

**LAPORAN PRAKTIKUM 6**  
**PEMROGRAMAN BERORIENTASI OBJEK**



Oleh :  
Sayyidina Auliya (21091397034) kelas 2021B

**D4 MANAJEMEN INFORMATIKA**  
**FAKULTAS VOKASI**  
**UNIVERSITAS NEGERI SURABAYA**  
**2022**

## SOURCE CODE DAN ANALISIS

### 1. Source Code dan Analisis 1

[PHP]

```
1  <!-- Nama : Sayyidina Auliya
2      NIM : 21091397034
3      Kelas : 2021 B--->
4
5  <?php
6
7  require_once 'No1 Abstract Prak6.php';
8
9  class Truck extends Vehicle {
10     public function __construct($maxLoad, $name)
11     {
12         $this->maxLoad = $maxLoad;
13         $this->name = $name;
14     }
15
16     public function calcFuelNeeds()
17     {
18         $fuel = $this->calcFuelEfficiency();
19         $trip = $this->calcTripDistance();
20
21         return ceil($fuel / $trip);
22     }
23 }
24
25 class RiverBarge extends Vehicle {
26     public function __construct($maxLoad, $name)
27     {
28         $this->maxLoad = $maxLoad;
29         $this->name = $name;
30     }
31
32     public function calcFuelNeeds()
33     {
34         $fuel = $this->calcFuelEfficiency();
35         $trip = $this->calcTripDistance();
36
37         return ceil($fuel / $trip);
38     }
39 }
40 $truck = new Truck(15000, 'Truk');
41 $riverBarge = new RiverBarge(20000, 'Perahu');
```

## [Abstrak]

```
1 <!-- Nama : Sayyidina Auliya
2 NIM : 21091397034
3 Kelas : 2021 B-->
4
5 <?php
6
7 abstract class Vehicle {
8     private $load = 0;
9     protected $maxLoad = 0, $name;
10
11     protected function __construct($maxLoad, $name) {
12         $this->$maxLoad = $maxLoad;
13         $this->$name = $name;
14     }
15
16     public function getLoad() {
17         return $this->load;
18     }
19
20     public function getMaxLoad() {
21         echo 'Maksimal muatan ' . $this->name . ' ' ;
22         return $this->maxLoad;
23     }
24
25     public function addBox($weight) {
26         if ($this->load >= $this->maxLoad) {
27             echo "$this->name menambah muatan sebesar $weight <br>";
28             echo 'Muatan telah penuh tidak bisa menambah lagi';
29         }else {
30             $this->load += $weight;
31             echo "$this->name menambah muatan sebesar $weight";
32         }
33     }
34
35     abstract public function calcFuelNeeds();
36
37     protected function calcFuelEfficiency() {
38         $range = 20000000;
39         $range /= $this->load;
40         return $range;
41     }
42
43     protected function calcTripDistance() {
44         return 200;
45     }
46 }
```

## [Index]

```
1 <!-- Nama : Sayyidina Auliya
2 NIM : 21091397034
3 Kelas : 2021 B-->
4
5 <?php
6 require_once 'No1 Prak6.php';
7 ?>
8
9 <!DOCTYPE html>
10 <html lang="id">
11
12 <head>
13 <!-- Bootstrap CSS -->
14 <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.1.3/dist/css/bootstrap.min.css" rel="stylesheet"
15 integrity="sha384-1BmE4kWBq78iYhFtdvKuhfTAU6au08tT94WtHfjDbrCEXSU1oBoqyl2QvZ6jIW3" crossorigin="anonymous">
16
17 <title>PBO Praktikum 6</title>
18 </head>
19
20 <body>
21 <div class="container">
22 <br>
23 <h2 class="text-center">PBO - Praktikum 6</h2>
24 <div class="row">
25 <div class="col-5 mx-auto border p-3 mt-2">
26 <h4 class="text-center"><strong>Soal 1</strong></h4>
27 <br><br>
28 <b><?= $truck->getMaxLoad() . ' kg'; ?> <br></b>
29 <br>
30 <?= $truck->addBox(7000) . ' kg'; ?> <br>
31 <?= $truck->addBox(8000) . ' kg'; ?> <br>
32 <?= $truck->addBox(9000) . ' kg'; ?> <br>
33
34 <?php
35 echo "Jadi, Butuh Bahan Bakar sebanyak " . $truck->calcFuelNeeds() . ' Liter'. ' <br>';
36 ?>
37 <br>
38 -----
39 <br>
40 <br>
41 <b><?= $riverBarge->getMaxLoad() . ' kg'; ?> <br></b>
42 <br>
43 <?= $riverBarge->addBox(2000) . ' kg'; ?> <br>
44 <?= $riverBarge->addBox(5000) . ' kg'; ?> <br>
45 <?= $riverBarge->addBox(6000) . ' kg'; ?> <br>
46
47 <?php
48 echo "Jadi, Butuh Bahan Bakar sebanyak " . $riverBarge->calcFuelNeeds() . ' Liter';
49 ?>
50 </div>
51 </div>
52 </div>
53 </body>
54
55 </html>
```

