

## Assignment 6.3 Ai Assisted Coding

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Btno:05

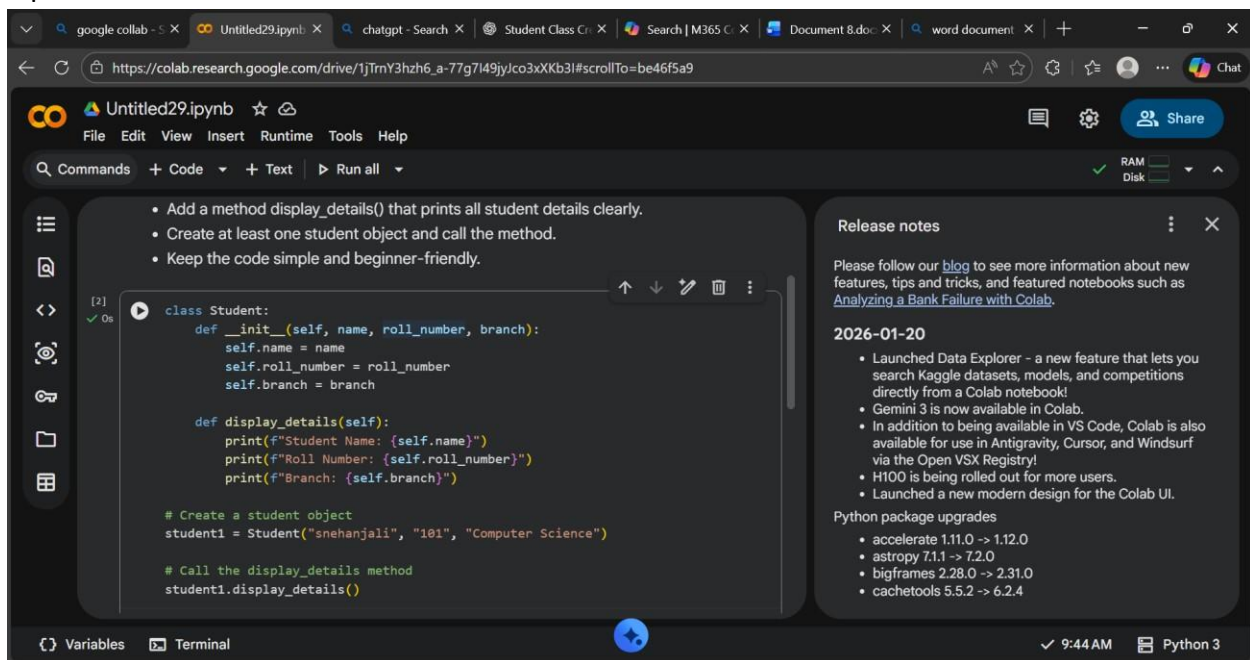
Task 1: Classes (Student Class).

Prompt: Write a Python program to create a Student class.

Requirements:

- The class should have attributes: name, roll\_number, and branch.
- Use a constructor (**init**) to initialize the values.
- Add a method `display_details()` that prints all student details clearly.
- Create at least one student object and call the method.
- Keep the code simple and beginner-friendly.

Input:



The screenshot shows a Google Colab notebook interface. The main code cell contains the following Python code:

```
class Student:
    def __init__(self, name, roll_number, branch):
        self.name = name
        self.roll_number = roll_number
        self.branch = branch

    def display_details(self):
        print(f"Student Name: {self.name}")
        print(f"Roll Number: {self.roll_number}")
        print(f"Branch: {self.branch}")

# Create a student object
student1 = Student("snehanjali", "101", "Computer Science")

# Call the display_details method
student1.display_details()
```

On the right side of the notebook, there is a 'Release notes' panel with the following content:

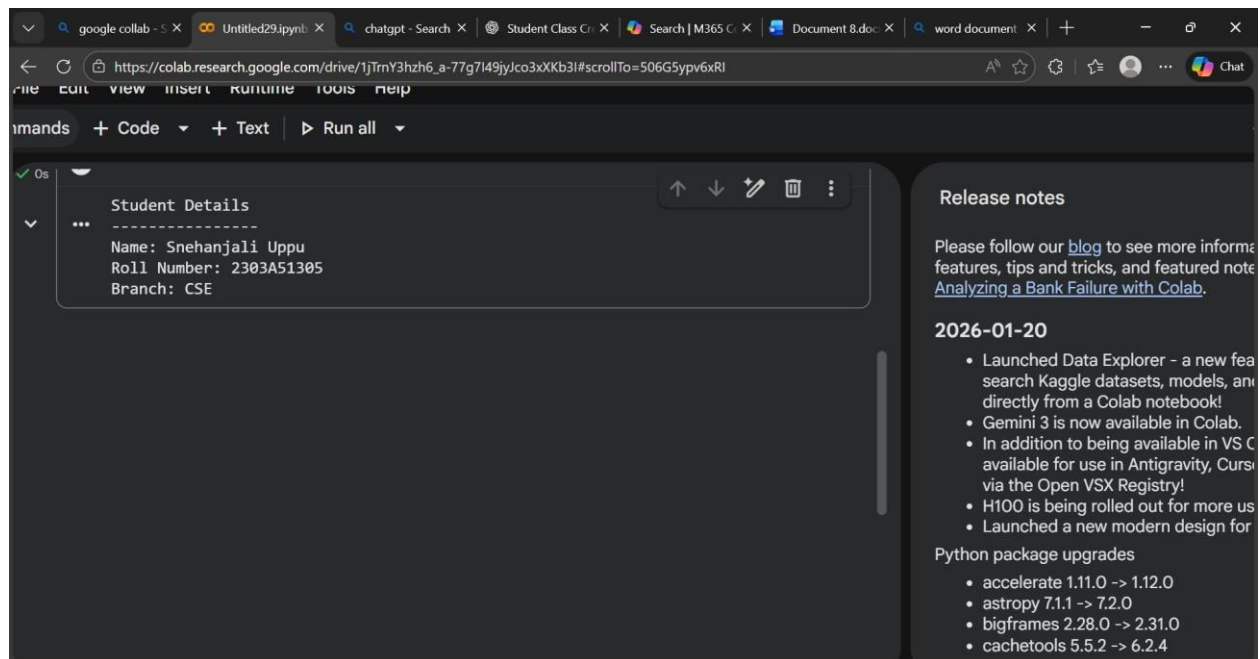
**2026-01-20**

- Launched Data Explorer - a new feature that lets you search Kaggle datasets, models, and competitions directly from a Colab notebook!
- Gemini 3 is now available in Colab.
- In addition to being available in VS Code, Colab is also available for use in AntigraVity, Cursor, and Windsurf via the Open VSX Registry!
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Below the release notes, there is a section for 'Python package upgrades':

- accelerate 1.11.0 -> 1.12.0
- astropy 71.1 -> 72.0
- bigframes 2.28.0 -> 2.31.0
- cachetools 5.5.2 -> 6.2.4

Output:



**Explanation:** The program defines a Student class with attributes (name, roll number, branch) initialized using a constructor.

