

MODULE 4 Enhancement Two: Algorithms and data structures

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In the CS-465: Full Stack Development course, we used the MEAN stack to build a web application for managing travel packages. In the projects, we used data types such as String, Date, Integer to store different values representing the trip name, description, trip date etc. In the algorithms and data structure category, I designed and evaluated computing solutions that solve a given problem using algorithmic principles and computer science practices and standards appropriate to its solution, while managing the trade-offs. I also demonstrated proficiency in Python by writing an algorithm to calculate driver payroll.

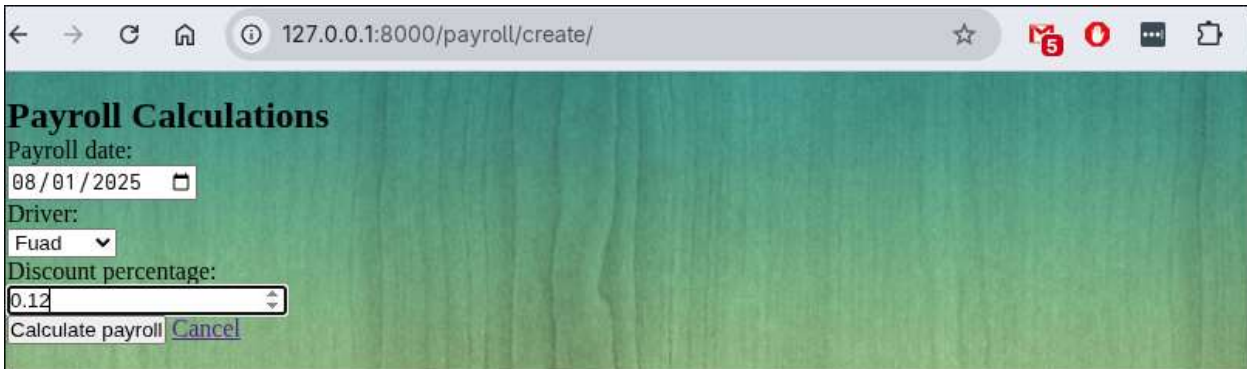
After adding loads to the database and assigning each load to a driver (Pic. 1), we can create a payroll for the drivers. To calculate payroll, all loads delivered the week before (Monday through Saturday) will be added to the payroll. For example, picture 2, we want to create a payroll for 08/01/2025, meaning loads delivered between 07/21/2025 – 07/26/2025 will be included in the payroll. The algorithm (Pic 4) loops through all loads assigned to the driver, checks if they should be included, then sums up all the total costs and multiplies them by the discount percentage. Picture 3 shows that the payroll for driver Fuad was created with one load. To experiment, we go back to the Loads and change the delivery date for Load “New Yor, NY - Nashville, TN”. The new date is 07/26/2025, so we expect the load to appear on the payroll from 08/01/2025 (Pic 5). And the total cost changed to \$5720.00 which is correct

$$((\$2500 + \$4000) * 0.88)$$



Load#	Pickup Date	Pickup Location	Delivery Date	Delivery Location	Total Cost	Driver Name	Options
12345680	New York, NY	Nashville, TN	July 23, 2025	July 28, 2025	\$2500.00	Fuad	Update Delete
12345681	Chicago, IL	Miami, FL	July 21, 2025	July 24, 2025	\$2000.00	Econian	Update Delete
12345683	Indianapolis, IN	Las Vegas, NV	July 22, 2025	July 26, 2025	\$4000.00	Fuad	Update Delete

Pic 1. Loads



Payroll Calculations

Payroll date: 08/01/2025

Driver: Fuad

Discount percentage: 0.12

Calculate payroll [Cancel](#)

Pic 2. Calculate Payroll



[CREATE PAYROLL](#)

Payroll Date	Driver Name	%	Total Pay	Options
Aug. 1, 2025	Fuad	0.12	3520.00	Update Delete

Pic 3. Payroll

```

class Payroll(models.Model):
    payroll_date = models.DateField()
    discount_percentage = models.DecimalField(
        max_digits=10, decimal_places=2, default=0.0
    )
    driver = models.ForeignKey("Driver", on_delete=models.CASCADE)

    # Payroll Calculations
    @property
    def total_pay(self):
        # Filter loads by driver and month/year
        today = date.today()
        start = today - timedelta(days=today.weekday() + 7)
        end = start + timedelta(5)
        print(today, start, end)
        driver_loads = Load.objects.filter(
            driver=self.driver, delivery_date__gte=start, delivery_date__lte=end
        )
        total = 0
        if driver_loads:
            for load in driver_loads:
                total += load.total_cost
            print(total, type(total))

            # Calculate total pay for the specific period
            # total = driver_loads.aggregate(Sum("total_cost"))["total_cost__sum"]

            print(total, type(total))
            total *= 1 - self.discount_percentage
            print(total, type(total))
        return total

```

Pic 4. src/erp_app/models.py



Payroll Date	Driver Name	%	Total Pay	Options
Aug. 1, 2025	Fuad	0.12	5720.0000	Update Delete

Pic 5. Payroll, after one more load was added to the calculations

References

Django. (2025). *Django Documentation*. <https://docs.djangoproject.com/en/5.2/>

SNHU Media. (2024, May 23). *CS 499 Milestone Two Code Review Overview Approach*

Assistance. https://www.youtube.com/watch?v=229TiLwyipI&ab_channel=SNHUMedia