### Analisis :

Analisa abstract class vehicle, metode calfueneeds yang digunakan untuk menghitung bahan bakar yang digunakan. Abstrak pada class vehicle sebagai parent class dan diakses sebuah child kelasnya, yaitu class truk dan class riverbarge yang mengambil nilai yang dihasilkan dari pembagian dua method, yaitu calfuelefficieng dan caltripdistance.

## 2. Source Code dan Analisis 2

[PHP]

```
1 <!-- Sayyidina Auliya_21091397034 -->
2
3 <?php
4
5 require_once 'interface no2 prak6.php';
6
7 class Airplane implements Flyer {
8     public function takeOff() {
9         return 'Pesawat lepas landas..';
10    }
11
12    public function land() {
13        return 'Pesawat mendarat';
14    }
15
16    public function fly() {
17        return 'Pesawat dalam perjalanan';
18    }
19 }
20
21 class Bird implements Flyer {
22     public function takeOff() {
23         return 'Burung mencari makan';
24     }
25
26     public function land() {
27         return 'Burung kembali pulang';
28     }
29
30     public function fly() {
31         return 'Burung terbang';
32     }
33
34     public function buildNest() {
35         return 'Burung membuat sarang';
36     }
37
38     public function layEggs() {
39         return 'Burung bertelur';
40     }
41 }
42
43 class Superman implements Flyer {
44     public function takeOff() {
45         return 'Superman mengejar Batman';
46     }
47
48     public function land() {
49         return 'Superman melawan Batman';
50     }
51
52     public function fly() {
53         return 'Superman melancarkan pukulan';
54     }
55
56     public function leapBuilding() {
57         return 'Batman terpentak menabrak bangunan pencakar langit';
58     }
59
60     public function stopBullet() {
61         return 'Polisi menembaki superman namun ditangkis';
62     }
63 }
64
65 $airplane = new Airplane;
66 $bird = new Bird;
67 $superman = new Superman;
```

## [Interface]

```
1 <!-- Sayyidina Auliya_21091397034 -->
2
3 <?php
4
5 interface Flyer {
6     public function takeOff();
7     public function land();
8     public function fly();
9 }
10
11 interface Sailer {
12     public function dock();
13     public function cruise();
14 }
```