The `display_details()` method prints the student information, showing basic OOP concepts like class, object, and methods.

## Task 2: Loops of a number.

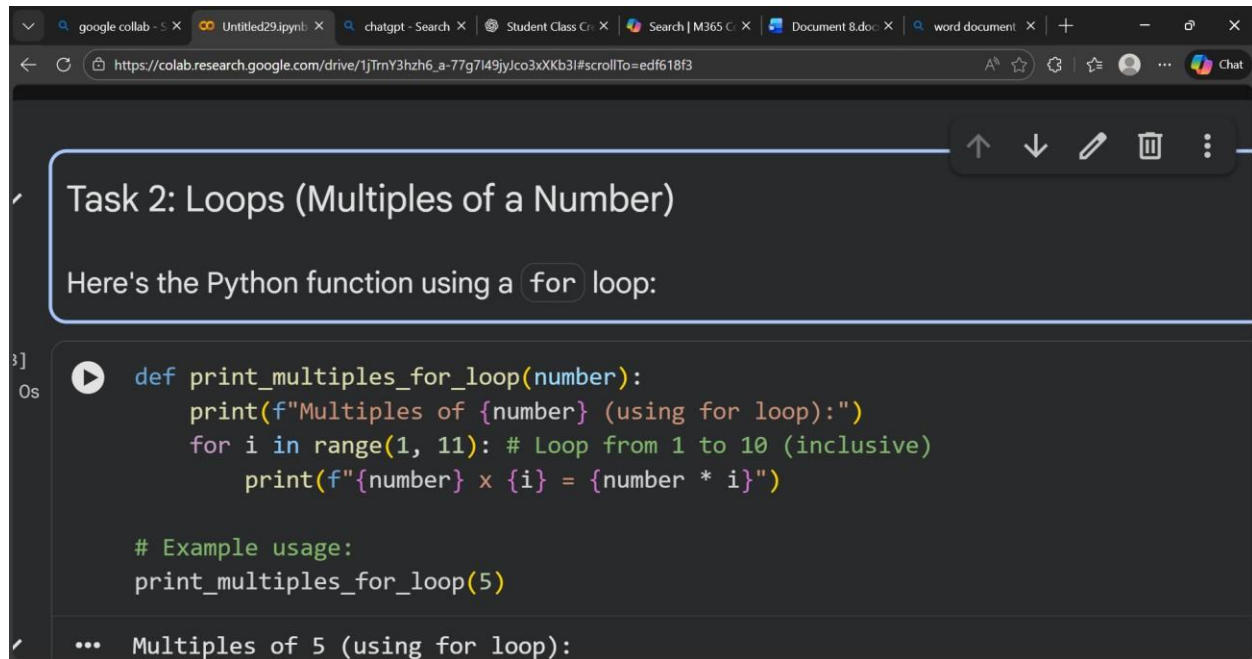
**Prompt:** Write a Python function that prints the first 10 multiples of a given number.

Requirements:

- Use a loop structure.
- The number should be passed as a parameter.
- Print the multiples clearly.
- Keep the code simple and beginner-friendly.

Then write another version of the same program using a different loop (while loop instead of for loop).

Input:

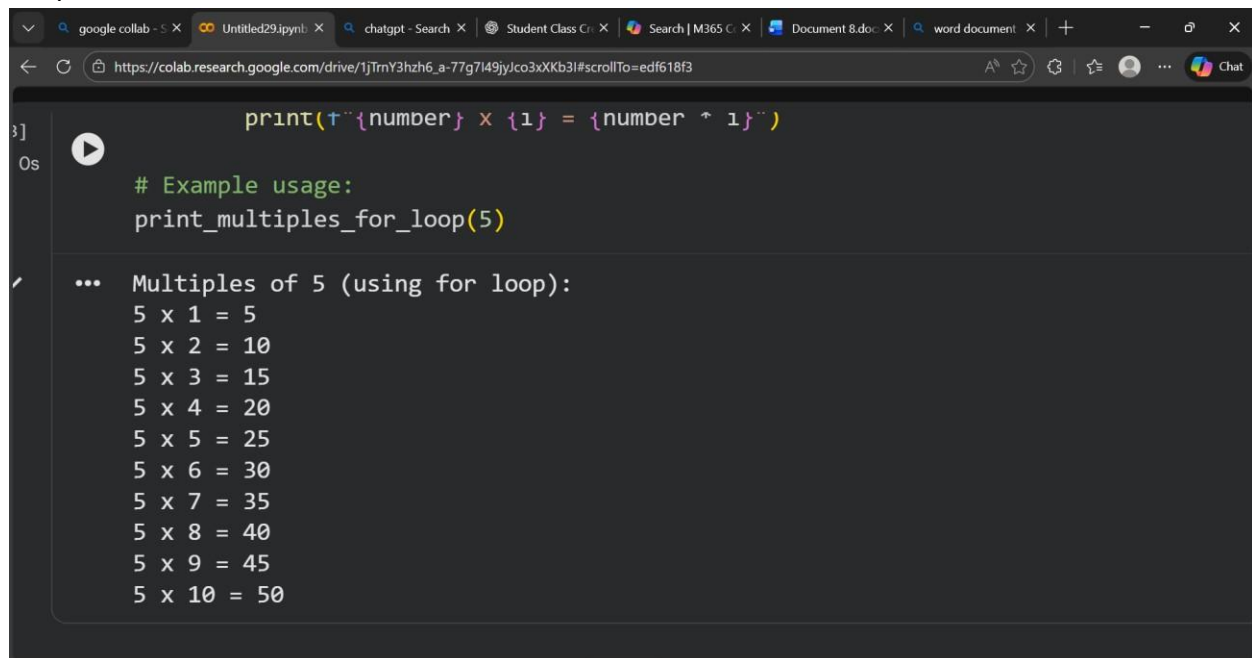


```
def print_multiples_for_loop(number):
    print(f"Multiples of {number} (using for loop):")
    for i in range(1, 11): # Loop from 1 to 10 (inclusive)
        print(f"{number} x {i} = {number * i}")

# Example usage:
print_multiples_for_loop(5)
```

