AI LAB ASSIGNMENT-4.1

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COURSE NAME: AI ASSISTED CODING

Task #1 – Zero-Shot Prompting with Conditional Validation

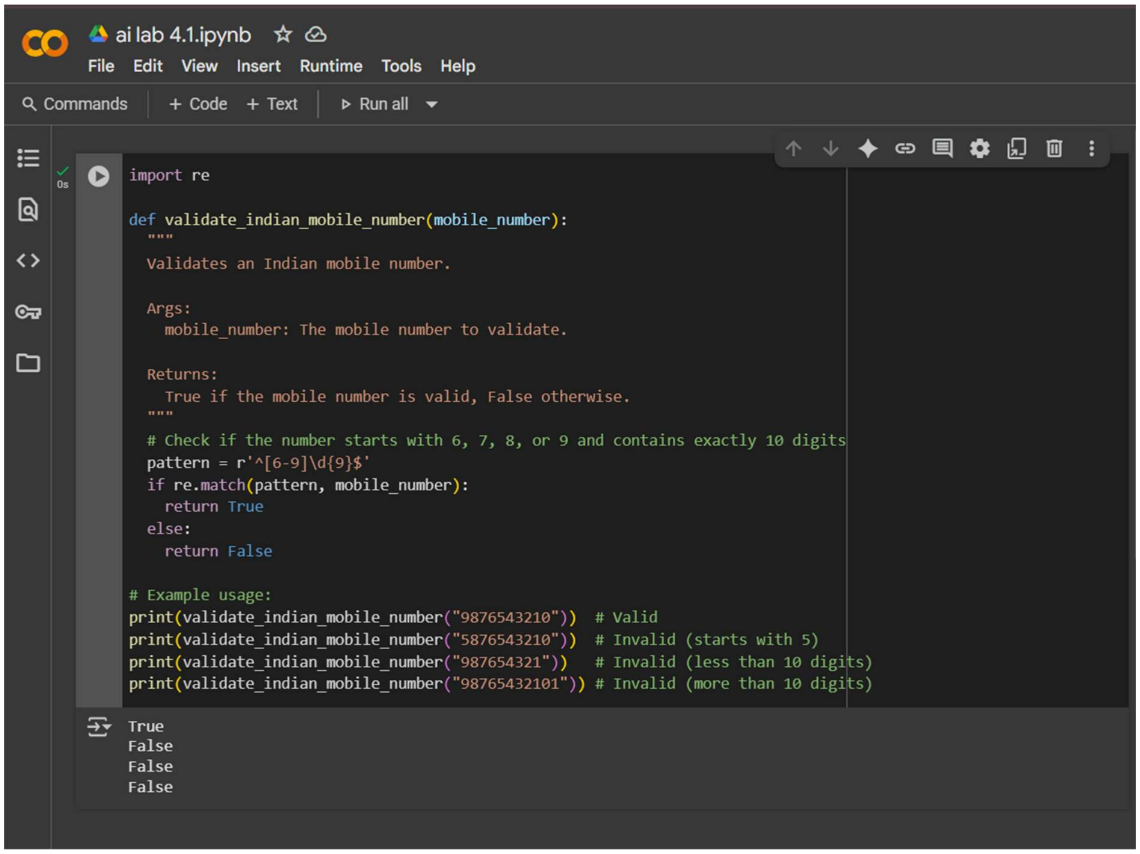
Objective

Use zero-shot prompting to instruct an AI tool to generate a function that validates an Indian mobile number.

Requirements

- The function must ensure the mobile number:
    - Starts with 6, 7, 8, or 9
    - Contains exactly 10 digits

Code: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```
import re

def validate_indian_mobile_number(mobile_number):
  """
  Validates an Indian mobile number.

  Args:
    mobile_number: The mobile number to validate.

