Pre Lab 3

Collections and Iteration: Looping Through Data
Applied Python Programming with AI and Raspberry Pi Interfaces

Instructor: Dr. Vikas Thammanna Gowda   Semester: ABCD 20YX

Points: 20   Assign: *TBD*   Due: *TBD*

Name: _____

Follow these steps to deepen your understanding of Python loops (`while` and `for`). You'll work with the provided "Ride Share Fare Calculator". Code and answer each question by editing, running, observing, and documenting the results.

1. Set up your environment

- Open your favorite Python editor or IDE (e.g., IDLE, VS Code, PyCharm).
- Open the file `ride_fare_loops.py`.
- Run the base code.
- Execute `ride_fare_loops.py` as-is.
- Verify that it prints the subtotal, tax, shipping, total cost, and whether the order is within your budget.

```python
# Pricing parameters
base_rate_per_mile   = 1.25     # $ per mile
base_rate_per_minute = 0.25     # $ per minute
peak_hours_morning   = range(7, 10)    # 7-9 AM
peak_hours_evening   = range(17, 20)   # 5-7 PM
peak_multiplier      = 1.5      # 50% surge
service_fee          = 2.00     # flat fee per ride


# Sample rides: (distance_mi, duration_min, start_hour)
rides = [
    (3.2, 12, 8),      # morning peak
    (5.0, 20, 14),     # off-peak
    (2.5, 15, 18),     # evening peak
    (10.0, 25, 22),    # late night
    (1.0, 5, 9)        # edge of peak
]

# 1. Calculate total revenue using a while loop
index = 0
total_revenue = 0.0

while index < len(rides):
    dist, dur, hour = rides[index]
    base_fare = dist * base_rate_per_mile + dur * base_rate_per_minute
    multiplier = peak_multiplier if (hour in peak_hours_morning or hour in
        peak_hours_evening) else 1.0
    fare = base_fare * multiplier + service_fee
    total_revenue += fare
    index += 1
print(f"Total revenue: ${total_revenue:.2f}")


```

```python
# 2. Compute total distance and average speed using a for loop
total_distance = 0.0
total_time = 0.0
for dist, dur, hour in rides:
    total_distance += dist
    total_time += dur
average_speed = total_distance / (total_time / 60)  # miles per hour
print(f"Total distance: {total_distance:.1f} miles")
print(f"Average speed: {average_speed:.1f} mph")
```

2. Record your observations (2 Points)

3. Record your observations with your inputs.(2 Points)

4. Answer the following questions (4 Points)

1. After the while loop finishes, what is the final value and type of the variable `index`?

2. What happens if you comment `line 29`

5. Thinker and Tinker

1. Say, you want to modify the while loop so that it displays the fare for each ride? Show your updated `while` block. **(4 Points)**

2. Suppose night-owl rides (hour ≥ 22) incur a flat \$5 surcharge. How would you integrate that into the while loop without breaking its structure? **(4 Points)**

3. You decide to use a `for` loop instead of `while`, give the snippet: **(4 Points)**

6. Submission Instructions

- Drop off your completed work in the file folder outside my office door (West Hall 100).
- Turn it in in class before start of lab.
- Scan your work into a PDF and upload it to LLM.
- If you upload an image to LLM, combine all pages into a single, high-resolution file that is clear and easy to read. (Failure to follow this instruction will result loss of points.))