... Multiples of 5 (using for loop):

Output:



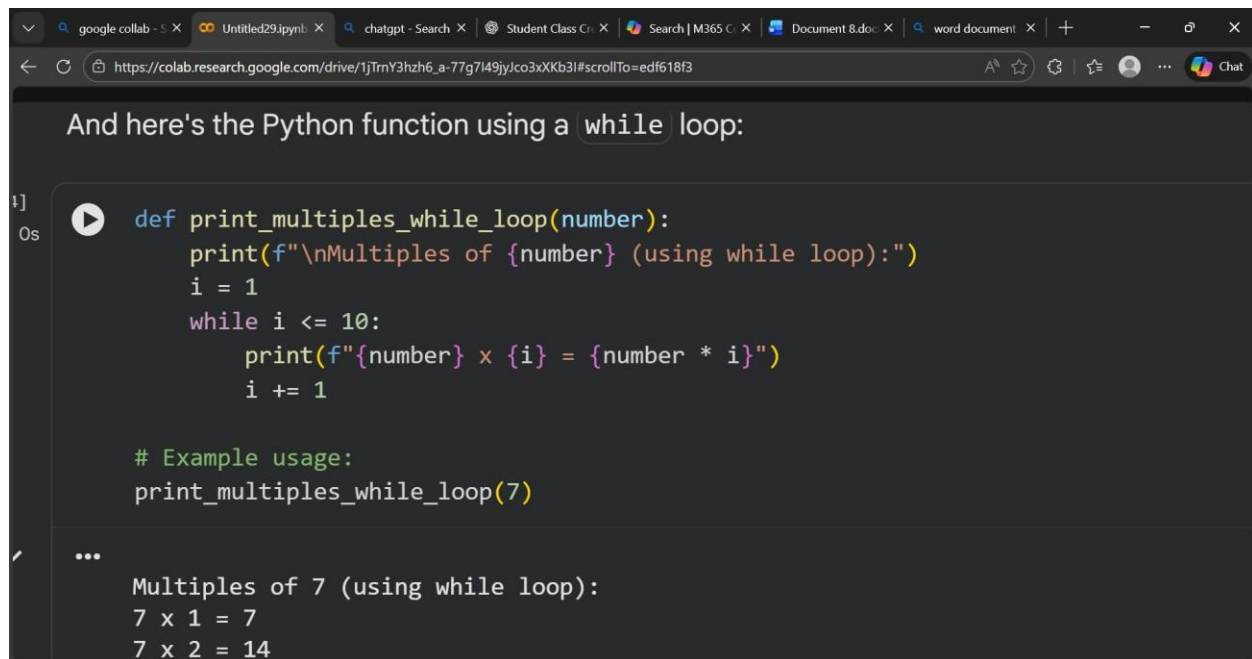
```
print(f"{number} x {i} = {number * i}")

# Example usage:
print_multiples_for_loop(5)
```

... Multiples of 5 (using for loop):

```
5 x 1 = 5
5 x 2 = 10
5 x 3 = 15
5 x 4 = 20
5 x 5 = 25
5 x 6 = 30
5 x 7 = 35
5 x 8 = 40
5 x 9 = 45
5 x 10 = 50
```

2)Input:



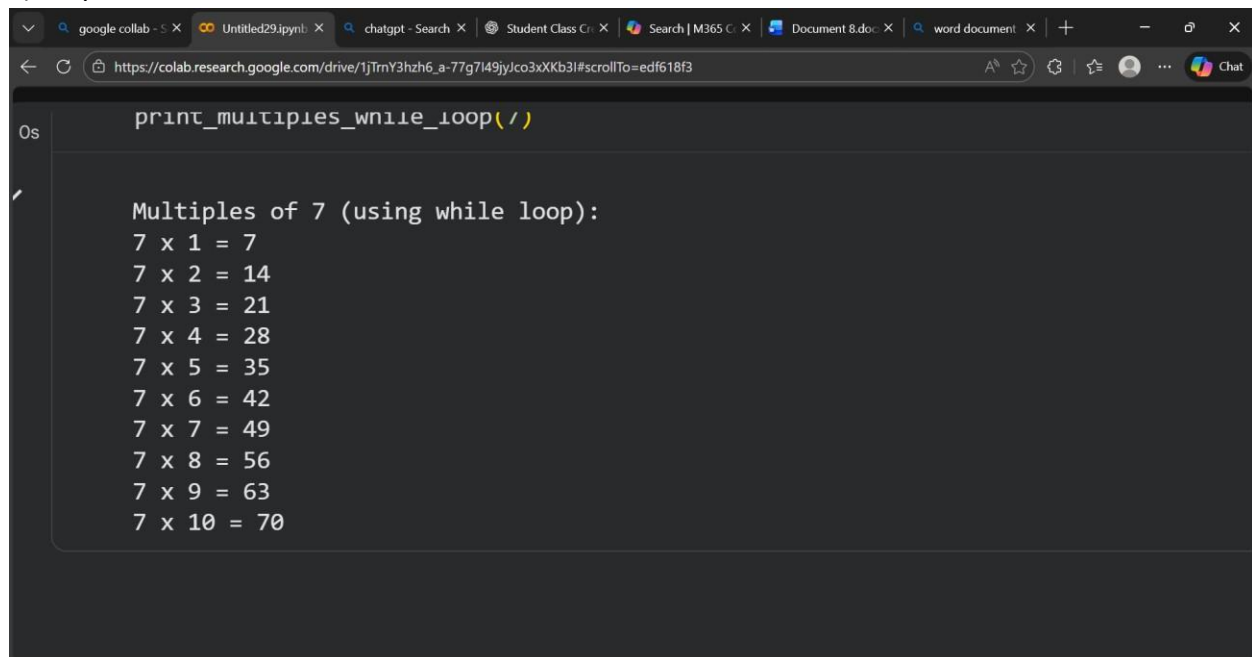
And here's the Python function using a `while` loop:

```
def print_multiples_while_loop(number):  
    print(f"\nMultiples of {number} (using while loop):")  
    i = 1  
    while i <= 10:  
        print(f"{number} x {i} = {number * i}")  
        i += 1  
  
    # Example usage:  
    print_multiples_while_loop(7)
```

...