  Returns:
    True if the mobile number is valid, False otherwise.
  """
  # Check if the number starts with 6, 7, 8, or 9 and contains exactly 10 digits
  pattern = r'^[6-9]\d{9}$'
  if re.match(pattern, mobile_number):
    return True
  else:
    return False

# Example usage:
print(validate_indian_mobile_number("9876543210"))  # Valid
print(validate_indian_mobile_number("5876543210"))  # Invalid (starts with 5)
print(validate_indian_mobile_number("987654321"))   # Invalid (less than 10 digits)
print(validate_indian_mobile_number("98765432101")) # Invalid (more than 10 digits)
```

```
True
False
False
False
```

Task #2 – One-Shot Prompting with Edge Case Handling

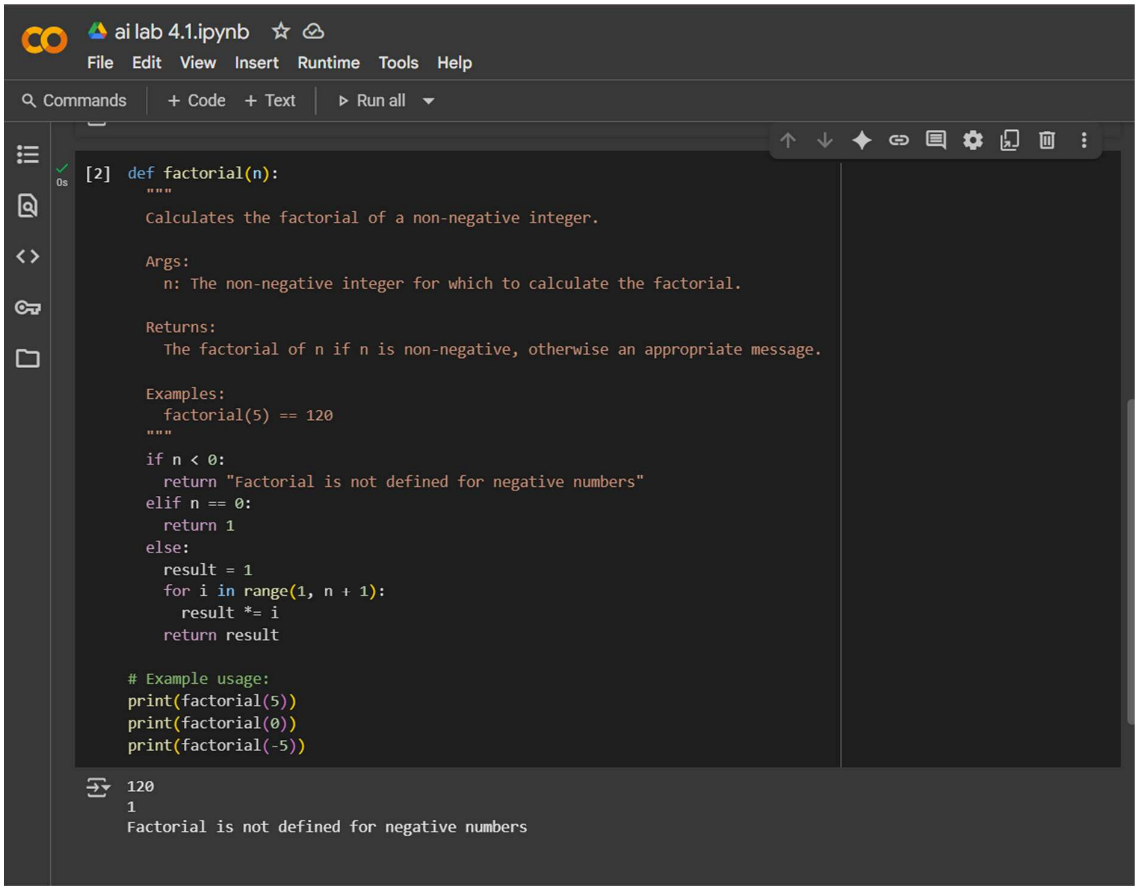
Objective

Use one-shot prompting to generate a Python function that calculates the factorial of a number.

Requirements

- Provide one sample input-output pair in the prompt to guide the AI.
- The function should handle:
  - 0! correctly
  - Negative input by returning an appropriate message

Code: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```
[2] def factorial(n):
      """
      Calculates the factorial of a non-negative integer.

      Args:
        n: The non-negative integer for which to calculate the factorial.

      Returns:
        The factorial of n if n is non-negative, otherwise an appropriate message.

      Examples:
        factorial(5) == 120
      """
      if n < 0:
        return "Factorial is not defined for negative numbers"
      elif n == 0:
        return 1
      else:
        result = 1
        for i in range(1, n + 1):
          result *= i
        return result

    # Example usage:
    print(factorial(5))
    print(factorial(0))
    print(factorial(-5))
```

```
120
1
Factorial is not defined for negative numbers
```

