CSC 141 / FALL 2026

Nested decisions and tracing

CSC 141 · Class 6
Tuesday, September 15, 2026
Dr. Si Chen

Quiz 1

11:00–11:15 AM
10 questions · 1 point each
Closed notes. Work independently.
Online: wcu.ninja/csc141/quiz1
Use the paper version if directed.

Today’s learning goals

Trace a decision without running it first.
Match each else to its if using indentation.
Choose a chain or nested decisions to fit a rule.
Check each possible outcome with a test.

One rule at a time

Community workshop rule:
If the room is closed, print “Come back later.”
If the room is open and a visitor registered, print “Welcome.”
Otherwise, print “Register at the desk.”

Inputs, output, and a plan

Inputs: room_open and registered, both Boolean values.
Output: exactly one message.
The registration decision matters only when the room is open.

```
# If the room is open:
#     If registered, welcome the visitor.
#     Otherwise, send them to the desk.
# Otherwise, ask them to return later.
```

The complete nested decision

```
room_open = True
registered = False

if room_open:
    if registered:
        print("Welcome.")
    else:
        print("Register at the desk.")
else:
    print("Come back later.")
```

The inner if is indented inside the outer if.

Each else aligns with the if it belongs to.

Trace: open, not registered

```
room_open = True
registered = False

# Outer test: True
# Inner test: False
# Inner else runs

# Output:
Register at the desk.
```

The outer else does not run.

A false inner condition does not make the outer condition false.

Trace: closed, registered

```
room_open = False
registered = True

# Outer test: False
# Inner decision: skipped
# Outer else runs

# Output:
Come back later.
```

The value of registered does not affect this path.

Skipped conditions are not evaluated.

All combinations

```
room_open    registered    message
True         True          Welcome.
True         False         Register at the desk.
False        True          Come back later.
False        False         Come back later.
```

Indentation changes the rule

```
if room_open:
    if registered:
        print("Welcome.")
else:
    print("Come back later.")
```

For True and False, this version prints nothing.

There is no else for the inner if.

A chain can express the same outcomes

```
if not room_open:
    print("Come back later.")
elif registered:
    print("Welcome.")
else:
    print("Register at the desk.")
```

The first branch handles the closed room.

Reaching elif means the room is open.

Independent if statements

```
points = 12

if points >= 10:
    print("Bronze")
if points >= 20:
    print("Silver")

print("Finished")
```

Each if starts a separate decision.

Predict the output for points = 12 and points = 25.

One label with an elif chain

```
points = 25

if points >= 20:
    print("Silver")
elif points >= 10:
    print("Bronze")
else:
    print("Keep practicing")
```

Only the first true branch runs.

Checking the larger threshold first makes both labels reachable.

Every path needs a value

```
member = False

if member:
    price = 4
else:
    price = 6

print(f"Price: ${price:.2f}")
```

price is assigned on both paths.

The final print is outside the decision.

Guided build: a workshop ticket

Fictional ticket rules:
Under age 12: $4.00.
Age 12 or older: members pay $6.00.
Age 12 or older: nonmembers pay $8.00.
Assume a nonnegative whole age and yes/no membership input.

Ticket plan and test cases

Read age as an int.
Read membership as text.
Check the age first.
For older visitors, check membership.
Print one price with two decimal places.

Tests: 11/yes : $4.00; 12/yes : $6.00; 12/no : $8.00.

Ticket solution after your attempt

```
age = int(input("Age: "))
member = input("Member (yes/no): ").lower()

if age < 12:
    price = 4.0
else:
    if member == "yes":
        price = 6.0
    else:
        price = 8.0

print(f"Ticket: ${price:.2f}")
```

At age 12, the outer condition is False.

The membership decision then selects the price.

Partner practice: a game room

Rule: a closed game room prints “Closed.”
An open room lets a visitor with a pass print “Play.”
An open room without a pass prints “Get a pass.”

Write the plan, then the code.
Test all four Boolean combinations.

Exit ticket

For an outer condition of False, does the inner if run?
How do you tell which if an else belongs to?
What is the difference between two if statements and an if/elif chain?

Before Thursday

Run the workshop ticket tests again without looking at the solution.
Bring one confusing trace or error to class.
PA1 is due Thursday, September 17, 11:59 PM in D2L.
Next class: test cases, debugging, and a complete small program.