Multiples of 7 (using while loop):  
7 x 1 = 7  
7 x 2 = 14

2)Output:



```
print_multiples_while_loop(7)
```

Multiples of 7 (using while loop):  
7 x 1 = 7  
7 x 2 = 14  
7 x 3 = 21  
7 x 4 = 28  
7 x 5 = 35  
7 x 6 = 42  
7 x 7 = 49  
7 x 8 = 56  
7 x 9 = 63  
7 x 10 = 70

Explanantion: A loop is used to repeat an action 10 times and calculate multiples of a number using multiplication. for loop is best for fixed iterations, while while loop gives more control using a condition.

## Task 3: Conditional Statements (Age Classification)

**Prompt:** Write a Python function to classify a person based on age.

Requirements:

- Use nested if-elif-else statements.

- Age groups:

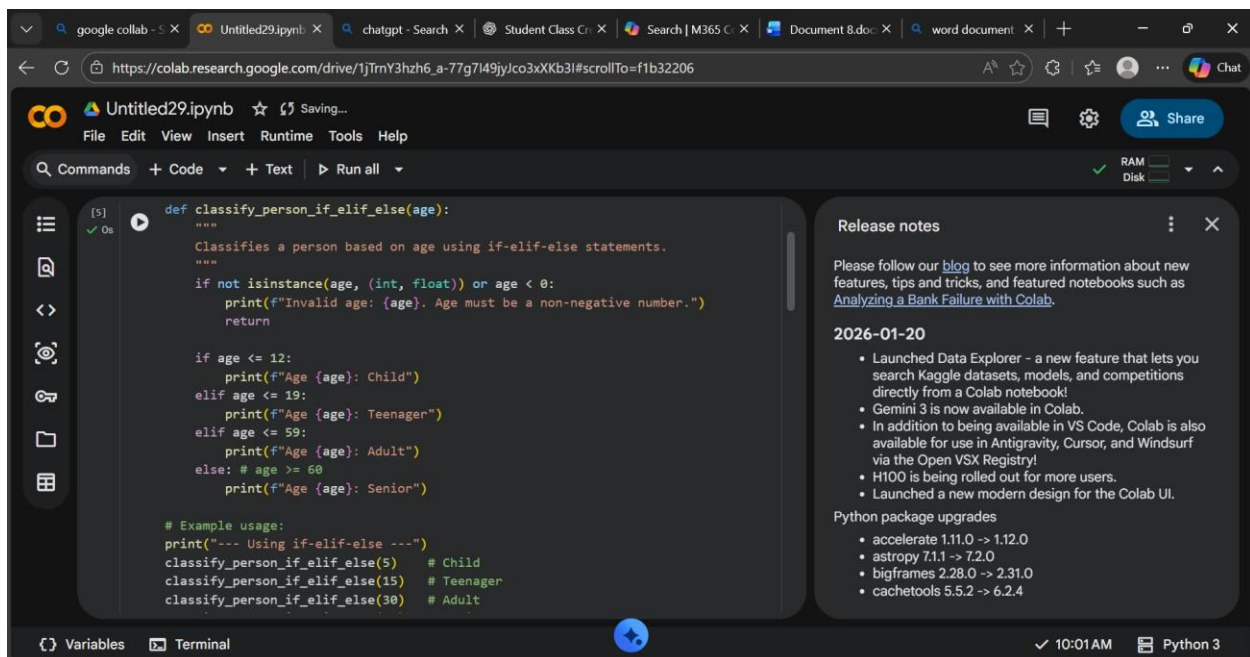
Child: 0–12

Teenager: 13–19

Adult: 20–59

Senior: 60 and above

The function should take age as input and print the category. Then generate another version using an alternative approach (simplified conditions or dictionary-based logic). Keep the code beginner-friendly. Input: using if else statements



The screenshot shows a Google Colab notebook interface. The main code cell contains a Python function named `classify_person_if_elif_else` that takes an `age` parameter and prints the corresponding age group. The function uses nested if-elif-else statements to check the age against the defined ranges: 0-12 for Child, 13-19 for Teenager, 20-59 for Adult, and 60 and above for Senior. Below the function definition, there is an example usage section that calls the function with ages 5, 15, and 30, showing the output for each. The notebook interface includes a menu bar (File, Edit, View, Insert, Runtime, Tools, Help), a toolbar with icons for running code, and a sidebar with a file explorer and a terminal. A release notes panel is also visible on the right side of the notebook.

```
def classify_person_if_elif_else(age):  
    """  
    Classifies a person based on age using if-elif-else statements.  
    """  
    if not isinstance(age, (int, float)) or age < 0:  
        print(f"Invalid age: {age}. Age must be a non-negative number.")  
        return  
  
    if age <= 12:  
        print(f"Age {age}: Child")  
    elif age <= 19:  
        print(f"Age {age}: Teenager")  
    elif age <= 59:  
        print(f"Age {age}: Adult")  
    else: # age >= 60  
        print(f"Age {age}: Senior")  
  
    # Example usage:  
    print("--- Using if-elif-else ---")  
    classify_person_if_elif_else(5)    # Child  
    classify_person_if_elif_else(15)   # Teenager  
    classify_person_if_elif_else(30)   # Adult
```

Output:

The screenshot shows a Google Colab notebook interface. The top bar includes tabs for 'google collab', 'Untitled29.ipynb', 'chatgpt - Search', 'Student Class Cr...', 'Search | M365 C...', 'Document 8.doc...', 'word document', and a '+' icon. The address bar shows the URL 'https://colab.research.google.com/drive/1jTmY3hzh6\_a-77g7l49jylco3xXKb3l#scrollTo=f1b32206'. The notebook has a dark theme. The left sidebar contains icons for file management and a 'Run all' button. The main code area shows a function 'classify\_person\_if\_elif\_else' with comments and test cases. The output shows the function being called for various ages, resulting in 'Child', 'Teenager', 'Adult', 'Senior', and 'Invalid age' messages.

```
print(f"Age {age}: Senior")

# Example usage:
print("--- Using if-elif-else ---")
classify_person_if_elif_else(5)    # Child
classify_person_if_elif_else(15)   # Teenager
classify_person_if_elif_else(30)   # Adult
classify_person_if_elif_else(70)   # Senior
classify_person_if_elif_else(-5)   # Invalid age
classify_person_if_elif_else("ten") # Invalid age

... --- Using if-elif-else ---
Age 5: Child
Age 15: Teenager
Age 30: Adult
Age 70: Senior
Invalid age: -5. Age must be a non-negative number.
Invalid age: ten. Age must be a non-negative number.
```

