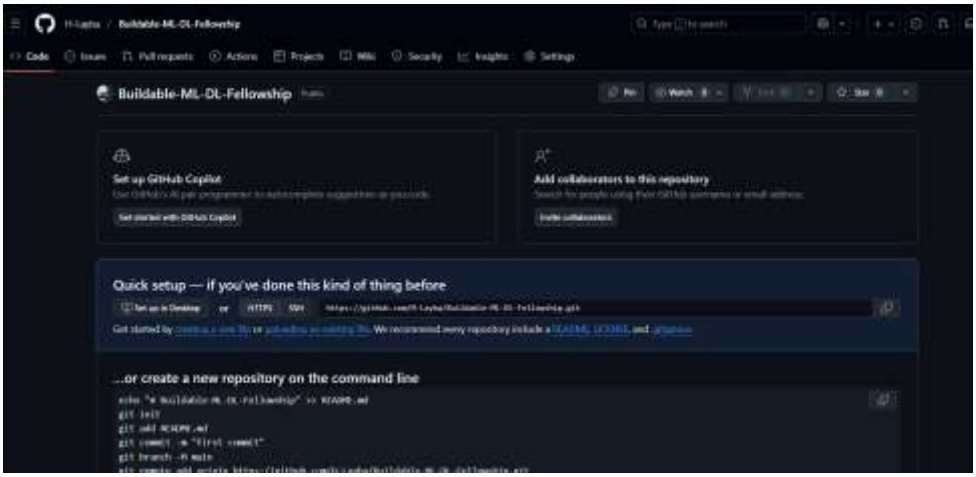
Buildables Fellowship Assignment

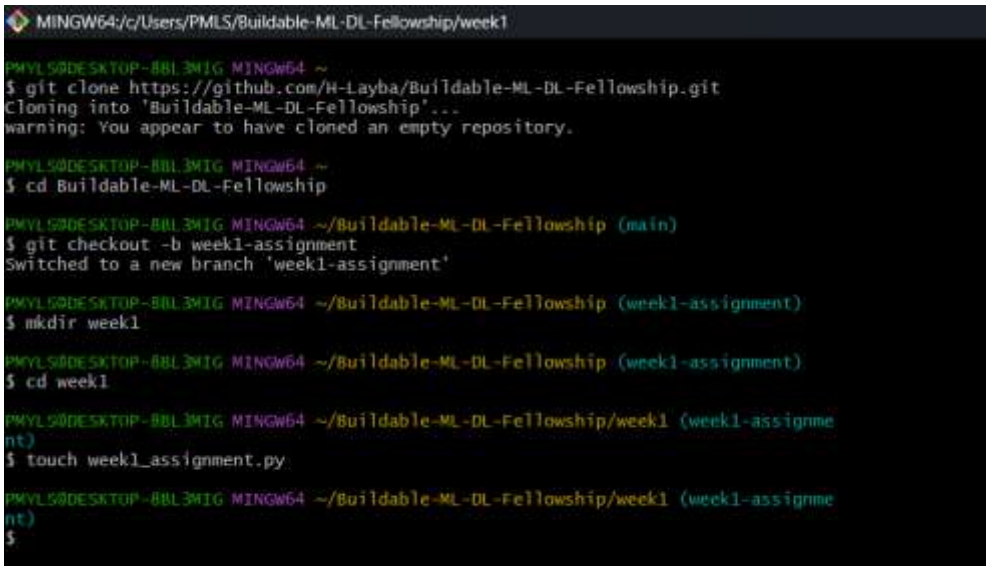
Week #1 Report

Q1:

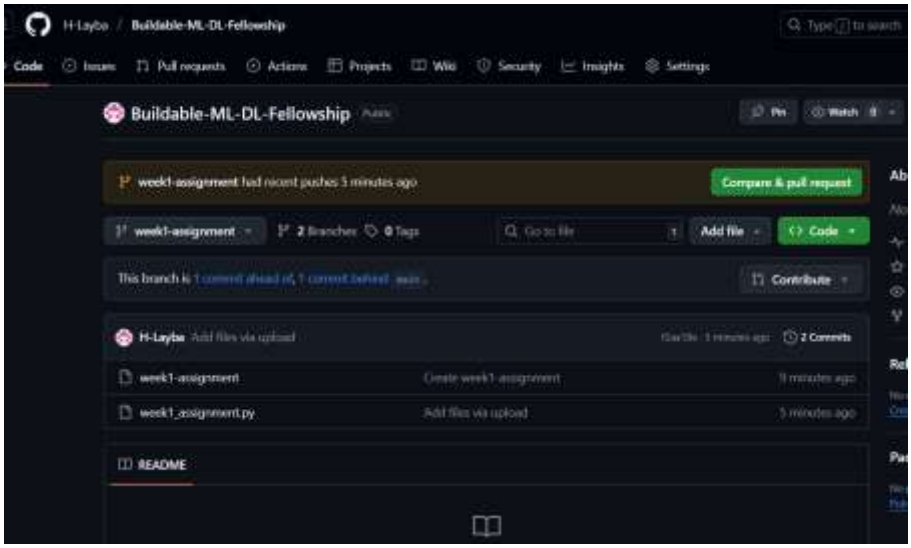
Repository Created



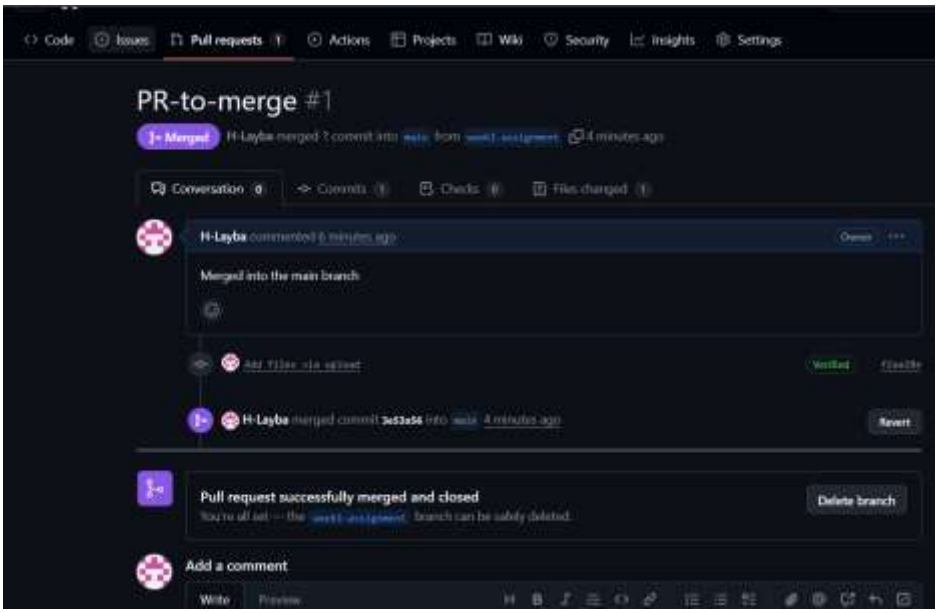
Folder creation using Git



Week 1 Folder



PR Completed



Q2:

```
 Q2 Mutable vs Immutable
Original tuple: (4, 5, 6)
Error when trying to modify tuple: 'tuple' object does not support item assignment
Original list: [4, 5, 6]
Modified list: [4, 77, 6]
Original dictionary: {'name': 'layba', 'age': 21}
Modified dictionary: {'name': 'layba', 'age': 24}
Original tuple with lists: ([1, 2, 3], [4, 5, 6])
Modified tuple with lists: ([1, 2, 10], [4, 5, 6])
```

- If the tuple contains mutable objects (like lists), the objects inside can still be modified**.**
- In your code, the tuple holds lists, which are mutable**.** That's why you can update the list elements even though the tuple itself is immutable.
- The tuple structure ([1,2,3], [4,5,6]) remains the same (2 elements only).
- But the first list inside ([1, 2, 3]) was changed to [1, 2, 10]
- You cannot change tuple elements directly.
- You can modify the contents of lists inside the tuple.