Task #3 – Few-Shot Prompting for Nested Dictionary Extraction

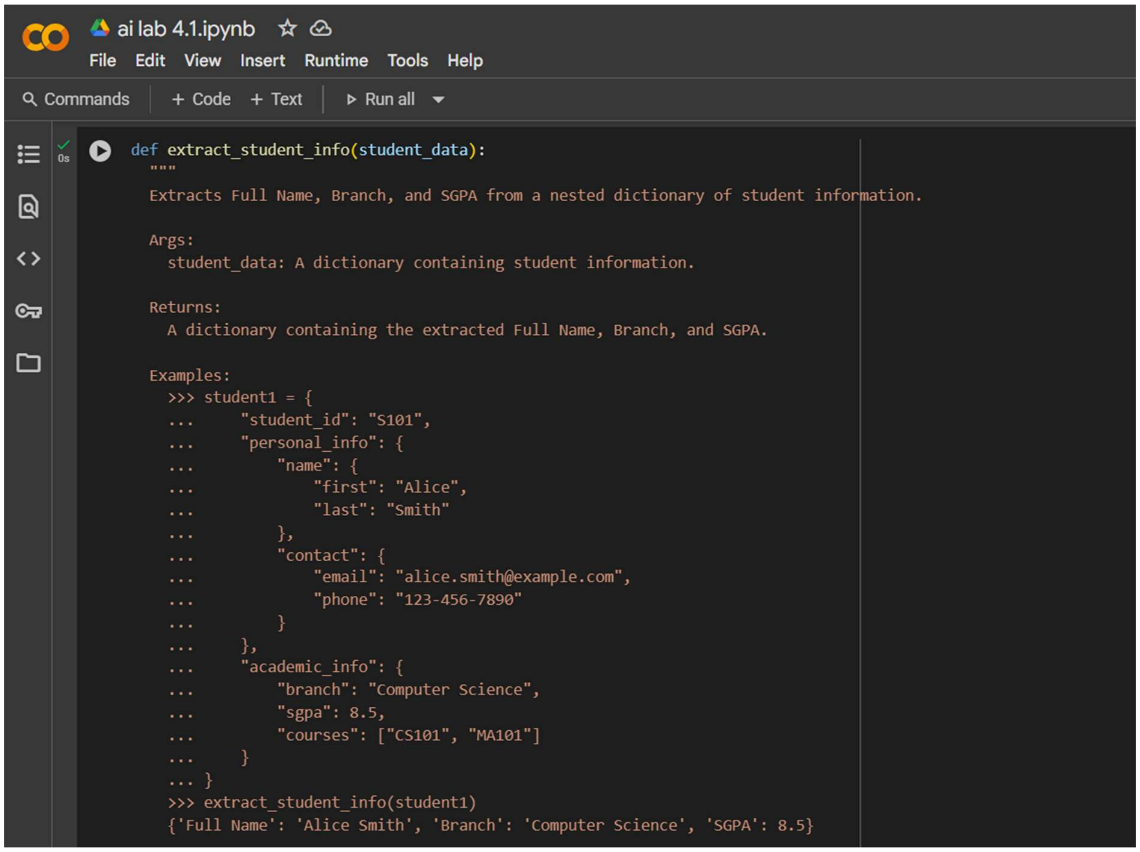
Objective

Use few-shot prompting (2–3 examples) to instruct the AI to create a function that parses a nested dictionary representing student information.