## 2)input:using alternative methods

The screenshot shows a Google Colab notebook interface. The top bar includes tabs for 'google collab', 'Untitled29.ipynb', 'chatgpt - Search', 'Student Class Cr...', 'Search | M365 C...', 'Document 8.doc...', 'word document', and a '+' icon. The address bar shows the URL 'https://colab.research.google.com/drive/1jTmY3hzh6\_a-77g7l49jylco3xXKb3l#scrollTo=f1b32206'. The notebook has a dark theme. The left sidebar contains icons for file management and a 'Run all' button. The main code area shows a function 'classify\_person\_alternative' that uses a dictionary to map age ranges to categories. The output shows the function being called for various ages, resulting in 'Child', 'Teenager', 'Adult', 'Senior', and 'Invalid age' messages. A 'Release notes' panel is open on the right, showing updates for 2026-01-20 and Python package upgrades.

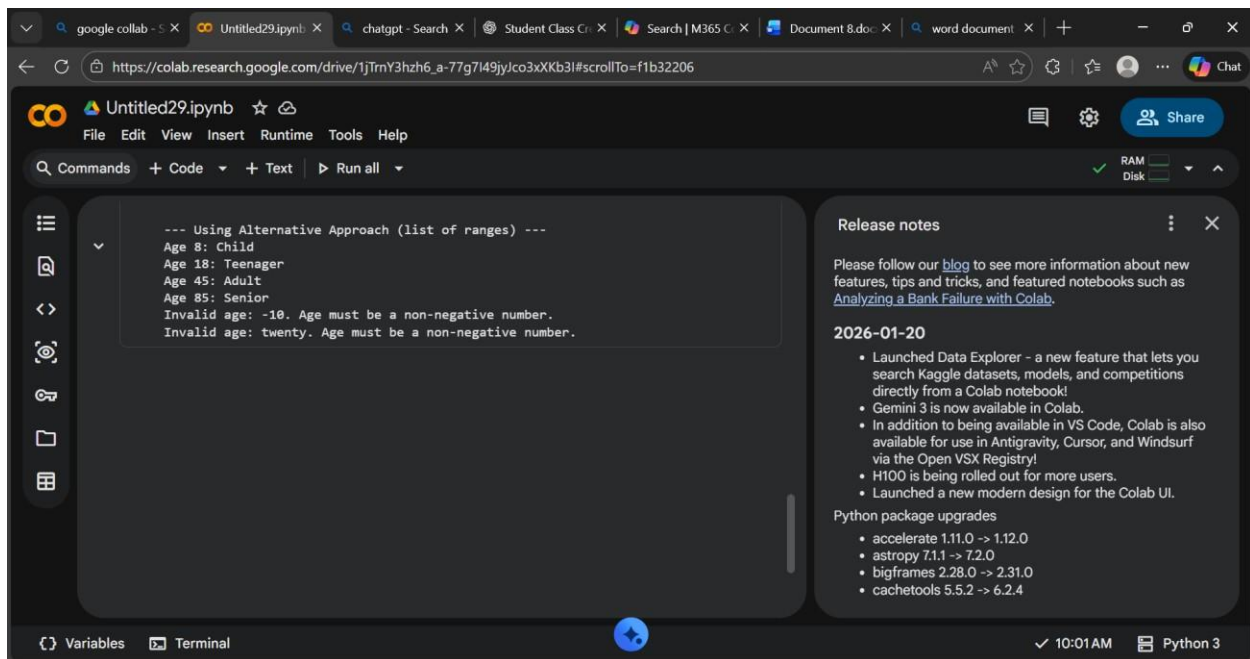
```
def classify_person_alternative(age):
    """
    Classifies a person based on age using an alternative approach
    (list of age ranges).
    """
    if not isinstance(age, (int, float)) or age < 0:
        print(f"Invalid age: {age}. Age must be a non-negative number.")
        return

    # Define age groups as (upper_bound, category_name)
    age_groups = [
        (12, "Child"),
        (19, "Teenager"),
        (59, "Adult"),
        (float('inf'), "Senior") # Use infinity for the upper bound of the last group
    ]

    for upper_bound, category in age_groups:
        if age <= upper_bound:
            print(f"Age {age}: {category}")
            return
```

Output:





Explanation: Conditional statements (if-elif-else) check age ranges and assign a category like child, teenager, adult, or senior.

The logic works top-to-bottom, and alternative methods like dictionary mapping make the system more flexible.

## Task 4: For and While Loops (Sum of First n Numbers)

**Prompt:** Write a Python function `sum_to_n(n)` to calculate the sum of the first n natural numbers.

Requirements:

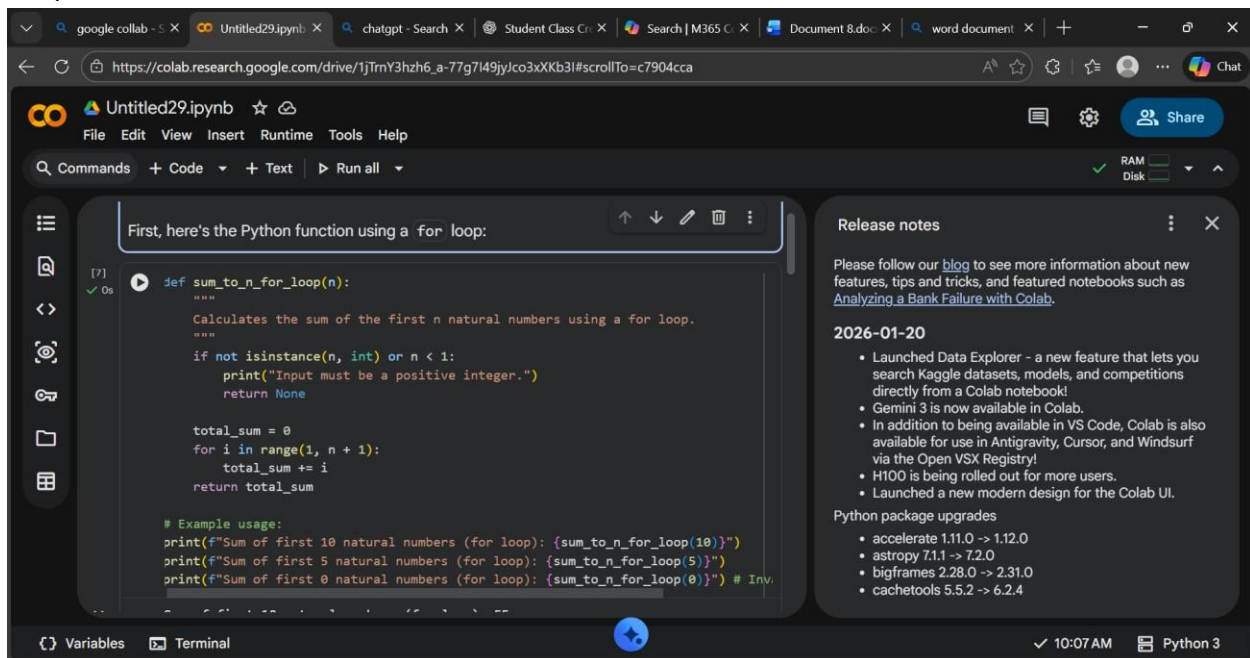
- Use a for loop.
- Keep the code simple.
- Show example function call and output.

