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BATCH:07

Lab 7: Error Debugging with AI – Systematic Bug Fixing

Task 1 – Syntax Error

The screenshot shows a code editor interface with a dark theme. On the left is a sidebar with icons for file operations like Open, Save, Find, and Refresh. The main area displays a Python file named 'fibo.py' with the following code:

```
1 def greet():
2     print "Hello, AI Debugging Lab!"
3
4 greet()
5
```

A syntax error is highlighted in red on the second line of the code, specifically around the 'print' keyword and its arguments. Below the code editor, a status bar shows tabs for 'PROBLEMS' (with 1), 'OUTPUT', 'DEBUG CONSOLE', 'TERMINAL', and 'PORTS'. The 'TERMINAL' tab is active, showing the command-line output of running the script:

```
/usr/local/bin/python3 /Users/sanjanareddy/fibo.py
❶ (base) sanjanareddy@Sanjanas-MacBook-Air ~ % /usr/local/bin/python3 /Users/sanjanareddy/fibo.py
  File "/Users/sanjanareddy/fibo.py", line 2
    print "Hello, AI Debugging Lab!"  
^
SyntaxError: Missing parentheses in call to 'print'. Did you mean print(...)?
❷ (base) sanjanareddy@Sanjanas-MacBook-Air ~ %
```

Observed Error

SyntaxError: Missing parentheses in call to 'print'

AI Explanation

Python 3 requires parentheses in the print function. Without parentheses, Python throws a syntax error.

Corrected Code:

A screenshot of the Visual Studio Code interface. The left sidebar shows icons for file navigation, search, and other workspace functions. The main editor area displays Python code for a 'greet' function. Below the editor is a terminal window showing the output of running the script: "Hello, AI Debugging Lab!". The bottom navigation bar includes tabs for PROBLEMS, OUTPUT, DEBUG CONSOLE, TERMINAL, and PORTS. The TERMINAL tab is currently selected. On the right side, there's a sidebar with icons for zsh and Python.

```
1 def greet():
2     print("Hello, AI Debugging Lab!")
3
4 greet()
5 assert greet() is None
6 assert isinstance(greet, type(greet))
7 assert callable(greet)
8
```

```
(base) sanjanareddy@Sanjanas-MacBook-Air ~ % /usr/local/bin/python3 /Users/sanjanareddy/fibo.py
Hello, AI Debugging Lab!
Hello, AI Debugging Lab!
% (base) sanjanareddy@Sanjanas-MacBook-Air ~ %
```

Task 2 – Incorrect If Condition

A screenshot of the Visual Studio Code interface. The left sidebar shows icons for file navigation, search, and other workspace functions. The main editor area displays Python code for a 'check_number' function. The code contains an incorrect if condition where 'n = 10' is used instead of 'n == 10'. Below the editor is a terminal window showing the error: "SyntaxError: invalid syntax. Maybe you meant '==' or ':=' instead of '='?". The bottom navigation bar includes tabs for PROBLEMS, OUTPUT, DEBUG CONSOLE, TERMINAL, and PORTS. The TERMINAL tab is currently selected. On the right side, there's a sidebar with icons for zsh and Python.

```
1 def check_number(n):
2     if n = 10:
3         return "Ten"
4     else:
5         return "Not Ten"
6
```

```
(base) sanjanareddy@Sanjanas-MacBook-Air ~ % /usr/local/bin/python3 /Users/sanjanareddy/fibo.py
Hello, AI Debugging Lab!
Hello, AI Debugging Lab!
File "/Users/sanjanareddy/fibo.py", line 2
    if n = 10:
      ^^^^^^
SyntaxError: invalid syntax. Maybe you meant '==' or ':=' instead of '='?
% (base) sanjanareddy@Sanjanas-MacBook-Air ~ %
```

Observed Error

SyntaxError due to use of assignment (=) instead of comparison (==).

AI Explanation

= is assignment operator.

== is comparison operator.

Python does not allow assignment inside if condition like this.

The screenshot shows a dark-themed interface of the Visual Studio Code code editor. At the top, there are three tabs: 'Welcome', 'fibo.py', and 'cp.py'. The 'fibo.py' tab is active, displaying the following Python code:

```
1 def check_number(n):
2     if n == 10:
3         return "Ten"
4     else:
5         return "Not Ten"
6 assert check_number(10) == "Ten"
7 assert check_number(5) == "Not Ten"
8 assert check_number(0) == "Not Ten"
```