## [Index]

```
3 <?php
4     require_once 'no 2 prak6.php';
5 ?>
6
7 <!DOCTYPE html>
8 <html lang="en">
9
10 <head>
11     <!-- Bootstrap CSS -->
12     <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.1.3/dist/css/bootstrap.min.css" rel="stylesheet"
13         integrity="sha384-1BmE4kWBq78iYhF1dvKuhfTAU6auU8tT94WrHftjDbrCEXSU1oBoqyl2QvZ6jIW3" crossorigin="anonymous">
14
15     <title>Praktikum 6</title>
16 </head>
17
18 <body>
19     <div class="container">
20         <br>
21         <div class="row">
22             <div class="col-5 mx-auto border p-3 mt-2">
23                 <h4 class="text-center"><strong><u>Soal 2</u></strong></h4>
24                 <br><br>
25                 <b><?php
26                     echo "Superman";
27                     ?></b> <br>
28                     <?= $superman->land(); ?> <br>
29                     <?= $superman->takeOff(); ?> <br>
30                     <?= $superman->fly(); ?> <br>
31                     <?= $superman->leapBuilding(); ?> <br>
32                     <?= $superman->stopBullet(); ?> <br>
33                     <br>
34                 <b><?php
35                     echo "Bird";
36                     ?></b> <br>
37                     <?= $bird->buildNest(); ?> <br>
38                     <?= $bird->takeOff(); ?> <br>
39                     <?= $bird->fly(); ?> <br>
40                     <?= $bird->land(); ?> <br>
41                     <?= $bird->layEggs(); ?> <br>
42                     <br>
43                 <b><?php
44                     echo "Airplane";
45                     ?></b> <br>
46                     <?= $airplane->takeOff(); ?> <br>
47                     <?= $airplane->fly(); ?> <br>
48                     <?= $airplane->land(); ?> <br>
49                 </div>
50             </div>
51         </div>
52     </body>
53
54 </html>
```

## Analisis :

Ini merupakan implementasi polymorphism dengan sistem penggunaan interface flyer. Sehingga, semua kelas yang di implementasi dari interface flyer harus mempunyai method take off, land, dan fly

### 3. Source Code dan Analisis 3

[PHP]

```
1 <!-- Sayyidina Auliya_21091397034 -->
2
3 <?php
4
5 require_once 'abstrac no 3 prak6.php';
6 require_once 'interface no 3 prak6.php';
7
8 class Animal
9 {
10     protected $name;
11
12     public function __construct($name)
13     {
14         $this->name = $name;
15     }
16
17     public function eat()
18     {
19         return $this->name . ' sedang makan';
20     }
21 }
22
23 class Homosapiens extends Animal {}
24
25 class Airplane2 extends Vehicle implements Flyer
26 {
27     public function __construct($maxLoad, $name)
28     {
29         $this->maxLoad = $maxLoad;
30         $this->name = $name;
31     }
32
33     public function takeOff()
34     {
35         return "$this->name lepas landas";
36     }
37
38     public function land()
39     {
40         return "$this->name mendarat";
41     }
42
43     public function fly()
44     {
45         return "$this->name dalam perjalanan";
46     }
47
48     public function calcFuelNeeds()
49     {
50         $fuel = $this->calcFuelEfficiency();
51         $trip = $this->calcTripDistance();
52
53
54
```

```

55         return ceil($fuel /= $strip);
56     }
57 }
58
59 class Superman2 extends Homosapiens implements Flyer
60 {
61     public function takeOff()
62     {
63         return "$this->name mengejar Batman";
64     }
65
66     public function land()
67     {
68         return "$this->name melawan Batman";
69     }
70
71     public function fly()
72     {
73         return "$this->name melancarkan pukulan";
74     }
75
76     public function leapBuilding()
77     {
78         return "Batman terpenjal menabrak bangunan pencakar langit";
79     }
80
81     public function stopBullet()
82     {
83         return "Polisi menembaki $this->name namun ditangkis";
84     }
85 }
86
87 $burung = new Animal('Burung');
88 $manusia = new Homosapiens('Aransha');
89 $airplane2 = new Airplane2(25000, 'Batik Air');
90 $superman2 = new Superman2('Superman');

```

## [Interface]

```

1  <!-- Sayyidina Auliya_21091397034 -->
2
3  <?php
4
5  interface Flyer {
6      public function takeOff();
7      public function land();
8      public function fly();
9  }
10
11 interface Sailer {
12     public function dock();
13     public function cruise();
14 }

