

Inception BD

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Full Stack Data Science with Generative AI Bootcamp 1.0

Assignment 03

Last Submission Date: 23 November 2025, at 11:59 PM

Assignment Submission Instructions:-

Step 1: Create a new **repository** on your GitHub account.

Step 2: Upload your code (the `.ipynb` file) from your computer to that repository.

Step 3: Copy the link to your `.ipynb` file.

Step 4: Send the link via email to: learn.inceptionbd@gmail.com

Gmail Format:-

Compose a new email with the following details:

To: learn.inceptionbd@gmail.com

Subject: FSDS with Gen AI Assignment-3 Submission

Body:

Hello, please find my assignment submission at the following GitHub repository link.

Name: Md. Ridoy Hossain

Student ID: 2AE89DFB

Repository Link: <https://github.com/inceptionbd/Computer-Vision>

Best Regards

Md. Ridoy Hossain

1. Inventory Price Calculator

Real-world use: Used in e-commerce dashboards for price summaries.

Task:

Write a function `calculate_inventory_summary(prices)` that:

- receives a list of product prices
- returns `total_cost` and `average_cost`

Example:

Input: `[120, 250, 399, 150]`

Output: `(919, 229.75)`

2. Unique Visitor Tracker

Real-world use: Website analytics tools calculating daily active users.

Task:

Write a function `count_unique_visitors(visitor_list)` that:

- takes a list of visitor IDs
- returns the number of unique visitors

Example:

Input: `[101, 205, 101, 310, 205, 550]`

Output: `4` (The unique IDs are 101, 205, 310, 550)

3. Product Category Counter

Real-world use: Inventory/category-based analytics.

Task:

Write a function `count_categories(products)` that:

- takes a list of product names
- returns a dictionary counting each product type.

Example:

Input: `["Laptop", "Smartphone", "Monitor", "Laptop", "Smartphone", "Headphones", "Laptop"]`

Output: `{"Laptop": 3, "Smartphone": 2, "Monitor": 1, "Headphones": 1}`

4. Temperature Analytics

Real-world use: Health tech temperature screening systems.

Task:

Write a function `analyze_temperatures(temp_list)` that:

- separates high ($> 38^{\circ}\text{C}$) and normal temps
- returns two lists: `(high_list, normal_list)`

Example:

Input: `[36.5, 38.0, 39.1, 37.2, 40.5, 38.0, 37.9]`

Output:

High List ($> 38^{\circ}\text{C}$): `[39.1, 40.5]`

Normal List ($< 38^{\circ}\text{C}$): `[36.5, 38.0, 37.2, 38.0, 37.9]`

Full Output Tuple: `([39.1, 40.5], [36.5, 38.0, 37.2, 38.0, 37.9])`

5. Menu Price Lookup

Real-world use: Restaurant ordering apps.

Task:

Write a function `get_price(menu, item)` that:

- receives a dictionary menu and an item name
- returns the price if exists
- otherwise returns `"Item not found"`

Example 1: Item Found

- Input (Menu): `{"Coffee": 3.50, "Tea": 2.75, "Muffin": 4.00, "Sandwich": 8.50}`
- Input (Item): `"Muffin"`
- Output: `4.00`

Example 2: Item Not Found

- Input (Menu): `{"Coffee": 3.50, "Tea": 2.75, "Muffin": 4.00, "Sandwich": 8.50}`
- Input (Item): `"Donut"`
- Output: `"Item not found"`

6. Student Grading System

Real-world use: School result automation.

Task:

Write a function `calculate_grade(score)` that:

- returns "A+", "A", "A-", "F" based on numeric marks

Write another function `grade_students(student_dict)` to:

- take a dictionary of student:score
- return student:grade dictionary

Example:

Input (Scores Dictionary): {"Alice": 85, "Bob": 78, "Charlie": 32, "David": 69}

Output (Grades Dictionary): {"Alice": "A+", "Bob": "A", "Charlie": "F", "David": "A-"}

7. Discount Calculator

Real-world use: Online store discount engine.

Task:

Write a function `apply_discounts(products)` where:

- `products` is a list of tuples: (name, price, discount)
- return a list of updated prices after discount

Example:

Input (List of Tuples): [("Keyboard", 80.00, 20), ("Mouse", 25.00, 10), ("Monitor", 300.00, 5)]

Output (List of Prices): [64.00, 22.50, 285.00]

8. Hashtag Generator

Real-world use: Social media automation tools.

Task:

Write a function `generate_hashtags(sentence)` that:

- converts every word into a hashtag
- returns a list of hashtags

Example:

Input: "AI Data Science"

Output: ["#ai", "#data", "#science"]

9. User Authentication Mock

Real-world use: Login systems (basic level).

Task:

Write a function `login(username, password)` that:

- checks if username exists
- checks if password matches
- returns "Login Successful" or "Invalid Credentials"

Example Setup (Mock Database): Assume the following credential database is used internally:
`CREDENTIALS = {"alex_s": "securepwd1", "maria_t": "password101", "john_d": "johndoe123"}`

Example 1: Successful Login

- Input (Username): "maria_t"
- Input (Password): "password101"
- Output: "Login Successful"

Example 2: Failed Login (Wrong Password)

- Input (Username): "alex_s"
- Input (Password): "securepwd12"
- Output: "Invalid Credentials"

Example 3: Failed Login (Non-existent User)

- Input (Username): "peter_z"
- Input (Password): "any_password"
- Output: "Invalid Credentials"

10. Shopping Cart Bill Calculator

Real-world use: Billing systems in e-commerce apps.

Task:

Write a function `calculate_total(cart, prices)` that:

- takes a shopping cart list
- takes a dictionary of item:price
- returns the total bill amount

Example:

Input (Cart): ["Milk", "Bread", "Milk", "Cheese", "Bread"]

Input (Price): {"Milk": 3.00, "Bread": 2.50, "Eggs": 4.00, "Cheese": 5.00}

Output (Total Bill Amount): 16.00