

PRINCIPLES OF ARTIFICIAL INTELLIGENCE

LAB – EXPERIMENT 8: FORWARD CHAINING

```
# Knowledge Base: Rules in IF-THEN format
```

```
knowledge_base = [  
    (["cough", "fever"], "flu"),  
    (["sore_throat", "runny_nose"], "cold"),  
    (["sore_throat"], "fever") # Sore throat can lead to fever  
]
```

```
# Given initial facts
```

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

```
# Forward Chaining Function
```

```
def forward_chaining():
```

```
    inferred = True # Keep looping as long as new facts are added
```

```
    while inferred:
```

```
        inferred = False # Stop if no new fact is added in an iteration
```

```
        for conditions, conclusion in knowledge_base:
```

```
            if all(condition in facts for condition in conditions) and conclusion not in facts:
```

```
                facts.add(conclusion) # Add the inferred fact
```

```
                inferred = True # Mark that we inferred a new fact
```

```
# Run forward chaining
```

```
forward_chaining()
```

```
# Check if flu or cold is inferred
```

```
if "flu" in facts:
```

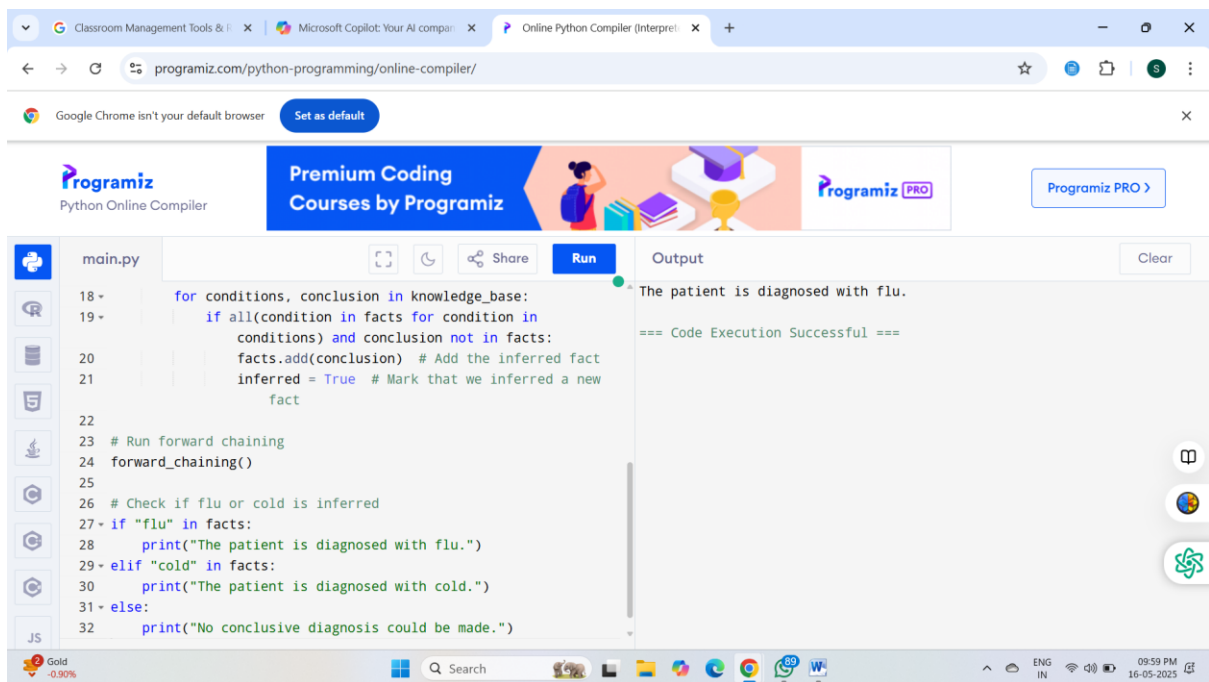
```
    print("The patient is diagnosed with flu.")
```

```
elif "cold" in facts:
```

```
    print("The patient is diagnosed with cold.")
```

```
else:
```

```
    print("No conclusive diagnosis could be made.")
```



The screenshot shows a web browser window with the URL `programiz.com/python-programming/online-compiler/`. The page features the Programiz logo and a banner for "Premium Coding Courses by Programiz". The main content area displays a Python script in a code editor, with a "Run" button and an "Output" panel. The script is a forward-chaining inference engine that checks for "flu" or "cold" in a set of facts. The output panel shows the result: "The patient is diagnosed with flu." and "=== Code Execution Successful ===".

```
main.py
18 for conditions, conclusion in knowledge_base:
19     if all(condition in facts for condition in
20         conditions) and conclusion not in facts:
21         facts.add(conclusion) # Add the inferred fact
22         inferred = True # Mark that we inferred a new fact
23
24 # Run forward chaining
25 forward_chaining()
26
27 # Check if flu or cold is inferred
28 if "flu" in facts:
29     print("The patient is diagnosed with flu.")
30 elif "cold" in facts:
31     print("The patient is diagnosed with cold.")
32 else:
33     print("No conclusive diagnosis could be made.")
```

Output

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

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