Below the code editor is a navigation bar with icons for 'PROBLEMS', 'OUTPUT', 'DEBUG CONSOLE', 'TERMINAL', and 'PORTS'. The 'TERMINAL' tab is selected, showing a terminal window with the following output:

```
(base) sanjanareddy@Sanjanas-MacBook-Air ~ % /usr/local/bin/python3 /Users/sanjanareddy/fibo.py
Hello, AI Debugging Lab!
(base) sanjanareddy@Sanjanas-MacBook-Air ~ % /usr/local/bin/python3 /Users/sanjanareddy/fibo.py
  file "/Users/sanjanareddy/fibo.py", line 2
    if n = 10:
      ^^^^^^
SyntaxError: invalid syntax. Maybe you meant '==' or ':=' instead of '='
(base) sanjanareddy@Sanjanas-MacBook-Air ~ % /usr/local/bin/python3 /Users/sanjanareddy/fibo.py
(base) sanjanareddy@Sanjanas-MacBook-Air ~ %
```

To the right of the terminal is a 'PROBLEMS' sidebar showing one error entry:

- zsh: 1: /Users/sanjanareddy/fibo.py: syntax error near line 2
- Python: 1: /Users/sanjanareddy/fibo.py: syntax error near line 2

Output

All test cases passed.

Task 3 – Runtime Error

The screenshot shows a VS Code interface with the following details:

- File Explorer:** Shows a tree view with the root folder being "Users > sanjanareddy > fibo.py > ...".
- Search:** A magnifying glass icon.
- 10K:** A circular icon with "10K" inside.
- Star:** A star icon.
- File:** A document icon.
- Terminal:** An Erlenmeyer flask icon.
- Code Editor:** Displays the following Python code in "fibo.py":

```
1 def read_file(filename):
2     with open(filename, 'r') as f:
3         return f.read()
4
5 print(read_file("nonexistent.txt"))
6
```

Terminal Output:

```
(base) sanjanareddy@Sanjanas-MacBook-Air ~ % /usr/local/bin/python3 /Users/sanjanareddy/fibo.py
  File "/Users/sanjanareddy/fibo.py", line 5, in <module>
    print(read_file("nonexistent.txt"))
               ^
  File "/Users/sanjanareddy/fibo.py", line 2, in read_file
    with open(filename, 'r') as f:
               ^
FileNotFoundError: [Errno 2] No such file or directory: 'nonexistent.txt'
(base) sanjanareddy@Sanjanas-MacBook-Air ~ %
```

Observed Error

FileNotFoundException: File does not exist.

AI Explanation

Program crashes when file is missing. Use try-except to handle runtime errors safely.

```
1 def read_file(filename):
2     try:
3         with open(filename, 'r') as f:
4             return f.read()
5     except FileNotFoundError:
6         return "Error: File not found."
7     except Exception:
8         return "Error: Invalid file path."
9 # Example usage and test cases
10 assert read_file("sample.txt") != None # when file exists
11 assert read_file("missing.txt") == "Error: File not found."
12 assert isinstance(read_file("invalid/path.txt"), str)
13
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
(base) sanjanareddy@Sanjanas-MacBook-Air ~ % /usr/local/bin/python3 /Users/sanjanareddy/fibo.py
print(read_file("nonexistent.txt"))
File "/Users/sanjanareddy/fibo.py", line 2, in read_file
    with open(filename, 'r') as f:
    ~~~~~
FileNotFoundError: [Errno 2] No such file or directory: 'nonexistent.txt'
● (base) sanjanareddy@Sanjanas-MacBook-Air ~ % /usr/local/bin/python3 /Users/sanjanareddy/fibo.py
❖ (base) sanjanareddy@Sanjanas-MacBook-Air ~ %
```

Output

User-friendly error message displayed when file is missing.

Task 4 – Calling Non-Existent Method

```
class Car:
    def start(self):
        return "Car started"

my_car = Car()
print(my_car.drive())
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
(base) sanjanareddy@Sanjanas-MacBook-Air ~ % /usr/local/bin/python3 /Users/sanjanareddy/fibo.py
(base) sanjanareddy@Sanjanas-MacBook-Air ~ % /usr/local/bin/python3 /Users/sanjanareddy/fibo.py
(base) sanjanareddy@Sanjanas-MacBook-Air ~ % /usr/local/bin/python3 /Users/sanjanareddy/fibo.py
Traceback (most recent call last):
  File "/Users/sanjanareddy/fibo.py", line 6, in <module>
    print(my_car.drive())
                  ^
AttributeError: 'Car' object has no attribute 'drive'
(base) sanjanareddy@Sanjanas-MacBook-Air ~ %
```

Observed Error

AttributeError: 'Car' object has no attribute 'drive'

AI Explanation

The method `drive()` is not defined in the class. Either define the method or call the correct existing method.

