

# PRINCIPLES OF ARTIFICIAL INTELLIGENCE

## LAB – EXPERIMENT 7:BACKWARD CHAINING

```
# Knowledge Base (Rules in IF-THEN format)
```

```
knowledge_base = {
```

```
    "flu": ["cough", "fever"],
```

```
    "fever": ["sore_throat"],
```

```
}
```

```
# Known facts
```

```
facts = {"sore_throat", "cough"}
```

```
# Backward chaining function
```

```
def backward_chaining(goal):
```

```
    if goal in facts: # If the goal is a known fact, return True
```

```
        return True
```

```
    if goal in knowledge_base: # If the goal has rules in KB
```

```
        for conditions in knowledge_base[goal]: # Check each rule
```

```
            if all(backward_chaining(cond) for cond in conditions): # Recursively verify
```

```
                return True
```

```
    return False # If no rule or fact supports the goal, return False
```

```
# Query: Does the patient have flu?
```

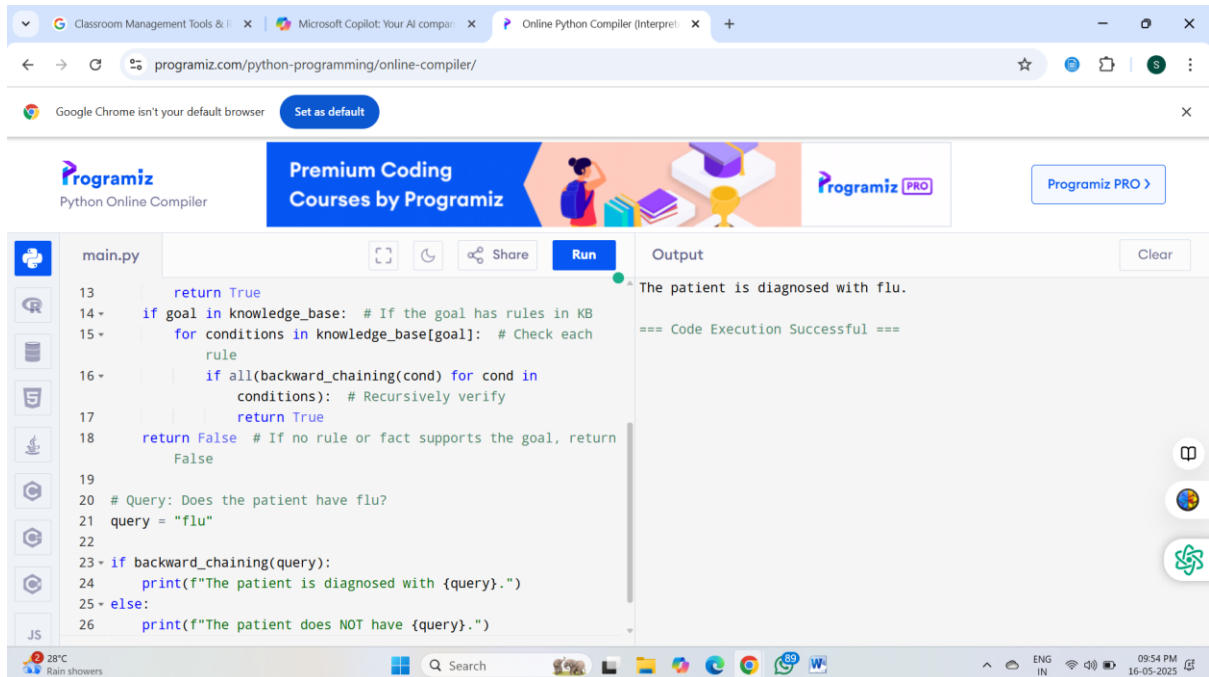
```
query = "flu"
```

```
if backward_chaining(query):
```

```
    print(f"The patient is diagnosed with {query}.")
```

else:

```
print(f"The patient does NOT have {query}.")
```



The screenshot shows the Programiz Python Online Compiler interface. The browser tabs include 'Classroom Management Tools & F...', 'Microsoft Copilot: Your AI compari...', and 'Online Python Compiler (Interpre...'. The address bar shows 'programiz.com/python-programming/online-compiler/'. The page header features the Programiz logo, 'Python Online Compiler', and a banner for 'Premium Coding Courses by Programiz'. The main editor area displays a file named 'main.py' with the following Python code:

```
13     return True
14     if goal in knowledge_base: # If the goal has rules in KB
15         for conditions in knowledge_base[goal]: # Check each
            rule
16             if all(backward_chaining(cond) for cond in
                conditions): # Recursively verify
17                 return True
18     return False # If no rule or fact supports the goal, return
        False
19
20 # Query: Does the patient have flu?
21 query = "flu"
22
23 if backward_chaining(query):
24     print(f"The patient is diagnosed with {query}.")
25 else:
26     print(f"The patient does NOT have {query}.")
```

The 'Output' panel on the right shows the result of the code execution:

```
The patient is diagnosed with flu.
=== Code Execution Successful ===
```

The bottom of the image shows a Windows taskbar with a search bar, several application icons, and system tray information including '28°C', 'Rain showers', 'ENG IN', and the date '16-05-2025'.

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