

# CSC148 Worksheet 6 Solution

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## Question 1

- The two classes already defined are: Vehicle and SuperDuperManager

The additional classes required to create for this exercise are: Car, Helicopter and MagicCarpet

Car, Helicopter and MagicCarpet are child classes of Vehicle.

## Question 2

- a. The following are attributes possessed by all vehicles

- type
- initial\_position
- moves\_to
- move\_diagonally
- fuel\_usage

### Correct Solution:

The following are attributes possessed by all vehicles

- position
- fuel

- b. No. Referencing the following code in *worksheet\_6\_starter\_code.py*,

```

1  class Vehicle:
2      ...
3
4      def __init__(self, initial_fuel: int,
5                    initial_position: Tuple[int, int]) -> None:
6          ...
7
8          self.fuel = initial_fuel
9          self.position = initial_position
10

```

we can come up with the following examples.

- Vehicle(100, (10,20))
- Vehicle(50, (5, 10))

Here, we can see the two vehicles have different value of fuel and initial position.

- fuel\_needed* not implemented because each child classes have different fuel consumption rate, and the method is to be defined by the child classes by overriding it.
- The following methods must be defined in each of its subclasses

- Car
  - fuel\_needed
  - move
- Helicopter
  - fuel\_needed
  - move
- MagicCarpet
  - \_\_init\_\_
  - move

### Correct Solution:

- Car
  - \_\_init\_\_
    - \* Necessary because the parameter *position* must be set as optional
    - \* Necessary because *self.position* must default to (0,0) if the argument of *position* not given.
  - fuel\_needed
    - \* Necessary because vehicle uses fuel

- \* Necessary because needs to define the fuel cost based on it not being able to moving diagonally.
- Helicopter
  - `__init__`
    - \* Necessary because the parameter *position* must be set as optional
    - \* Necessary because *self.position* must default to (3,5) if the argument of position not given.
  - `fuel_needed`
    - \* Necessary because vehicle uses fuel
    - \* Necessary because needs to define the fuel cost based on it being able to move diagonally.
- MagicCarpet
  - `__init__`
    - \* Necessary to set the parameters *initial\_fuel*, *initial\_position* as optional
    - \* Necessary to randomize the value of *self.position*.
  - `move`
    - \* Necessary to set the parameters *new\_x* and *new\_y* as optional.
    - \* Necessary to randomize the value of new position.

## Question 3

```

1      """
2      Initializing SuperDuperManager:
3      >>> s = SuperDuperManager()
4      >>> s._vehicles
5      {}
6
7      Adding Vehicles:
8      >>> s.add_vehicle('Car', '1', 100)
9      >>> s._vehicles['1'].__class__.__name__
10     'Car'
11     >>> s.add_vehicle('Helicopter', '1', 100)
12     >>> s._vehicles['1'].__class__.__name__
13     'Car'
14
15     >>> s.add_vehicle('Helicopter', '2', 100)
16     >>> s._vehicles['2'].__class__.__name__
17     'Helicopter'
18
19     >>> s.add_vehicle('UnreliableMagicCarpet', '3', 100)
20     >>> s._vehicles['3'].__class__.__name__
21     'UnreliableMagicCarpet'

```

```

22
23 Moving Vehicle:
24 >>> s._vehicles['1'].position
25 (0,0)
26 >>> s.move_vehicle('1', 1, 1)
27 >>> s._vehicles['1'].position
28 (1,1)
29
30 >>> s._vehicles['2'].position
31 (3,5)
32 >>> s.move_vehicle('2', 1, 1)
33 >>> s._vehicles['2'].position
34 (4,6)
35
36 >>> s._vehicles['3'].position
37 (4,8)
38 >>> s._vehicles['3'].position
39 (12,4)
40 >>> s.move_vehicle('3', 1, 1)
41 >>> s._vehicles['3'].position
42 (100,100)
43
44 Get Vehicle Position:
45 >>> s.get_vehicle_position('1')
46 (1,1)
47
48 >>> s.get_vehicle_position('2')
49 (4,6)
50
51 >>> s.get_vehicle_position('3')
52 (50,200)
53
54 Get Vehicle Fuel:
55 >>> s.get_vehicle_fuel('1')
56 98
57
58 >>> s.get_vehicle_fuel('2')
59 99
60
61 >>> s.get_vehicle_fuel('2')
62 100
63 """

```

## Question 4

- a. The instance attribute *id\_* is used to keep track of vehicles.

The type of the instance attribute is string.

### Correct Solution:

The instance attribute *self.\_vehicles* is used to keep track of vehicles.

The type of the instance attribute is `'dict'`.

- b. The vehicles are initialized in class *SuperDuperManager*'s *add\_vehicle* method.
- c. In code that keeps track of all the vehicles, the vehicles are updated via the methods *add\_vehicle* and *move\_vehicle*

**Question 5**

**Question 6**

**Question 7**

**Question 8**