

# 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?
```

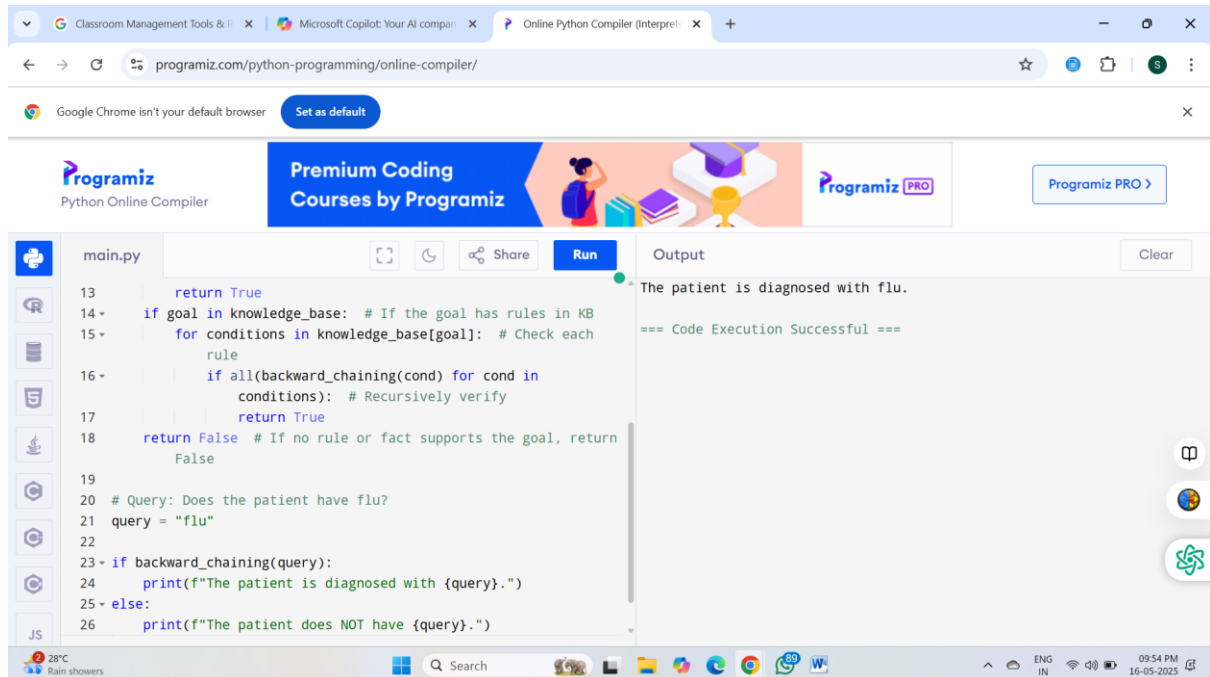
```
query = "flu"
```

```
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 address bar displays `programiz.com/python-programming/online-compiler/`. The page header includes the Programiz logo, a banner for "Premium Coding Courses by Programiz", and a "Programiz PRO" button. The main workspace is divided into two panels: a code editor on the left and an output panel on the right. The code editor shows 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
16 +         rule
17 +         if all(backward_chaining(cond) for cond in
18 +             conditions): # Recursively verify
19 +                 return True
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 the date and time set to 09:54 PM on 16-05-2025.

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