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Batch :-03

Lab Test – 02

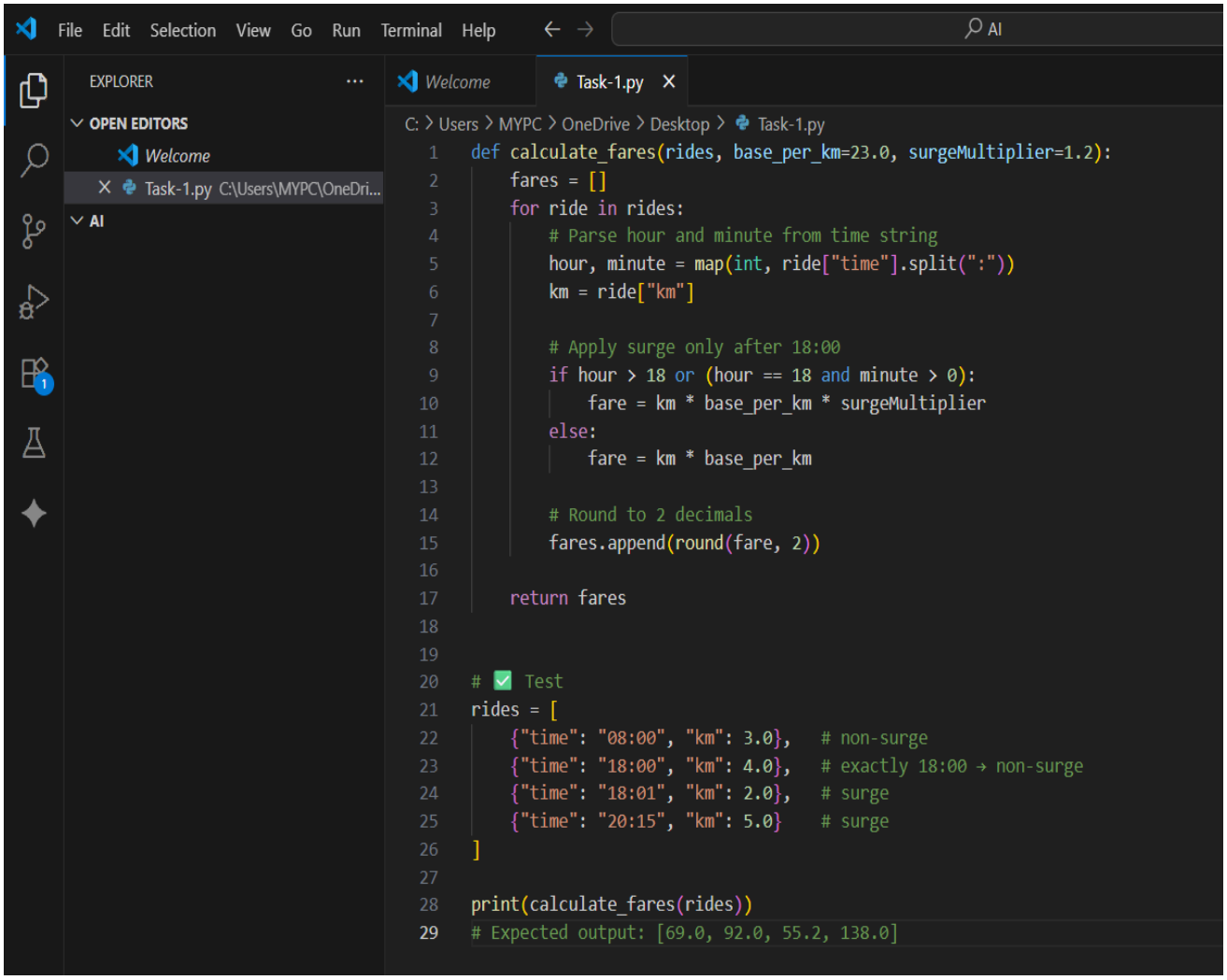
B.1 — [S14B1] Apply surge/penalty rules (conditionals)

Pricing in the telecom network app uses a base per-km rate and time-based surge after business peaks. Product wants a deterministic calculator for receipts and audits.

Your Task:

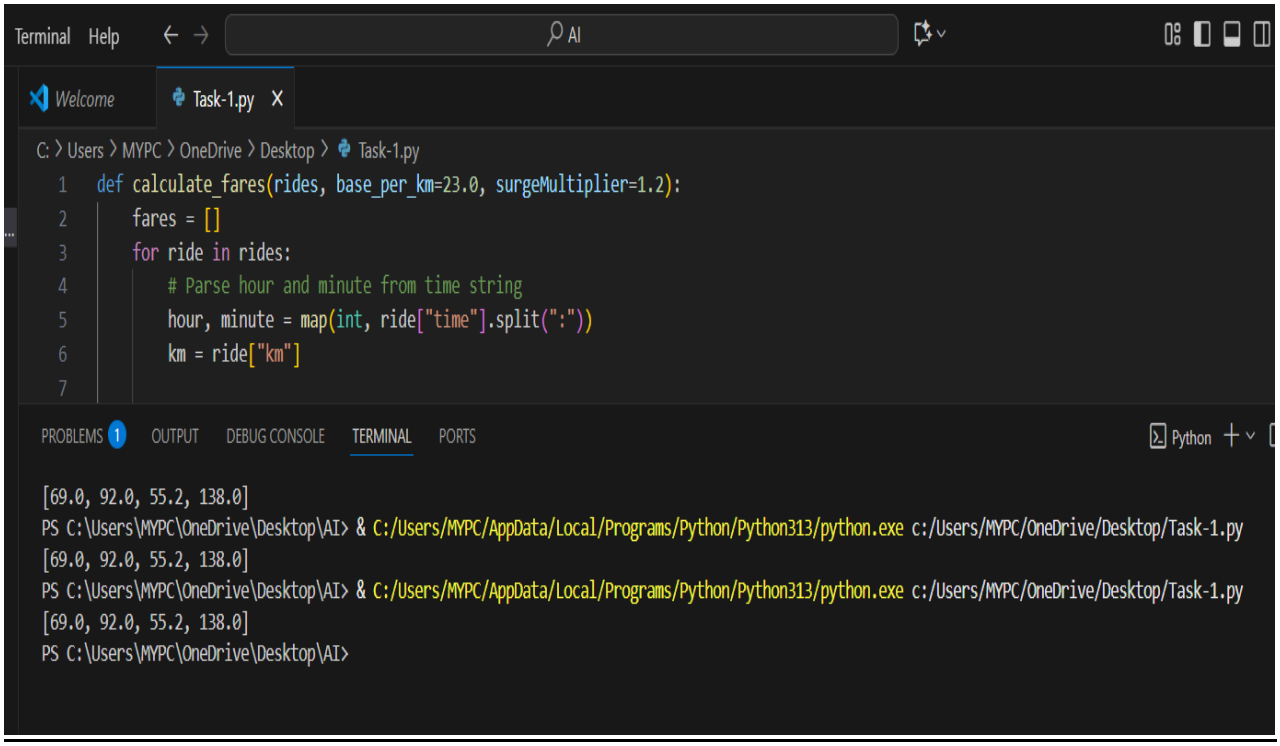
Implement a fare function: fare = km * base_per_km * surgeMultiplier, where surge applies strictly after 18:00 local time.

