

# Lab 2: Introduction to Object-Oriented Programming

## Solution

### 2) Designing Classes

1. *Read the problem description.*
2. *Decide what classes you need to design.*

```
1  class Race:
2      pass
3
4  class Runner:
5      pass
```

3. *Sample usage.*

```
1  class Race:
2      """
3      === Sample Usage ===
4
5      Create a race registry:
6      >>> r = Race()
7      >>> r.categories['lt20']
8      []
9      >>> r.categories['lt30']
10     []
11     >>> r.categories['lt40']
12     []
13     >>> r.categories['gt40']
14     []
15
16     Registering runners:
17     >>> runner_1 = Runner('Gerhard','gerhard@gmail.com')
18     >>> r.register(runner_1, 'lt40')
19     >>> r.categories['lt40'][0].name
20     Gerhard
21     >>> runner_2 = Runner('Tom','tom@gmail.com')
22     >>> r.register(runner_2, 'lt30')
23     >>> r.categories['lt30'][0].name
24     Tom
25     >>> runner_3 = Runner('Toni','toni@gmail.com')
```

```

26     >>> r.register(runner_3, 'lt20')
27     >>> r.categories['lt20'][0].name
28     Toni
29     >>> r.register(runner_1, 'lt30')
30     >>> r.categories['lt30'][1].name
31     Gerhard
32     """
33     pass
34
35
36     ...
37
38
39     if __name__ == '__main__':
40         import doctest
41         doctest.testmod()

```

### Correct Solution:

```

1     class Race:
2         """
3         === Sample Usage ===
4
5         Create a race registry:
6         >>> r = Race()
7         >>> r.runners
8         []
9
10        Registering runners:
11        >>> runner_1 = Runner('Gerhard','gerhard@gmail.com', 'lt40')
12        >>> r.register(runner_1)
13        >>> r.runners[0].name
14        'Gerhard'
15        >>> runner_2 = Runner('Tom','tom@gmail.com', 'lt30')
16        >>> r.register(runner_2)
17        >>> r.runners[1].name
18        'Tom'
19        >>> runner_3 = Runner('Toni','toni@gmail.com', 'lt20')
20        >>> r.register(runner_3)
21        >>> r.runners[2].name
22        'Toni'
23
24        Updating runner in a speed category:
25        >>> runner_4 = r.get_runner('Gerhard')
26        >>> runner_4.edit_category('lt30')
27        >>> runner_4.speed_category
28        'lt30'
29
30        Get all runners in a speed category:
31        >>> r.get_runners('lt30')
32        ['Gerhard','Tom']
33        """

```

```
34
35
36 class Runner:
37     """
38     === Sample Usage ===
39     Create a runner:
40     >>> runner = Runner('Gerhard', 'gerhard@gmail.com', 'lt30')
41     >>> runner.name
42     'Gerhard'
43     >>> runner.email
44     'gerhard@gmail.com'
45     >>> runner.speed_category
46     'lt30'
47     """
48
49 if __name__ == '__main__':
50     import doctest
51     doctest.testmod()
52
53
```

#### 4. *Designing the interface.*