

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



Disusun Oleh :

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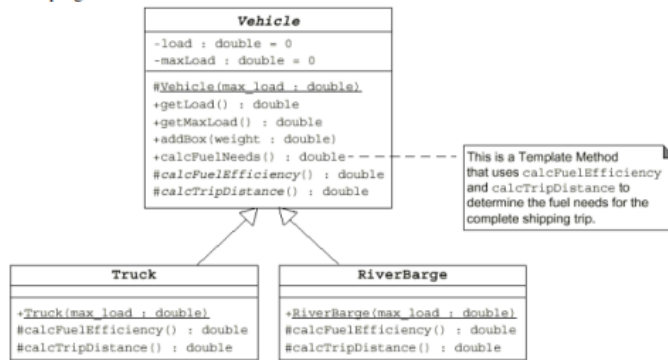
**PROGRAM STUDI D4 MANAJEMEN INFORMATIKA**

**FAKULTAS VOKASI**

**UNIVERSITAS NEGERI SURABAYA**

**2022**

1. Buat program berdasarkan UML berikut



1.

## Source Code

### ❖ PHP

```

Prak6 no1.php > ...
1  <!-- Ahmed NUR Sidik 21091397038 2021B-->
2
3  <?php
4
5  require_once 'Prak6 no1 abstrak.php';
6
7  class Truck extends Vehicle {
8      public function __construct($maxLoad, $name)
9      {
10         $this->maxLoad = $maxLoad;
11         $this->name = $name;
12     }
13
14     public function calcFuelNeeds()
15     {
16         $fuel = $this->calcFuelEfficiency();
17         $trip = $this->calcTripDistance();
18
19         return ceil($fuel / $trip);
20     }
21 }

```

```

20     }
21 }
22
23 class RiverBarge extends Vehicle {
24     public function __construct($maxLoad, $name)
25     {
26         $this->maxLoad = $maxLoad;
27         $this->name = $name;
28     }
29
30     public function calcFuelNeeds()
31     {
32         $fuel = $this->calcFuelEfficiency();
33         $trip = $this->calcTripDistance();
34
35         return ceil($fuel / $trip);
36     }
37 }
38 $truck = new Truck(16000, 'Truk');
39 $riverBarge = new RiverBarge(15000, 'Perahu');

```

### ❖ Abstrak PHP

```

Prak6 no1 abstrak.php > PHP Intelephense > Vehicle > getL
1  <!-- Ahmed NUR Sidik 21091397038 2021B-->
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 = 50000000;
37         $range /= $this->load;
38         return $range;
39     }
40
41     protected function calcTripDistance() {
42         return 500;
43     }
44 }

```

### ❖ Index PHP

```

Prak6 no1 index.php > html > head
1 <!-- Ahmed Nur Sidik 21091397038 20218-->
2
3 <?php
4     require_once 'Prak6 no1.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="sha384-1BmE4Kk8Bq781YhF1dvKuhfTAU6auU8tT94MrHfTjDbrCEXSU1oBoqy12QvZ6jIW3" crossorigin="anonymous">
14
15     <title>PBO Praktikum 6</title>
16 </head>
17
18 <body>
19     <div class="container">
20         <br>
21         <h2 class="text-center">Tugas PBO Praktikum 6</h2>
22         <div class="row">
23             <div class="col-5 mx-auto border p-3 mt-2">
24                 <h4 class="text-center"><strong>No 1</strong></h4>
25                 <br><br>
26                 <b><?=> $truck->getMaxLoad() . ' kg'; ?> <br></b>
27
28                 <?=> $truck->addBox(1000) . ' kg'; ?> <br>
29                 <?=> $truck->addBox(7000) . ' kg'; ?> <br>
30                 <?=> $truck->addBox(8000) . ' kg'; ?> <br>
31
32                 <?php
33                     echo "Jadi, membutuhkan bahan bakar sebanyak " . $truck->calcFuelNeeds() . ' Liter'. '<br>';
34                 ?>
35                 <br>
36                 -----
37                 <br>
38                 <b><?=> $riverBarge->getMaxLoad() . ' kg'; ?> <br></b>
39
40                 <?=> $riverBarge->addBox(2000) . ' kg'; ?> <br>
41                 <?=> $riverBarge->addBox(4000) . ' kg'; ?> <br>
42                 <?=> $riverBarge->addBox(9000) . ' kg'; ?> <br>
43
44                 <?php
45                     echo "Jadi, membutuhkan bahan bakar sebanyak " . $riverBarge->calcFuelNeeds() . ' Liter';
46                 ?>
47             </div>
48         </div>
49     </div>
50 </body>
51 </html>