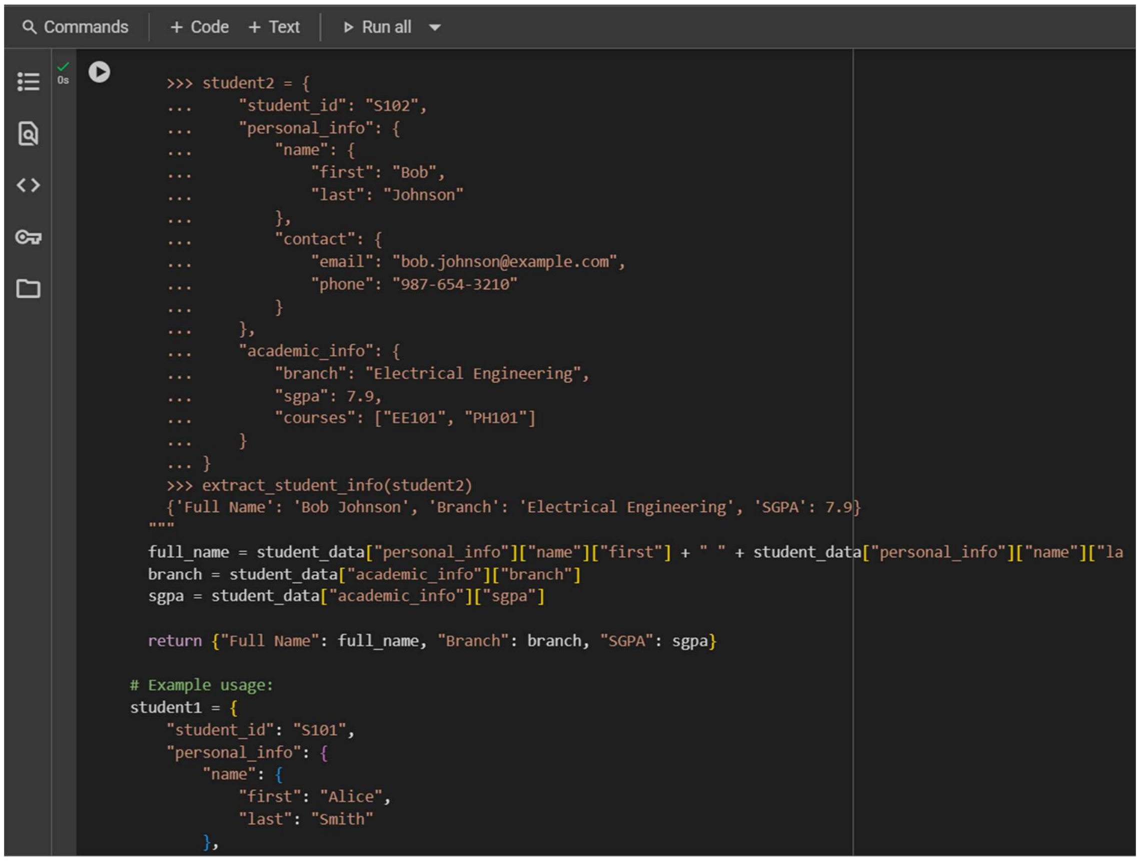
Requirements

- The function should extract and return:
    - Full Name
    - Branch
    - SGPA