Then provide an alternative implementation using:

- 1) a while loop
- 2) a mathematical formula

Explain the differences briefly.

1 Input:



The screenshot shows the Google Colab interface with a notebook titled 'Untitled29.ipynb'. The code cell contains a Python function `sum_to_n_for_loop(n)` that calculates the sum of the first `n` natural numbers using a `for` loop. The function includes a type check and a return statement. The output of the code cell shows the sum of the first 10 natural numbers (55), the sum of the first 5 natural numbers (15), and the sum of the first 0 natural numbers (None). The right sidebar displays release notes for Colab, dated 2026-01-20, listing new features like Data Explorer and Gemini 3, and Python package upgrades.

```
[7] ✓ 0s
def sum_to_n_for_loop(n):
    """
    Calculates the sum of the first n natural numbers using a for loop.
    """
    if not isinstance(n, int) or n < 1:
        print("Input must be a positive integer.")
        return None

    total_sum = 0
    for i in range(1, n + 1):
        total_sum += i
    return total_sum

# Example usage:
print(f"Sum of first 10 natural numbers (for loop): {sum_to_n_for_loop(10)}")
print(f"Sum of first 5 natural numbers (for loop): {sum_to_n_for_loop(5)}")
print(f"Sum of first 0 natural numbers (for loop): {sum_to_n_for_loop(0)}") # Inv.
```

Release notes

Please follow our [blog](#) to see more information about new features, tips and tricks, and featured notebooks such as [Analyzing a Bank Failure with Colab](#).

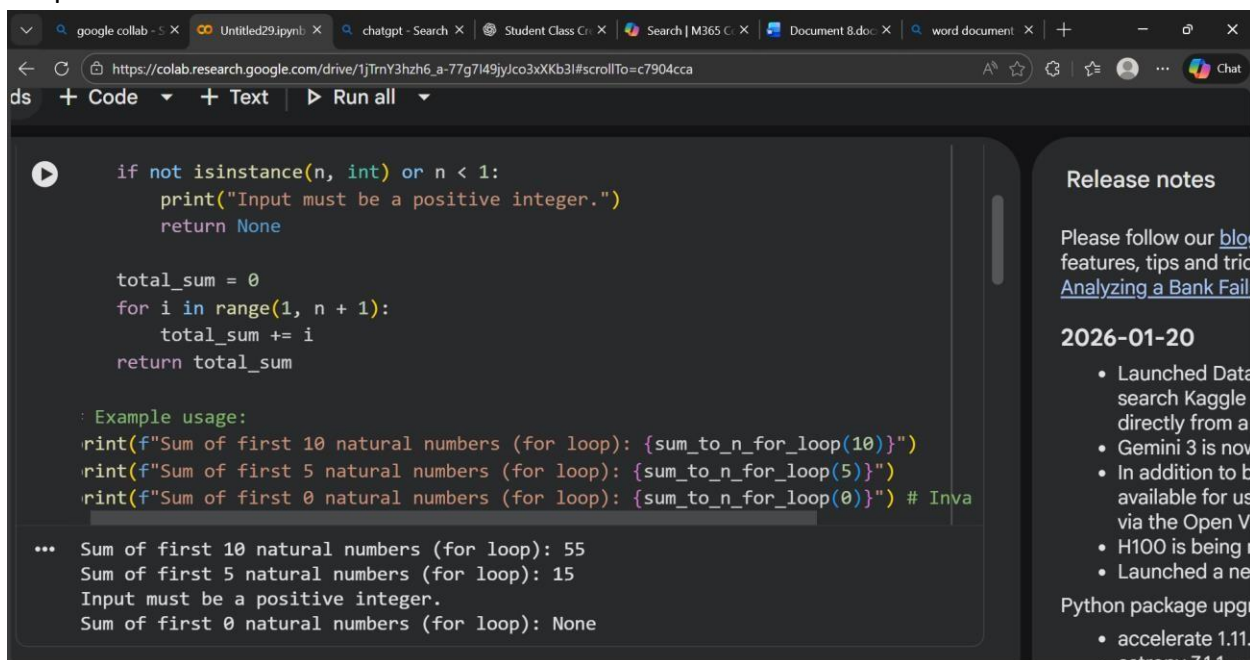
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Python package upgrades

- accelerate 1.11.0 -> 1.12.0
- astropy 7.1.1 -> 7.2.0
- bigframes 2.28.0 -> 2.31.0
- cachetools 5.5.2 -> 6.2.4

Output:



The screenshot shows the Google Colab interface with the same notebook. The code cell is executed, and the output is displayed. The output shows the sum of the first 10 natural numbers (55), the sum of the first 5 natural numbers (15), and the sum of the first 0 natural numbers (None). The right sidebar displays release notes for Colab, dated 2026-01-20, listing new features like Data Explorer and Gemini 3, and Python package upgrades.

```
if not isinstance(n, int) or n < 1:
    print("Input must be a positive integer.")
    return None

total_sum = 0
for i in range(1, n + 1):
    total_sum += i
return total_sum

# Example usage:
print(f"Sum of first 10 natural numbers (for loop): {sum_to_n_for_loop(10)}")
print(f"Sum of first 5 natural numbers (for loop): {sum_to_n_for_loop(5)}")
print(f"Sum of first 0 natural numbers (for loop): {sum_to_n_for_loop(0)}") # Inva
```