```



## [Abstrak]

```
1 <!-- Sayyidina Auliya_21091397034 -->
2
3 <?php
4
5 abstract class Vehicle {
6     private $load = 0;
7     protected $maxLoad = 0, $name;
8
9     protected function __construct($maxLoad, $name) {
10         $this->$maxLoad = $maxLoad;
11         $this->$name = $name;
12     }
13
14     public function getLoad() {
15         return $this->load;
16     }
17
18     public function getMaxLoad() {
19         echo 'Maksimal muatan ' . $this->name . ' ' ;
20         return $this->maxLoad;
21     }
22
23     public function addBox($weight) {
24         if ($this->load >= $this->maxLoad) {
25             echo "$this->name menambah muatan sebesar $weight <br>";
26             echo 'Muatan telah penuh tidak bisa menambah lagi';
27         }else {
28             $this->load += $weight;
29             echo "$this->name menambah muatan sebesar $weight";
30         }
31     }
32
33     abstract public function calcFuelNeeds();
34
35     protected function calcFuelEfficiency() {
36         $range = 90000000;
37         $range /= $this->load;
38         return $range;
39     }
40
41     protected function calcTripDistance() {
42         return 900;
43     }
44 }
```

## [Index]

```
1 <!-- Sayyidina Auliya_21091397034 -->
2
3 <?php
4     require_once 'no 3 prak6.php';
5 ?>
6
7 <!DOCTYPE html>
8 <html lang="id">
9
10 <head>
11     <!-- Bootstrap CSS -->
12     <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.1.3/dist/css/bootstrap.min.css" rel="stylesheet"
13         integrity="sha384-1BmE4kWBq78iYhFdvKuhfTAU6auU8tT94WrHftjDbrCEXSU1oBoqyl2QvZ6jIW3" crossorigin="anonymous">
14
15     <title>Praktikum 6</title>
16 </head>
17 <body>
18     <div class="container">
19         <div class="row">
20             <div class="col-5 mx-auto border p-3 mt-2">
21                 <h4 class="text-center"><strong><u>Soal 3</u></strong></h4>
22                 <br><br>
23                 <?= $burung->eat(); ?> <br>
24                 <?= $manusia->eat(); ?> <br>
25                 <br>
26
27                 <b><?= $airplane2->getMaxLoad() . ' kg'; ?> <br></b>
28                 <?= $airplane2->addBox(2000) . ' kg'; ?> <br>
29                 <?= $airplane2->addBox(4000) . ' kg'; ?> <br>
30                 <?= $airplane2->addBox(7000) . ' kg'; ?> <br>
31                 <?= $airplane2->addBox(9000) . ' kg'; ?> <br>
32                 <?= $airplane2->takeOff(); ?> <br>
33                 <?= $airplane2->fly(); ?> <br>
34                 <?= $airplane2->land(); ?> <br>
35
36                 <?php
37                     echo "Jadi, Butuh Bahan Bakar sebanyak " . $airplane2->calcFuelNeeds() . ' Liter'. '<br>';
38                 ?>
39                 <br>
40                 <?= $superman2->eat(); ?> <br>
41                 <?= $superman2->land(); ?> <br>
42                 <?= $superman2->takeOff(); ?> <br>
43                 <?= $superman2->fly(); ?> <br>
44                 <?= $superman2->leapBuilding(); ?> <br>
45                 <?= $superman2->stopBullet(); ?> <br>
46             </div>
47         </div>
48     </div>
49 </body>
50
51 </html>
```

### Analisis :

Analisa pada interface flyer dan abstract class vehicle merupakan class airplane, implementasi dari interface flyer dan turunan dari vehicle. Sehingga kelas airplane harus mempunyai method calc fuel needs, take off, land, dan fly juga.

Class implementasi dimana terdapat flyer dan turunan dari animal, sehingga mempunyai method take off, land, fly, dan eat. Dan class superman turunan dari homosapiens yang juga mempunyai dari animal, serta dimana implementasi dari interface flyer. Maka, class superman mempunyai method eat, take off, land, dan fly.