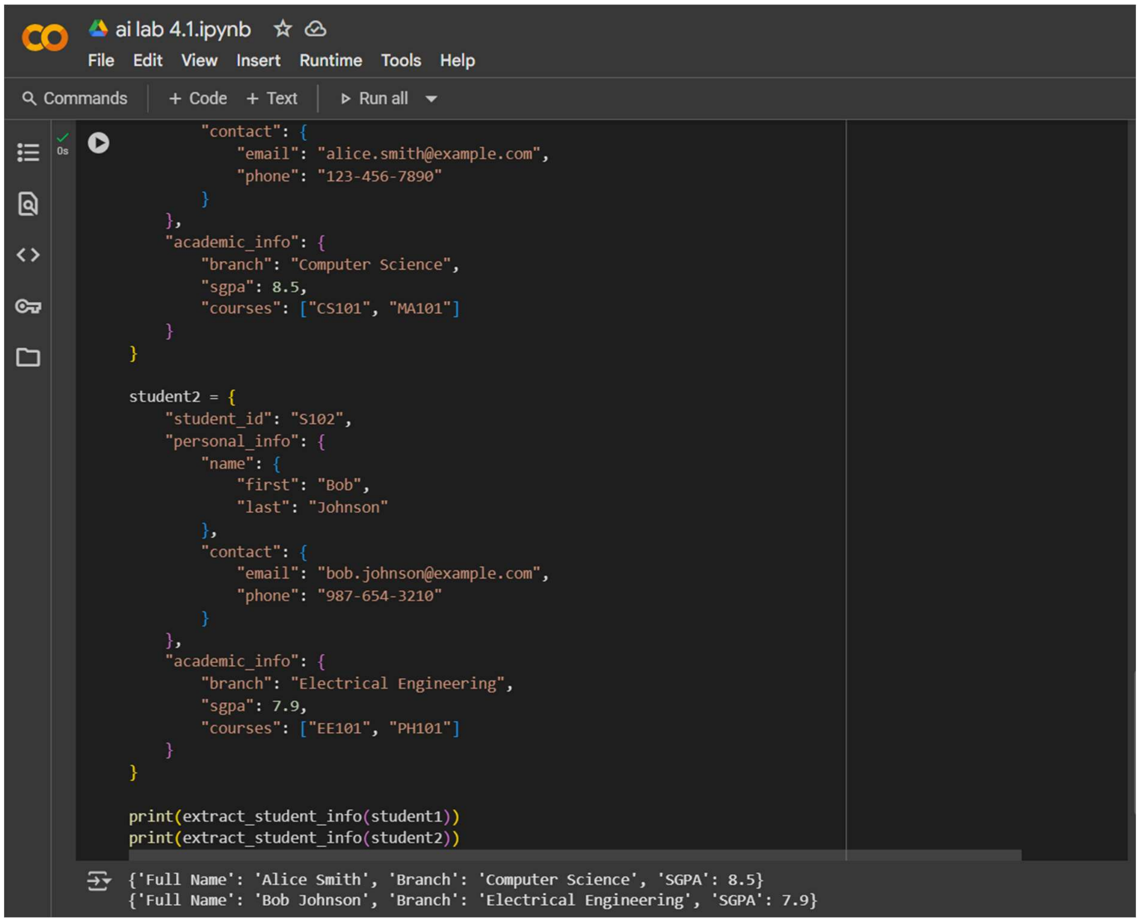
CODE:



```python
def extract_student_info(student_data):
  """
  Extracts Full Name, Branch, and SGPA from a nested dictionary of student information.

  Args:
    student_data: A dictionary containing student information.

  Returns:
    A dictionary containing the extracted Full Name, Branch, and SGPA.

  Examples:
    >>> student1 = {
    ...     "student_id": "S101",
    ...     "personal_info": {
    ...         "name": {
    ...             "first": "Alice",
    ...             "last": "Smith"
    ...         },
    ...         "contact": {
    ...             "email": "alice.smith@example.com",
    ...             "phone": "123-456-7890"
    ...         }
    ...     },
    ...     "academic_info": {
    ...         "branch": "Computer Science",
    ...         "sgpa": 8.5,
    ...         "courses": ["CS101", "MA101"]
    ...     }
    ... }
    >>> extract_student_info(student1)
    {'Full Name': 'Alice Smith', 'Branch': 'Computer Science', 'SGPA': 8.5}
```



```python
    >>> student2 = {
    ...     "student_id": "S102",
    ...     "personal_info": {
    ...         "name": {
    ...             "first": "Bob",
    ...             "last": "Johnson"
    ...         },
    ...         "contact": {
    ...             "email": "bob.johnson@example.com",
    ...             "phone": "987-654-3210"
    ...         }
    ...     },
    ...     "academic_info": {
    ...         "branch": "Electrical Engineering",
    ...         "sgpa": 7.9,
    ...         "courses": ["EE101", "PH101"]
    ...     }
    ... }
    >>> extract_student_info(student2)
    {'Full Name': 'Bob Johnson', 'Branch': 'Electrical Engineering', 'SGPA': 7.9}
  """
  full_name = student_data["personal_info"]["name"]["first"] + " " + student_data["personal_info"]["name"]["la
  branch = student_data["academic_info"]["branch"]
  sgpa = student_data["academic_info"]["sgpa"]

  return {"Full Name": full_name, "Branch": branch, "SGPA": sgpa}

# Example usage:
student1 = {
    "student_id": "S101",
    "personal_info": {
        "name": {
            "first": "Alice",
            "last": "Smith"
        },
```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```
            "contact": {
                "email": "alice.smith@example.com",
                "phone": "123-456-7890"
            }
        },
        "academic_info": {
            "branch": "Computer Science",
            "sgpa": 8.5,
            "courses": ["CS101", "MA101"]
        }
    }

