Year 3, my goal is to pursue a career as an AI/ML engineer, contributing to real-world AI applications and web-based solutions. Continuous learning, open-source contributions, and advanced certifications will ensure I stay updated with emerging technologies and industry standards.

Github Profile Link:

https://github.com/kaushal02007-dot

Reflection

Completing this assignment was a valuable learning experience that allowed me to integrate technical skills, professional development, and career planning. One of the main challenges I faced was designing and implementing the Bash script to automate a career-related task. Ensuring correct file permissions, understanding Linux commands, and executing the script successfully required attention to detail and patience. Creating an algorithm and flowchart for a career-related system also demanded careful thinking to translate logical steps into a visual representation.

Updating my LinkedIn profile and researching relevant certifications were other challenging yet rewarding tasks. Crafting a concise summary, highlighting skills, and organizing my projects on GitHub helped me understand the importance of a professional online presence. Planning for a hackathon and drafting a career roadmap required strategic thinking to align my short-term and long-term goals with industry requirements.

Through this assignment, I improved my *technical skills* in Linux, Bash scripting, Git, and project organization. I also enhanced my *professional skills,* including career planning, certification research, and portfolio management. Additionally, I developed critical *problem-solving and planning abilities* by designing algorithms, flowcharts, and roadmaps.

This experience will help me academically by providing a structured approach to learning and project execution, and professionally by preparing me to present my skills effectively, participate in technical events, and pursue a clear path toward a career in AI, ML, and web development.