## 4. Source Code dan Analisis 4

[PHP]

```
1 <!-- Nama : Sayyidina Auliya
2 NIM : 21091397034
3 Kelas : 2021 B-->
4
5 <?php
6
7 require_once 'No4 Abstract Prak6.php';
8 require_once 'No4 interface prak6.php';
9
10 class RiverBarge2 extends Vehicle implements Sailer {
11     public function __construct($maxLoad, $name) {
12         $this->maxLoad = $maxLoad;
13         $this->name = $name;
14     }
15
16     public function calcFuelNeeds() {
17         $fuel = $this->calcFuelEfficiency();
18         $trip = $this->calcTripDistance();
19
20         return ceil($fuel /= $trip);
21     }
22
23     public function dock() {
24         return $this->name . ' berada di dermaga';
25     }
26
27     public function cruise() {
28         return $this->name . ' sedang berlayar';
29     }
30 }
31
32 class Airplane2 implements Flyer {
33     public function takeOff() {
34
35         return 'Pesawat lepas landas';
36     }
37     public function land() {
38         return 'Pesawat mendarat';
39     }
40     public function fly() {
41         return 'Pesawat dalam perjalanan';
42     }
43 }
44 class SeaPlane extends Vehicle implements Sailer {
45     public function __construct($maxLoad, $name) {
46         $this->maxLoad = $maxLoad;
47         $this->name = $name;
48     }
49
50     public function calcFuelNeeds() {
51         $fuel = $this->calcFuelEfficiency();
52         $trip = $this->calcTripDistance();
53
54         return ceil($fuel /= $trip);
55     }
56
57     public function dock() {
58         return $this->name . ' berada di dermaga';
59     }
60
61     public function cruise() {
62         return $this->name . ' sedang berlayar';
63     }
64
65     public function takeOff() {
66         return $this->name . ' lepas landas';
67     }
68 }
```

```

68
69     public function land() {
70         return $this->name . ' mendarat';
71     }
72
73     public function fly() {
74         return $this->name . ' dalam perjalanan';
75     }
76 }
77
78 class Helicopter extends Vehicle {
79     public function __construct($maxLoad, $name) {
80         $this->maxLoad = $maxLoad;
81         $this->name = $name;
82     }
83
84     public function calcFuelNeeds() {
85         $fuel = $this->calcFuelEfficiency();
86         $trip = $this->calcTripDistance();
87
88         return ceil($fuel / $trip);
89     }
90     public function takeOff() {
91         return $this->name . ' lepas landas';
92     }
93
94     public function land() {
95         return $this->name . ' mendarat';
96     }
97
98     public function fly() {
99         return $this->name . ' dalam perjalanan';
100     }
101 }
102
103 $riverBarge2 = new RiverBarge2(80000, 'Atomic');
104 $seaPlane = new SeaPlane(40000, 'Titanic');
105 $helicopter = new Helicopter(30000, 'Brocklyn');

```

## [Interface]

```

1 <!-- Nama : Sayyidina Auliya
2 NIM : 21091397034
3 Kelas : 2021 b-->
4
5 <?php
6
7 interface Flyer {
8     public function takeOff();
9     public function land();
10    public function fly();
11 }
12
13 interface Sailer {
14     public function dock();
15     public function cruise();
16 }

```

## [Abstrak]

```
1  <!-- Nama      : Sayyidina Auliya
2      NIM       : 21091397034
3      Kelas    : 2021 B-->
4
5  <?php
6
7  abstract class Vehicle {
8      private $load = 0;
9      protected $maxLoad = 0, $name;
10
11      protected function __construct($maxLoad, $name) {
12          $this->$maxLoad = $maxLoad;
13          $this->$name = $name;
14      }
15
16      public function getLoad() {
17          return $this->load;
18      }
19
20      public function getMaxLoad() {
21          echo 'Maksimal muatan ' . $this->name . ' ' ;
22          return $this->maxLoad;
23      }
24
25      public function addBox($weight) {
26          if ($this->load >= $this->maxLoad) {
27              echo "$this->name menambah muatan sebesar $weight <br>";
28              echo 'Muatan telah penuh tidak bisa menambah lagi';
29          } else {
30              $this->load += $weight;
31              echo "$this->name menambah muatan sebesar $weight";
32          }
33      }
34
35      abstract public function calcFuelNeeds();
36
37      protected function calcFuelEfficiency() {
38          $range = 900000000;
39          $range /= $this->load;
40          return $range;
41      }
42
43      protected function calcTripDistance() {
44          return 900;
45      }
46  }
```