The screenshot shows a dark-themed interface of the Visual Studio Code (VS Code) code editor. In the center-left pane, there is a code editor window titled "fibo.py". The code contains a class definition for "Car" with methods "start" and "drive", and a test block using assertions. A line 14 contains a print statement. The code editor has a status bar at the bottom with icons for file operations, search, and help.

```
1  class Car:
2      def start(self):
3          return "Car started"
4
5      def drive(self):
6          return "Car is moving"
7
8  my_car = Car()
9
10 # Test cases
11 assert my_car.start() == "Car started"
12 assert my_car.drive() == "Car is moving"
13 assert isinstance(my_car, Car)
14 print("All tests passed.")
# fibo.py
```

Below the code editor is a navigation bar with tabs: PROBLEMS, OUTPUT, DEBUG CONSOLE, TERMINAL, and PORTS. The TERMINAL tab is currently selected, showing a terminal window with the following output:

```
(base) sanjanareddy@Sanjanas-MacBook-Air ~ % /usr/local/bin/python3 /Users/sanjanareddy/fibo.py
Traceback (most recent call last):
  File "/Users/sanjanareddy/fibo.py", line 6, in <module>
    print(my_car.drive())
               ^^^^^^^^^^
AttributeError: 'Car' object has no attribute 'drive'
● (base) sanjanareddy@Sanjanas-MacBook-Air ~ % /usr/local/bin/python3 /Users/sanjanareddy/fibo.py
  All tests passed.
❖ (base) sanjanareddy@Sanjanas-MacBook-Air ~ %
```

Task 5 – TypeError

The screenshot shows a dark-themed interface of the Visual Studio Code (VS Code) code editor. At the top, there's a tab bar with 'Welcome', 'fibo.py' (which is the active file), and 'cp.py'. Below the tabs, the code editor displays the following Python code:

```
1 def add_five(value):
2     return value + 5
3
4 →| print(add_five("10"))
5     ^
```

The line 'print(add_five("10"))' is highlighted in blue, indicating it's the current line of execution. A cursor is positioned at the start of the line. In the bottom right corner of the code editor, there's a small green status icon.

Below the code editor, there's a navigation bar with links: PROBLEMS, OUTPUT, DEBUG CONSOLE, TERMINAL, and PORTS. The TERMINAL tab is selected, showing the command-line output of the Python interpreter:

```
(base) sanjanareddy@Sanjanas-MacBook-Air ~ % /usr/local/bin/python3 /Users/sanjanareddy/fibo.py
File "/Users/sanjanareddy/fibo.py", line 4, in <module>
    print(add_five("10"))
           ^~~~~~^
File "/Users/sanjanareddy/fibo.py", line 2, in add_five
    return value + 5
           ^~~~~~^
TypeError: can only concatenate str (not "int") to str
△ (base) sanjanareddy@Sanjanas-MacBook-Air ~ %
```

The terminal output shows a **TypeError** occurring at line 4, where the string '10' is passed to the function 'add_five'. The error message states: 'TypeError: can only concatenate str (not "int") to str'.

Observed Error

TypeError: Cannot add string and integer.

AI Explanation

Python does not allow adding string and integer directly.

The screenshot displays two terminal sessions within the VS Code interface.

Top Terminal:

```
Users > sanjanareddy > fibo.py > ...
1 def add_five_str(value):
2     return str(value) + "5"
3
4 # Test cases
5 assert add_five_str("10") == "105"
6 assert add_five_str("0") == "05"
7 assert add_five_str("7") == "75"
8
```

Bottom Terminal:

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
(base) sanjanareddy@Sanjanas-MacBook-Air ~ % /usr/local/bin/python3 /Users/sanjanareddy/fibo.py
File "/Users/sanjanareddy/fibo.py", line 2, in add_five
    return value + 5
~~~~~~^~~~~~
TypeError: can only concatenate str (not "int") to str
● (base) sanjanareddy@Sanjanas-MacBook-Air ~ % /usr/local/bin/python3 /Users/sanjanareddy/fibo.py
❖ (base) sanjanareddy@Sanjanas-MacBook-Air ~ %
```

```
Users > sanjanareddy > fibo.py > ...
1 def add_five(value):
2     return int(value) + 5
3
4 # Test cases
5 assert add_five("10") == 15
6 assert add_five("0") == 5
7 assert add_five("5") == 10
8
```

Bottom Terminal (Continued):

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
(base) sanjanareddy@Sanjanas-MacBook-Air ~ % /usr/local/bin/python3 /Users/sanjanareddy/fibo.py
print(add_five("10"))
~~~~~^~~~~~
File "/Users/sanjanareddy/fibo.py", line 2, in add_five
    return value + 5
~~~~~~^~~~~~
TypeError: can only concatenate str (not "int") to str
● (base) sanjanareddy@Sanjanas-MacBook-Air ~ % /usr/local/bin/python3 /Users/sanjanareddy/fibo.py
❖ (base) sanjanareddy@Sanjanas-MacBook-Air ~ %
```

Output

Program runs successfully for multiple inputs.