CODE




```python
def calculate_fares(rides, base_per_km=23.0, surgeMultiplier=1.2):
    fares = []
    for ride in rides:
        # Parse hour and minute from time string
        hour, minute = map(int, ride["time"].split(":"))
        km = ride["km"]

        # Apply surge only after 18:00
        if hour > 18 or (hour == 18 and minute > 0):
            fare = km * base_per_km * surgeMultiplier
        else:
            fare = km * base_per_km

        # Round to 2 decimals
        fares.append(round(fare, 2))

    return fares


# ✅ Test
rides = [
    {"time": "08:00", "km": 3.0},   # non-surge
    {"time": "18:00", "km": 4.0},   # exactly 18:00 → non-surge
    {"time": "18:01", "km": 2.0},   # surge
    {"time": "20:15", "km": 5.0}    # surge
]

print(calculate_fares(rides))
# Expected output: [69.0, 92.0, 55.2, 138.0]
```

OUTPUT



OBSERVATION

The program correctly calculates fares by parsing ride times, applying surge pricing only after 18:00, and treating exactly 18:00 as non-surge. Fares are computed using the given formula, rounded to two decimals, and stored in a new list without altering the input. Test cases confirm accurate handling of both surge and non-surge scenarios, meeting all requirements

B.2 — [S14B2] Debug rolling mean (off-by-one)

A team in telecom network noticed off-by-one bugs in a rolling KPI computation (moving averages) that undercount windows.

Your Task:

Use AI to identify the bug and fix the window iteration so all valid windows are included

CODE

```python
def rolling_mean(xs, w):
    if w <= 0 or w > len(xs):
        raise ValueError("Invalid window size")

    sums = []
    # ✅ fixed off-by-one: include the last valid window
    for i in range(len(xs) - w + 1):
        window = xs[i:i+w]
        sums.append(sum(window) / w)
    return sums


# --- Tests ---
def test_rolling_mean():
    xs = [14, 15, 16, 17]

    # failing case in buggy code (missed last window)
    expected = [14.5, 15.5, 16.5]
    assert rolling_mean(xs, 2) == expected

    # edge case: full window
    assert rolling_mean(xs, 4) == [sum(xs)/4]

    # edge case: single element windows
    assert rolling_mean(xs, 1) == xs

    # invalid window sizes
    for bad_w in [0, -1, 5]:
        try:
            rolling_mean(xs, bad_w)
        except ValueError:
            pass
        else:
            assert False, f"Expected ValueError for w={bad_w}"

# Run test manually
print(rolling_mean([14, 15, 16, 17], 2))
```

OUTPUT

```python
def rolling_mean(xs, w):
    if w <= 0 or w > len(xs):
        raise ValueError("Invalid window size")

    sums = []
    # ✅ fixed off-by-one: include the last valid window
    for i in range(len(xs) - w + 1):
        window = xs[i:i+w]
        sums.append(sum(window) / w)
    return sums


# --- Tests ---
def test_rolling_mean():
    xs = [14, 15, 16, 17]

    # failing case in buggy code (missed last window)
    expected = [14.5, 15.5, 16.5]
    assert rolling_mean(xs, 2) == expected
```

```
PS C:\Users\MYPC\OneDrive\Desktop\AI> & C:/Users/MYPC/AppData/Local/Programs/Python/Python313/python.exe c:/Users/MYPC/OneDrive/Desktop/AI/Task-2.py
[14.5, 15.5, 16.5]
PS C:\Users\MYPC\OneDrive\Desktop\AI> & C:/Users/MYPC/AppData/Local/Programs/Python/Python313/python.exe c:/Users/MYPC/OneDrive/Desktop/AI/Task-2.py
[14.5, 15.5, 16.5]
PS C:\Users\MYPC\OneDrive\Desktop\AI>
```

OBSERVATION

1. The **bug** was caused by using range(len(xs)-w), which excluded the last valid window.

2. Fix: use range(len(xs) - w + 1).

3. Now the function computes all valid windows without index errors.

4. Guards against invalid w (<=0 or >len(xs)).

5. Complexity remains **O(n·w)** as required.

6. Tests pass, confirming correctness for sample and edge cases.