## [Index]

```
1 <!-- Nama : Sayyidina Auliya
2 NIM : 21091397034
3 Kelas : 2021 B-->
4
5 <?php
6 require_once 'No4 prak6.php';
7 ?>
8
9 <!DOCTYPE html>
10 <html lang="en">
11
12 <head>
13 <!-- Bootstrap CSS -->
14 <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.1.3/dist/css/bootstrap.min.css" rel="stylesheet"
15 integrity="sha384-1BmE4kWBq78iYhF1dvKuhfTAU6auU8tT94WrHftjDbrCEXSU1oBoqyl2QvZ6jIW3" crossorigin="anonymous">
16
17 <title>PB0 - Praktikum 6</title>
18 </head>
19 <body>
20 <h2 class="text-center">PB0 - Praktikum 6</h2>
21 <div class="container">
22 <div class="row">
23 <h4 class="text-center"><strong>Soal 4</strong></h4>
24 <br><br>
25 <div class="col-4 mx-auto border p-2 mt-2">
26 <b><?= $riverBarge2->getMaxLoad() . ' kg'; ?> <br></b>
27 <?= $riverBarge2->addBox(13000) . ' kg'; ?> <br>
28 <?= $riverBarge2->addBox(15000) . ' kg'; ?> <br>
29 <?= $riverBarge2->addBox(4000) . ' kg'; ?> <br>
30 <?= $riverBarge2->addBox(8000) . ' kg'; ?> <br>
31 <?= $riverBarge2->dock(); ?> <br>
32 <?= $riverBarge2->cruise(); ?> <br>
33 <?php
34 echo "Jadi, Butuh Bahan Bakar sebanyak " . $riverBarge2->calcFuelNeeds() . ' Liter'. '<br>';
35 ?>
36 </div>
37 <div class="col-4 mx-auto border p-2 mt-2">
38 <b><?= $seaPlane->getMaxLoad() . ' kg'; ?> <br></b>
39 <?= $seaPlane->addBox(13000) . ' kg'; ?> <br>
40 <?= $seaPlane->addBox(8000) . ' kg'; ?> <br>
41 <?= $seaPlane->dock(); ?> <br>
42 <?= $seaPlane->cruise(); ?> <br>
43 <?= $seaPlane->takeOff(); ?> <br>
44 <?= $seaPlane->fly(); ?> <br>
45 <?= $seaPlane->land(); ?> <br>
46 <?php
47 echo "Jadi, Butuh Bahan Bakar sebanyak " . $seaPlane->calcFuelNeeds() . ' Liter'. '<br>';
48 ?>
49 </div>
50 <div class="col mx-auto border p-2 mt-2">
51 <b><?= $helicopter->getMaxLoad() . ' kg'; ?> <br></b>
52 <?= $helicopter->addBox(5000) . ' kg'; ?> <br>
53 <?= $helicopter->addBox(1000) . ' kg'; ?> <br>
54 <?= $helicopter->takeOff(); ?> <br>
55 <?= $helicopter->fly(); ?> <br>
56 <?= $helicopter->land(); ?> <br>
57 <?php
58 echo "Jadi, Butuh Bahan Bakar sebanyak " . $helicopter->calcFuelNeeds() . ' Liter'. '<br>';
59 ?>
60 </div>
61 </div>
62 </div>
63 </body>
64
65 </html>
```

## Analisis :

Analisa implementasi pada polymorphism menggunakan interface dan abstract class, ditunjukkan pada class seaplane dengan implementasi interface sailer. Turunan class airplane yang implementasinya flyer dan child dari sebuah vehicle, sehingga class seaplane mempunyai method dock, cruise, take off, land, fly, dan calcfueneeds.