```

## ❖ Output

### Tugas PBO Praktikum 6

#### No 1

##### Maksimal muatan Truk 16000 kg

Truk , menambah muatan sebesar 1000 kg  
 Truk , menambah muatan sebesar 7000 kg  
 Truk , menambah muatan sebesar 8000 kg  
 Jadi, membutuhkan bahan bakar sebanyak 7 Liter

##### Maksimal muatan Perahu 15000 kg

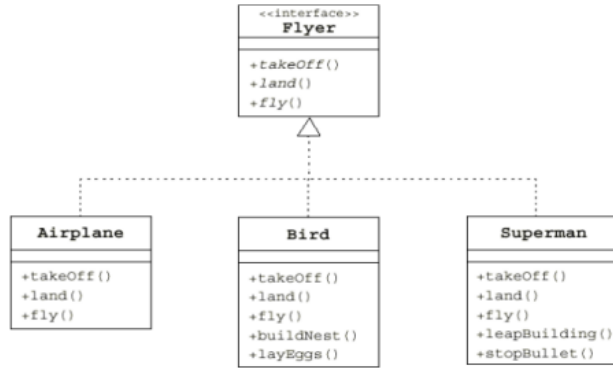
Perahu , menambah muatan sebesar 2000 kg  
 Perahu , menambah muatan sebesar 4000 kg  
 Perahu , menambah muatan sebesar 9000 kg  
 Jadi, membutuhkan bahan bakar sebanyak 7 Liter

## ❖ Analisa

Implementasi dari class abstrak pada class Vehicle, method calcFuelNeeds digunakan untuk menghitung berapa bahan bakar yang digunakan. Abstrak method di letakkan pada class Vehicle sebagai parent class dan diakses oleh child classnya yaitu class Truk, dan class RiverBarge yang akan mengembalikan nilai yang dihasilkan dari pembagian 2 method yaitu calcFuelEfficiency dan calcTripDistance.

2.

2. Buat program berdasarkan UML berikut



## Source Code

### ❖ PHP

```
Prak6 no2.php > ...
1  <!-- Ahmed NUR Sidik 21091397038 20218-->
2
3  <?php
4
5  require_once 'Prak6 no2 interface.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 terpenjal 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 PHP

```
Prak6 no2 interface.php > PHP Intelphense > Sailer
1 <!-- Ahmed NUr Sidik 21091397038 2021B-->
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 PHP

```
Prak6 no2 index.php > html > head > title
1 <!-- Ahmed NUr Sidik 21091397038 2021B-->
2
3 <?php
4     require_once 'Prak6 no2.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="sha384-18mE4kWh8q78iYhF1dvKuhfTAU6auU8tT94WrHftjDbrCEXSU1oBoqy12Qv26jIW3" crossorigin="anonymous">
14
15     <title>Tugas PBO 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>No 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>
```

## ❖ Output

### No 2

#### Superman

Superman melawan Batman  
Superman mengejar Batman  
Superman melancarkan pukulan  
Batman terpelantak menabrak bangunan pencakar langit  
Polisi menembaki superman namun ditangkis

#### Bird

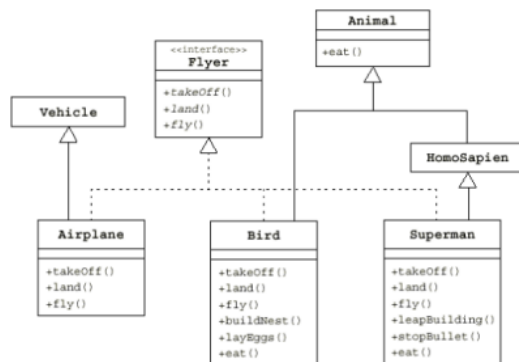
Burung membuat sarang  
Burung mencari makan  
Burung terbang  
Burung kembali pulang  
Burung bertelur

#### Airplane

Pesawat lepas landas..  
Pesawat dalam perjalanan  
Pesawat mendarat

## 3.

3. Buat program berdasarkan UML berikut



## Source Code

## ❖ Interface PHP

```
Prak6 no3 interface.php > ...
1 <!-- Ahmed NUR Sidik 21091397038 2021B -->
2 <?php
3
4 interface Flyer {
5     public function takeOff();
6     public function land();
7     public function fly();
8 }
9
10 interface Sailer {
11     public function dock();
12     public function cruise();
13 }
```

## ❖ PHP

```
Prak6 no3.php > ...
1  <!-- Ahmed NUR Sidik 21091397038 2021B-->
2
3  <?php
4
5  require_once 'Prak6 no3 abstrak.php';
6  require_once 'Prak6 no3 interface.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         $strip = $this->calcTripDistance();
52
53
54         return ceil($fuel /= $strip);
55     }
56 }
57
58
59 class Superman2 extends Homosapiens implements Flyer
60 {
61     public function takeOff()
62     {
63         return "$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 terpengal 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');
```