    student2 = {
        "student_id": "S102",
        "personal_info": {
            "name": {
                "first": "Bob",
                "last": "Johnson"
            },
            "contact": {
                "email": "bob.johnson@example.com",
                "phone": "987-654-3210"
            }
        },
        "academic_info": {
            "branch": "Electrical Engineering",
            "sgpa": 7.9,
            "courses": ["EE101", "PH101"]
        }
    }

    print(extract_student_info(student1))
    print(extract_student_info(student2))
```

```
{'Full Name': 'Alice Smith', 'Branch': 'Computer Science', 'SGPA': 8.5}
{'Full Name': 'Bob Johnson', 'Branch': 'Electrical Engineering', 'SGPA': 7.9}
```

Task #5 – Few-Shot Prompting for Text Processing and Word Frequency

Objective

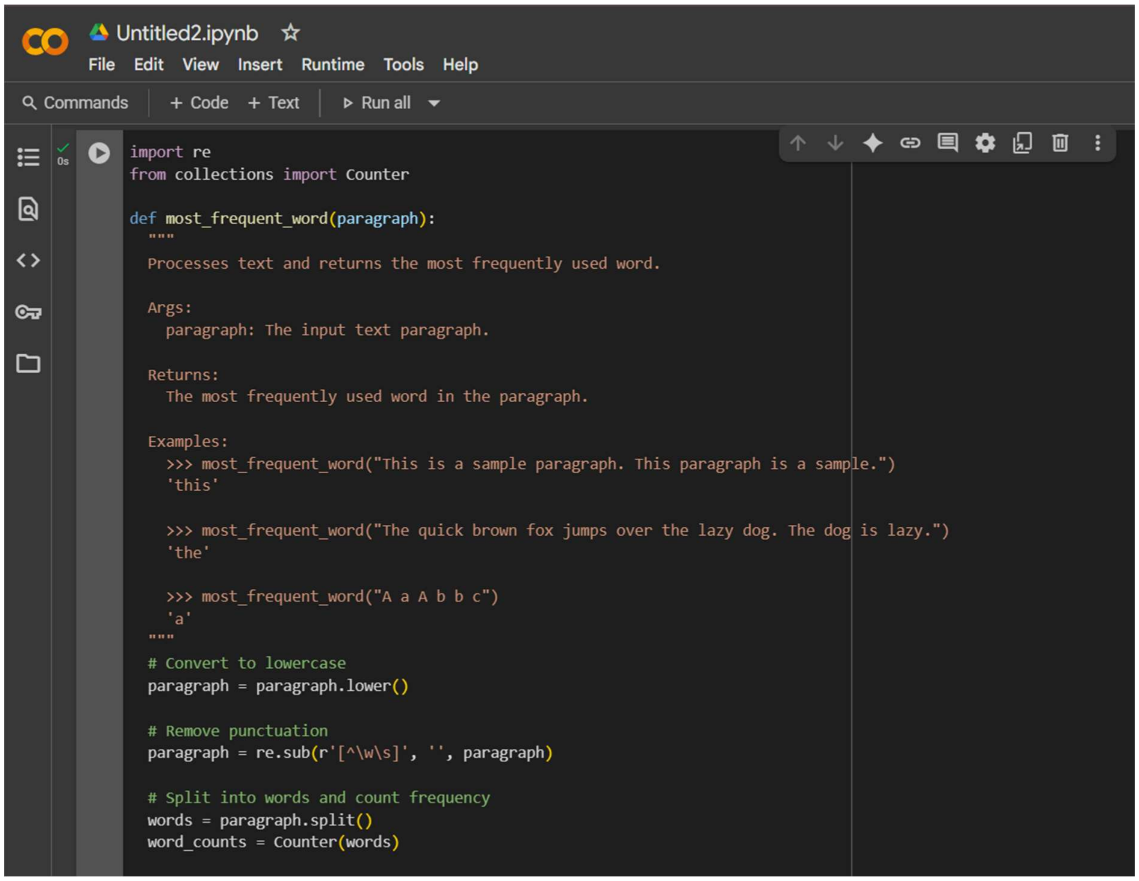
Use few-shot prompting (with at least 3 examples) to generate a Python function that processes text and analyzes word frequency.

Requirements

The function must:

- **Accept a paragraph as input**
- **Convert all text to lowercase**
- **Remove punctuation**
- **Return the most frequently used word**

Code: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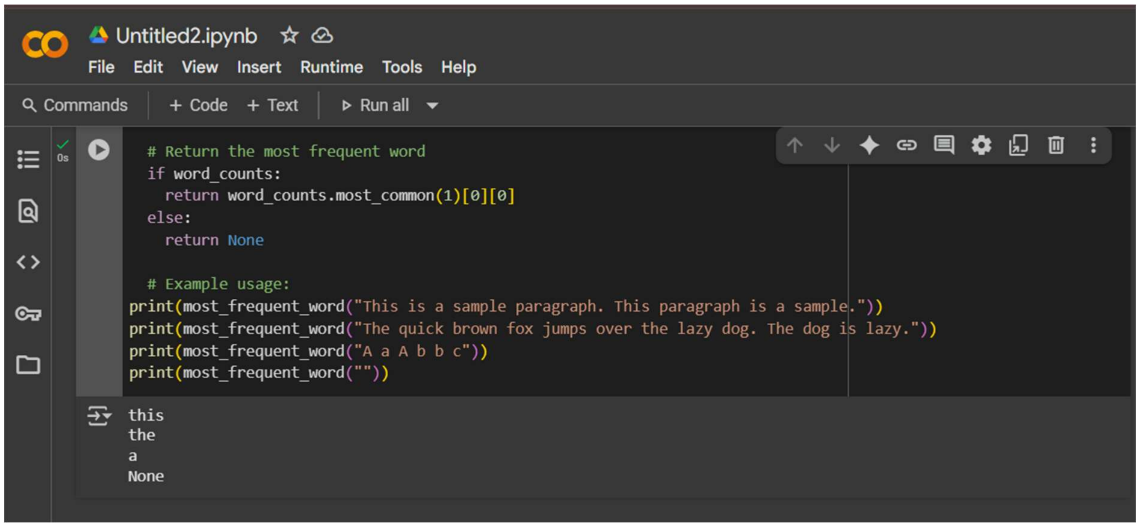
```python
import re
from collections import Counter

def most_frequent_word(paragraph):
  """
  Processes text and returns the most frequently used word.

  Args:
    paragraph: The input text paragraph.

  Returns:
    The most frequently used word in the paragraph.

  Examples:
    >>> most_frequent_word("This is a sample paragraph. This paragraph is a sample.")
    'this'

    >>> most_frequent_word("The quick brown fox jumps over the lazy dog. The dog is lazy.")
    'the'

    >>> most_frequent_word("A a A b b c")
    'a'
  """
  # Convert to lowercase
  paragraph = paragraph.lower()

  # Remove punctuation
  paragraph = re.sub(r'[^\w\s]', '', paragraph)

  # Split into words and count frequency
  words = paragraph.split()
  word_counts = Counter(words)
```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```python
  # Return the most frequent word
  if word_counts:
    return word_counts.most_common(1)[0][0]
  else:
    return None

  # Example usage:
print(most_frequent_word("This is a sample paragraph. This paragraph is a sample."))
print(most_frequent_word("The quick brown fox jumps over the lazy dog. The dog is lazy."))
print(most_frequent_word("A a A b b c"))
print(most_frequent_word(""))
```

```
this
the
a
None
```