... Sum of first 10 natural numbers (for loop): 55  
Sum of first 5 natural numbers (for loop): 15  
Input must be a positive integer.  
Sum of first 0 natural numbers (for loop): None

Release notes

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2026-01-20

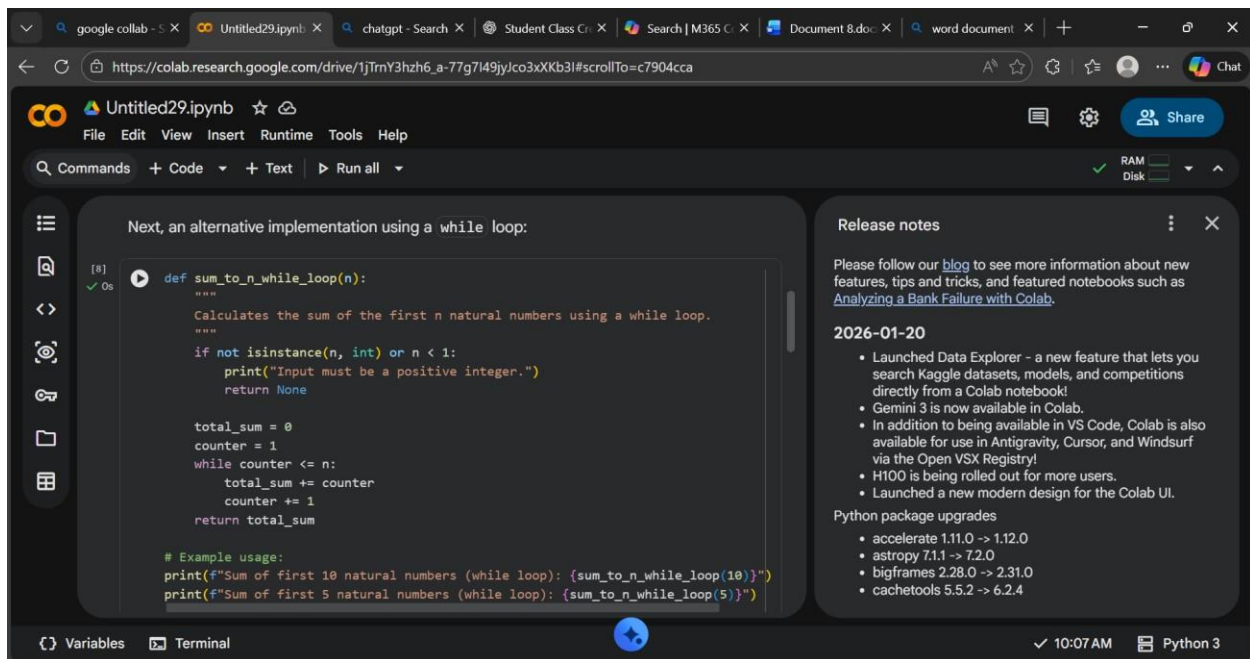
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Python package upgrades

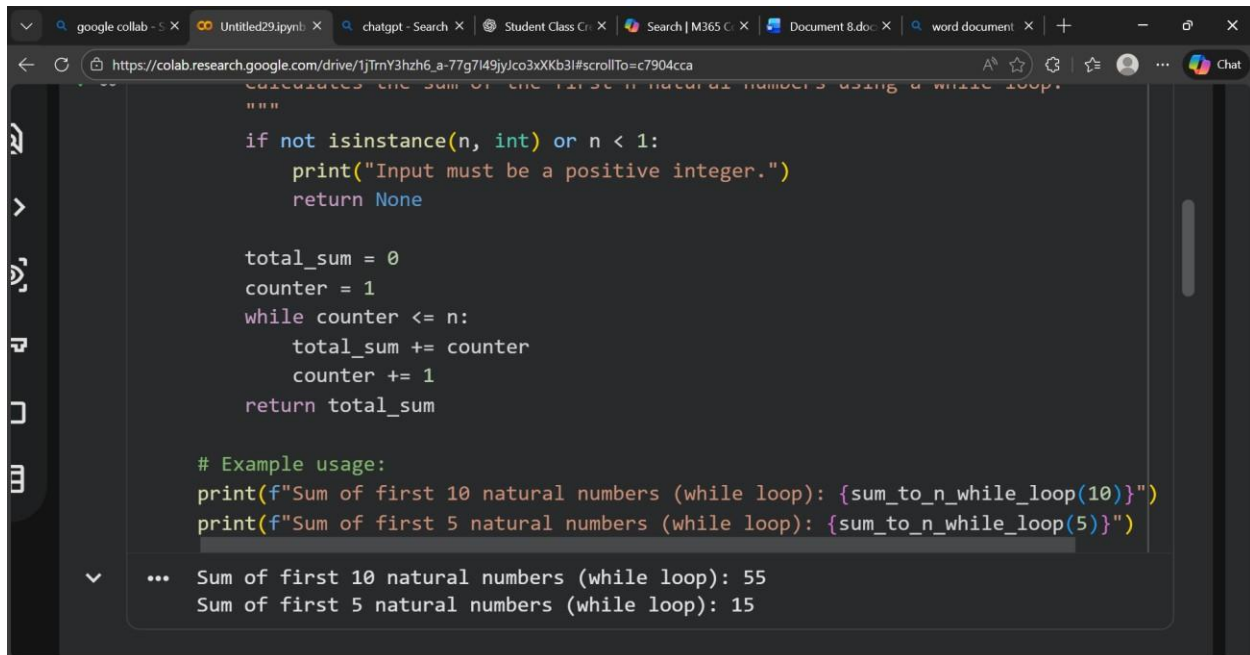
- accelerate 1.11.0 -> 1.12.0
- astropy 7.1.1 -> 7.2.0
- bigframes 2.28.0 -> 2.31.0
- cachetools 5.5.2 -> 6.2.4

2) input:





Output:



3)input:

Finally, the most efficient approach using a mathematical formula (Gauss's formula):

```
[9] ✓ Os def sum_to_n_formula(n):  
    """  
    Calculates the sum of the first n natural numbers using a mathematical formula  
    """  
    if not isinstance(n, int) or n < 1:  
        print("Input must be a positive integer.")  
        return None  
  
    return n * (n + 1) // 2 # Using integer division  
  
    # Example usage:  
    print(f"Sum of first 10 natural numbers (formula): {sum_to_n_formula(10)}")  
    print(f"Sum of first 5 natural numbers (formula): {sum_to_n_formula(5)}")
```

... Sum of first 10 natural numbers (formula): 55

**Release notes**

Please follow our [blog](#) for features, tips and tricks. [Analyzing a Bank Failure](#)

**2026-01-20**

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Python package upgr

- accelerate 1.11.
- astropy 7.1.1 ->

Output:

... Sum of first 10 natural numbers (formula): 55  
... Sum of first 5 natural numbers (formula): 15

**Release notes**

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**2026-01-20**

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Python package upgr

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- astropy 7.1.1 ->

Explanation:

- In the **for loop**, the program repeats from 1 to n and keeps adding numbers to total.
- In the **while loop**, the same addition happens but the loop runs based on a condition ( $i \leq n$ ).

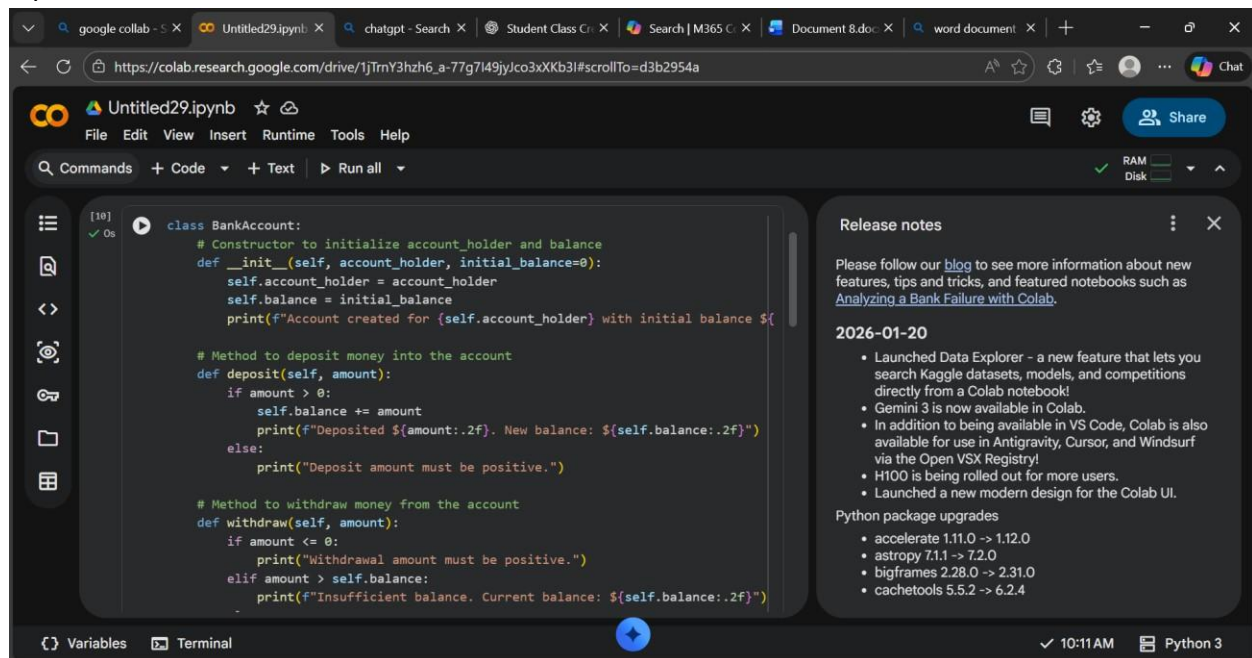
## Task 5: Classes (Bank Account Class)

**Prompt:** Write a Python program to create a BankAccount class.

Requirements:

- Attributes: `account_holder`, `balance`
- Methods: `deposit(amount)` – add money `withdraw(amount)` – deduct money if sufficient  
`balance` `check_balance()` – display current balance
- Include comments in the code.
- Create an object and demonstrate deposit and withdrawal.
- Keep it simple and beginner-friendly.

Input:



The screenshot shows a Google Colab notebook titled 'Untitled29.ipynb'. The code defines a `BankAccount` class with the following methods and attributes:

```
[18] class BankAccount:
# Constructor to initialize account_holder and balance
def __init__(self, account_holder, initial_balance=0):
    self.account_holder = account_holder
    self.balance = initial_balance
    print(f"Account created for {self.account_holder} with initial balance ${initial_balance}")

# Method to deposit money into the account
def deposit(self, amount):
    if amount > 0:
        self.balance += amount
        print(f"Deposited ${amount:.2f}. New balance: ${self.balance:.2f}")
    else:
        print("Deposit amount must be positive.")

# Method to withdraw money from the account
def withdraw(self, amount):
    if amount <= 0:
        print("Withdrawal amount must be positive.")
    elif amount > self.balance:
        print(f"Insufficient balance. Current balance: ${self.balance:.2f}")
```

On the right side of the notebook, there is a 'Release notes' panel for Colab, dated 2026-01-20, listing new features like Data Explorer and Gemini 3, and Python package upgrades.

The screenshot shows a Google Colab notebook titled 'Untitled29.ipynb'. The code defines a `BankAccount` class with the following methods:

- `__init__`: Initializes the account with a holder name and initial balance.
- `check_balance`: Prints the current account holder and balance.
- `deposit`: Adds a specified amount to the balance.
- `withdraw`: Checks if the balance is sufficient before deducting the amount.

The code also includes a demonstration of creating a `BankAccount` object and performing deposit and withdrawal operations.

Output:

The screenshot shows the output of the code executed in the Colab notebook. The output displays the results of the `BankAccount` class operations:

```
Account created for John Doe with initial balance $100.00
Account holder: John Doe, Current balance: $100.00
...
Deposited $50.50. New balance: $150.50
Withdraw $20.00. New balance: $130.50
Insufficient balance. Current balance: $130.50
Account holder: John Doe, Current balance: $130.50
Deposit amount must be positive.
Withdrawal amount must be positive.
```

Explanation:

- The **class** represents a bank account.
- The **constructor** (`__init__`) sets account holder name and initial balance.
- `deposit()` increases balance.
- `withdraw()` checks balance before deducting (prevents overdraft).
- `check_balance()` shows account details.