Q3:

```
Q3 User Information Dictionary
Enter your name: layba huda
Enter your age: 22
Enter your email: laybahuda@gmail.com
Enter your favorite number (1-100): 101
Favorite number must be between 1 and 100.
Enter your favorite number (1-100): 0
Favorite number must be between 1 and 100.
Enter your favorite number (1-100): 4

Welcome layba huda! Your account has been registered with email laybahuda@gmail.com.
```

Q4:

```
Q4 Cinema Ticketing System
Enter number of customers: 4

--- Customer 1 ---
Enter age: 22
Is the customer a student? (yes/no): yes
Is it a weekend show? (yes/no): yes

--- Customer 2 ---
Enter age: 21
Is the customer a student? (yes/no): yes
Is it a weekend show? (yes/no): yes

--- Customer 3 ---
Enter age: 22
Is the customer a student? (yes/no): yes
Is it a weekend show? (yes/no): yes

--- Customer 4 ---
Enter age: 22
Is the customer a student? (yes/no): yes
Is it a weekend show? (yes/no):

Group discount applied (10% off total bill).

 Ticket Details
Customer 1 | Age: 22 | Student: True | Weekend: True | Ticket Price: $11.6
Customer 2 | Age: 21 | Student: True | Weekend: True | Ticket Price: $11.6
Customer 3 | Age: 22 | Student: True | Weekend: True | Ticket Price: $11.6
Customer 4 | Age: 22 | Student: True | Weekend: False | Ticket Price: $9.6

Total Revenue: $39.96
Highest Paying Customer: Customer 1 -> $11.6
Lowest Paying Customer: Customer 4 -> $9.6
```

Q5:

```
 Q5  Weather Alert System
Enter the temperature in Celsius: 23
Enter the weather condition: cloudy

Weather Alert System Output:
Normal weather conditions.
Temperature: 23.0°C, 73.40°F, 296.15K
```

Q6:

```
 Q6 Sales Analytics
Enter daily sales ( 5 values): 25
Please enter at least 5 values.
Enter daily sales ( 5 values): 23,23,24,25,26
 Invalid input. Please enter numeric values only.
Enter daily sales ( 5 values): 23 23 24 25 26

 Sales Summary
Highest sales day: 26.0
Lowest sales day: 23.0
Median sales: 24.0
```

Q7:

```
 Q7 Inventory Management
Initial Inventory: {'Monitor': 10, 'Phone': 15, 'Airpods': 8, 'Speakers': 12, 'Laptop': 20}
Enter the item you want to buy: Phone
Enter quantity of Phone: 3
Enter the item you want to buy: airpods
Enter quantity of airpods: 1
airpods is not available in inventory.
Enter the item you want to buy: Airpods
Enter quantity of Airpods: 1

Updated Inventory: {'Monitor': 10, 'Phone': 12, 'Airpods': 7, 'Speakers': 12, 'Laptop': 20}
Most stocked product: Laptop (20 left)
Least stocked product: Airpods (7 left)
PS C:\Users\PMLS\AppData\Local\Programs\Microsoft VS Code>
```

Q9:

1. **Difference Between AI, Machine Learning, Deep Learning, And Data Science:**

Artificial Intelligence: AI is a broad area in computer science that focuses on building systems capable of performing tasks that usually require human intelligence, such as reasoning, decision-making.
Example: Virtual assistants like Siri or Alexa that understand voice commands and respond accordingly.

Machine Learning (ML):
ML is a subset of AI where algorithms are trained to recognize patterns and make predictions by learning from past data instead of following hard-coded instructions.
Example: Email services automatically detecting and filtering spam messages.

Deep Learning (DL):
DL is a branch of ML that relies on artificial neural networks with many layers to process and learn from large and complex datasets. It is especially powerful for tasks involving images, audio, and text.
Example: Google Translate uses deep neural networks to translate text between different languages.

Data Science:
Data Science is the practice of collecting, analyzing, and interpreting both structured and unstructured data to uncover useful insights, often leveraging AI and ML techniques along with statistics and visualization tools.
Example: Banks analyze customer transaction data to detect fraudulent activity.

2. **Explain mutable vs immutable data types in your own words**

Mutable: Data types that can be changed/modified after creation like lists, dictionaries.

Immutable: Data types that cant be changed/modified after creation like tuples, integers.

3. **Explain the difference between deep copy and shallow copy**

Shallow Copy:
Creates a new object but references elements of the original object. Changes in nested elements affect both copies.

Deep Copy:
Creates a completely independent copy, including nested objects. Changes in one do not affect the other.

4. Explain Git branching and why it is important in collaborative development

Git Branching:
In Git, branching lets developers create independent lines of development within a project. This way, new features, bug fixes, or experimental code can be worked on without interfering with the main source code.

Significance:

- **Concurrent Work:** Team members can develop different features simultaneously.
- **Separation:** Modifications remain isolated until they are reviewed and merged.
- **Team Collaboration:** Reduces code conflicts by keeping work on separate branches.
- **Safe Testing:** Developers can experiment freely without risking issues in the main project.