Buildable ML/DL Fellowship - Week 1 Assignment Report

Question 1 – Git & GitHub (Version Control Basics)

- Created new branch: **week1-assignment** from main branch. - Added **week1/week1_assignment.py** file with solutions. - Committed and pushed changes to the branch. - Merged into main branch using a Pull Request (PR).
■ Screenshot Placeholder: Branch creation, commits, PR

Question 2 – Mutable vs Immutable

- Tuple: Immutable, cannot change elements directly. - List: Mutable, can change elements. - Dictionary: Mutable, values can be updated. - Tuple with sub-lists: Tuple is immutable, but sub-lists are mutable and can be modified.
■ Screenshot Placeholder: Program output for Q2

Question 3 – User Information Dictionary

- Program validates user inputs (age, email, favorite number). - Ensures correct formats and ranges. - Stores user data in a dictionary. - Displays a formatted welcome message.
■ Screenshot Placeholder: Program output for Q3

Question 4 – Cinema Ticketing System

- Function **calculate_ticket_price()** applies rules: * Children <12 $\rightarrow$ \$5, Teenagers 13–17 $\rightarrow$ \$8, Adults 18–59 $\rightarrow$ \$12, Seniors 60+ $\rightarrow$ \$6 * Student discount: 20% * Weekend surcharge: +\$2 - Invalid ages raise an error. - System processes multiple customers, shows ticket details, total revenue, highest & lowest paying customers. - Bonus: Group discount ($\geq$4 customers $\rightarrow$ 10% off).
■ Screenshot Placeholder: Program output for Q4

Question 5 – Weather Alert System

- Function **weather_alert()** checks conditions: * temp <0 & snowy $\rightarrow$ Heavy snow alert * temp >35 & sunny $\rightarrow$ Heatwave warning * rainy & temp <15 $\rightarrow$ Cold rain alert * Otherwise normal weather - Bonus: Converts temperature into Fahrenheit & Kelvin.
■ Screenshot Placeholder: Program output for Q5

Question 6 – Sales Analytics

- Function **analyze_sales()** returns maximum, minimum, and median sales. - User must enter at least 5 values. - Displays summary: Highest, Lowest, Median sales.
■ Screenshot Placeholder: Program output for Q6

Question 7 – E-commerce Inventory Management

- Function **update_inventory()** updates stock (cannot go below 0). - Initialized with 5 products. - Simulates shopping cart for 3 items. - Displays updated inventory, most & least stocked products.
■ Screenshot Placeholder: Program output for Q7

Question 9 – Conceptual Understanding

AI vs ML vs DL vs Data Science
- Artificial Intelligence (AI): Broad field of building intelligent systems (e.g., Siri, self-driving cars).
 - Machine Learning (ML): Subset of AI where systems learn from data (e.g., spam email filters).
- Deep Learning (DL): Subset of ML using neural networks (e.g., face recognition in Facebook).
 - Data Science: Broader field including data analysis, visualization, ML, statistics (e.g., Netflix recommendations).

Mutable vs Immutable
- Mutable: Can be changed (Lists, Dictionaries, Sets). - Immutable: Cannot be changed (Tuples, Strings, Integers). - Example: Lists allow element replacement, Tuples do not.

Deep Copy vs Shallow Copy
- Shallow Copy: Copies object structure but references nested objects (changes in nested affect both).
 - Deep Copy: Creates completely independent copy including nested objects.

Git Branching Importance
- Branching allows multiple developers to work independently without affecting main codebase.
- Useful for features, bug fixes, experiments.
- Enables safe collaboration and controlled merging.