## ❖ Abstract PHP

```

Prak6 no3 abstrak.php > ...
1 <!-- Ahmed NUR Sidik 21091397038 2021B-->
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 $this->maxLoad;
21     }
22
23
24     public function addBox($weight) {
25         if ($this->load >= $this->maxLoad) {
26             echo "$this->name menambah muatan sebesar $weight <br>";
27             echo 'Muatan telah penuh tidak bisa menambah lagi';
28         }else {
29             $this->load += $weight;
30             echo "$this->name menambah muatan sebesar $weight";
31         }
32     }
33
34     abstract public function calcFuelNeeds();
35
36     protected function calcFuelEfficiency() {
37         $range = 50000000;
38         $range /= $this->load;
39         return $range;
40     }
41
42     protected function calcTripDistance() {
43         return 500;
44     }
45 }

```

## ❖ Index PHP

```

Prak6 no3 index.php > ...
1 <!-- Ahmed NUR Sidik 21091397038 2021B-->
2
3 <?php
4     require_once 'Prak6 no3.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="sha384-1BmE4kWBq78iYhF1dvKuhfTAU6auU8tT94WrHftjDbrCEXSU1oBoqy12QvZ6jIW3" crossorigin="anonymous">
14
15     <title>Tugas PBO 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>No 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(6000) . ' kg'; ?> <br>
29                 <?= $airplane2->addBox(2000) . ' kg'; ?> <br>
30                 <?= $airplane2->addBox(7000) . ' kg'; ?> <br>
31                 <?= $airplane2->addBox(5000) . ' 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>

```

## ❖ Output



### No 3

Burung sedang makan  
Aransha sedang makan

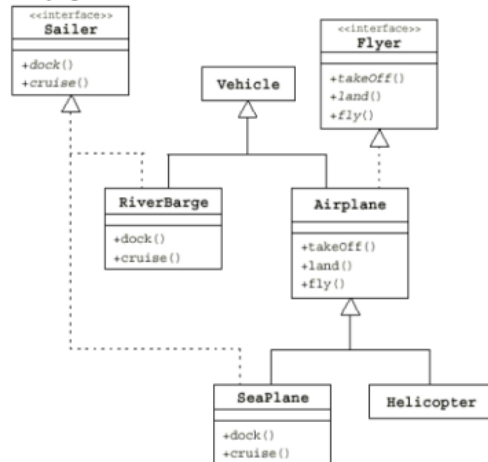
#### Maksimal muatan Batik Air 25000 kg

Batik Air menambah muatan sebesar 6000 kg  
Batik Air menambah muatan sebesar 2000 kg  
Batik Air menambah muatan sebesar 7000 kg  
Batik Air menambah muatan sebesar 5000 kg  
Batik Air lepas landas  
Batik Air dalam perjalanan  
Batik Air mendarat  
Jadi, Butuh Bahan Bakar sebanyak 5 Liter

Superman sedang makan  
Superman melawan Batman  
Superman mengejar Batman  
Superman melancarkan pukulan  
Batman terpental menabrak bangunan pencakar langit  
Polisi menembaki Superman namun ditangkis

4.

4. Buat program berdasarkan UML berikut



## Source Code

### ❖ Interface PHP

```
Prak6 no4 interface.php > ...
1  <!-- - Ahmed - NUR - Sidik - 21091397038 - 2021B - -->
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 }
```

### ❖ PHP

```

Prak6 no4.php > PHP IntelliSense > RiverBarge2 > dock
1 <!-- Ahmed NUR Sidik 21091397038 2021B-->
2
3 <?php
4
5 require_once 'Prak6 no4 abstrak.php';
6 require_once 'Prak6 no4 interface.php';
7
8 class RiverBarge2 extends Vehicle implements Sailer {
9     public function __construct($maxLoad, $name) {
10         $this->maxLoad = $maxLoad;
11         $this->name = $name;
12     }
13
14     public function calcFuelNeeds() {
15         $fuel = $this->calcFuelEfficiency();
16         $strip = $this->calcTripDistance();
17
18         return ceil($fuel /= $strip);
19     }
20
21     public function dock() {
22         return $this->name . ' berada di dermaga';
23     }
24
25     public function cruise() {
26         return $this->name . ' sedang berlayar';
27     }
28 }
29
30 class Airplane2 implements Flyer {
31     public function takeOff() {
32         return 'Pesawat lepas landas';
33     }
34     public function land() {
35         return 'Pesawat mendarat';
36     }
37     public function fly() {
38         return 'Pesawat dalam perjalanan';

