```
# A class for the object Package
class Package:
  def __init__(self, weight, location):
    self.weight = weight
    self.location = location
```

```
# iteration 1

# Returns number of vehicles required using first fit Decreasing Algorithm

def firstFit(weight, n, c):
    # Initialize result (Count of vehicle)
    res = 0

    # Create an array to store remaining space in vehicle
    # there can be at most n vehicle
    vehicle_rem = [0] * n

    # Create a list to store the items in each vehicle
    vehicle = [[] for _ in range(n)]

    # Place items one by one
    for i in range(n):
        # Find the first vehicle that can accommodate weight[i]
        j = 0
        while j < res:
            if vehicle_rem[j] >= weight[i]:
                vehicle_rem[j] -= weight[i]
                vehicle[j].append(weight[i])  # Add item to the vehicle
                break
            j += 1

        # If no vehicle could accommodate weight[i]
        if j == res:
            vehicle_rem[res] = c - weight[i]
            vehicle[res].append(weight[i])  # Add item to the new vehicle
            res += 1

    return res, vehicle  # Return the number of vehicle and the vehicle themselves

# Returns number of vehicle required using first fit
# decreasing offline algorithm
def firstFitDec(weight, n, c):
    # First sort all weights in decreasing order
    weight.sort(reverse=True)

    # Now call first fit for sorted items
    return firstFit(weight, n, c)

# ===============================================================================
packages = [Package(23, 'Aurora'), Package(51, 'Antipolo'), Package(24, 'Marikina'),
            Package(17, 'Masbate'), Package(64, 'Bicol'), Package(43, 'Rizal'),
            Package(88, 'Zabarte')]
weight = [i.weight for i in packages]
c = 100
n = len(weight)
memo =  {} # for storing the vehicle and their carriage
num_vehicle, vehicle = firstFitDec(weight, n, c)


print("Number of vehicle required in First Fit Decreasing:", num_vehicle)
print("Items in each vehicle:")
for i in range(num_vehicle):
    memo[i] = vehicle[i]
    print(f"Vehicle {i + 1}: {vehicle[i]}")

print(f"The dictionary of all the vehicle and their carriage: {memo}")
```

```
Number of vehicle required in First Fit Decreasing: 4
Items in each vehicle:
Vehicle 1: [88]
Vehicle 2: [64, 24]
Vehicle 3: [51, 43]
Vehicle 4: [23, 17]
The dictionary of all the vehicle and their carriage: {0: [88], 1: [64, 24], 2: [51, 43], 3: [23, 17]}
```

```
# Iteration 2

# Use Dijkstra's Algorithm and the solution to the "The Travelling Salesman Problem"
```