```

```

39     }
40 }
41
42 class SeaPlane extends Vehicle implements Sailer {
43     public function __construct($maxLoad, $name) {
44         $this->maxLoad = $maxLoad;
45         $this->name = $name;
46     }
47
48     public function calcFuelNeeds() {
49         $fuel = $this->calcFuelEfficiency();
50         $strip = $this->calcTripDistance();
51
52         return ceil($fuel /= $strip);
53     }
54
55     public function dock() {
56         return $this->name . ' berada di dermaga';
57     }
58
59     public function cruise() {
60         return $this->name . ' sedang berlayar';
61     }
62
63     public function takeOff() {
64         return $this->name . ' lepas landas';
65     }
66
67     public function land() {
68         return $this->name . ' mendarat';
69     }
70
71     public function fly() {
72         return $this->name . ' dalam perjalanan';
73     }
74 }
75
76 class Helicopter extends Vehicle {

```

```

77     public function __construct($maxLoad, $name) {
78         $this->maxLoad = $maxLoad;
79         $this->name = $name;
80     }
81
82     public function calcFuelNeeds() {
83         $fuel = $this->calcFuelEfficiency();
84         $strip = $this->calcTripDistance();
85
86         return ceil($fuel /= $strip);
87     }
88     public function takeOff() {
89         return $this->name . ' lepas landas';
90     }
91
92     public function land() {
93         return $this->name . ' mendarat';
94     }
95
96     public function fly() {
97         return $this->name . ' dalam perjalanan';
98     }
99 }
100
101 $riverBarge2 = new RiverBarge2(30000, 'Atomic');
102 $seaPlane = new SeaPlane(20000, 'Titanic');
103 $helicopter = new Helicopter(10000, 'Brocklyn');

```

## ❖ Abstract PHP

❖ **Index PHP**

```

1 <!-- Ahmed Nur Sidik 21091397038 2021B-->
2
3 <?php
4     require_once 'Prak6 no4.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="sha384-1BmE4KBQ78IHf1dvKuhFTAU6auU8tT94wRHftjDbrCEXSUI0Boqy12QvZ6j1W3" crossorigin="anonymous">
14
15     <title>Tugas PBO Praktikum 6</title>
16 </head>
17 <body>
18     <h2 class="text-center">Tugas PBO Praktikum 6</h2>
19     <div class="container">
20         <div class="row">
21             <h4 class="text-center"><strong>No 4</strong></h4>
22             <br>
23             <div class="col-4 mx-auto border p-2 mt-2">
24                 <b><?= $riverBarge2->getMaxLoad() . ' kg'; ?> <br></b>
25                 <?= $riverBarge2->addBox(12000) . ' kg'; ?> <br>
26                 <?= $riverBarge2->addBox(14000) . ' kg'; ?> <br>
27                 <?= $riverBarge2->addBox(1000) . ' kg'; ?> <br>
28                 <?= $riverBarge2->addBox(3000) . ' kg'; ?> <br>
29                 <?= $riverBarge2->dock(); ?> <br>
30                 <?= $riverBarge2->cruise(); ?> <br>
31                 <br>
32                 <br>
33                 <br>
34                 <br>
35                 <br>
36                 <br>
37                 <br>
38                 <br>
39                 <br>
40                 <br>
41                 <br>
42                 <br>
43                 <br>
44                 <br>
45                 <br>
46                 <br>
47                 <br>
48                 <br>
49                 <br>
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## ❖ Output

### Tugas PBO Praktikum 6

#### No 4

<b>Maksimal muatan Atomic 30000 kg</b> Atomic menambah muatan sebesar 12000 kg Atomic menambah muatan sebesar 14000 kg Atomic menambah muatan sebesar 1000 kg Atomic menambah muatan sebesar 3000 kg Atomic berada di dermaga Atomic sedang berlayar Jadi, Butuh Bahan Bakar sebanyak 4 Liter	<b>Maksimal muatan Titanic 20000 kg</b> Titanic menambah muatan sebesar 12000 kg Titanic menambah muatan sebesar 8000 kg Titanic berada di dermaga Titanic sedang berlayar Titanic lepas landas Titanic dalam perjalanan Titanic mendarat Jadi, Butuh Bahan Bakar sebanyak 5 Liter	<b>Maksimal muatan Brocklyn 10000 kg</b> Brocklyn menambah muatan sebesar 8000 kg Brocklyn menambah muatan sebesar 2000 kg Brocklyn lepas landas Brocklyn dalam perjalanan Brocklyn mendarat Jadi, Butuh Bahan Bakar sebanyak 10 Liter
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## ❖ Analisa

Implementasi polymorphism dengan interface dan abstrak class ditunjukkan pada class SeaPlane yang implements interface Sailer, turunan dari class Airplane yang implements Flyer dan child dari Vehicle sehingga class SeaPlane memiliki method dock, cruise, takeoff, land, fly, dan calcFuelNeeds