

LAPORAN PRAKTIKUM 6

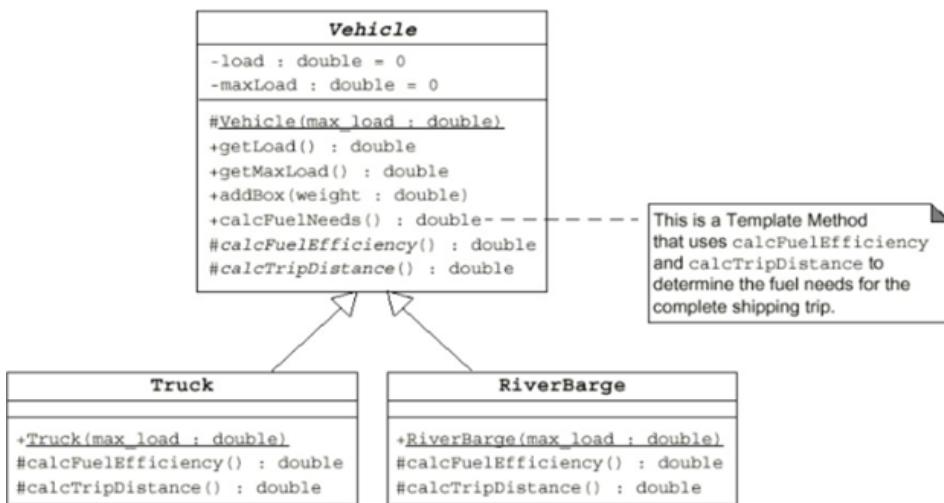
**Mata Kuliah Pemrograman Berorientasi
Obyek**



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PROGRAM STUDI D4
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1. Buat program berdasarkan UML berikut



Source code PHP

The screenshot shows the Visual Studio Code interface with the file `No1.php` open. The code implements the Vehicle, Truck, and RiverBarge classes. It includes a template method `calcFuelNeeds()` in the base class `Vehicle` that calls `calcFuelEfficiency()` and `calcTripDistance()`. The `Truck` and `RiverBarge` classes inherit from `Vehicle` and provide their own implementations for `calcFuelEfficiency()` and `calcTripDistance()`.

```
<?php
require_once '../No1/No1abstract.php';

class Truck extends Vehicle {
    public function __construct($maxLoad, $name)
    {
        $this->maxLoad = $maxLoad;
        $this->name = $name;
    }

    public function calcFuelNeeds()
    {
        $fuel = $this->calcFuelEfficiency();
        $trip = $this->calcTripDistance();

        return ceil($fuel / $trip);
    }
}

class RiverBarge extends Vehicle {
    public function __construct($maxLoad, $name)
    {
        $this->maxLoad = $maxLoad;
        $this->name = $name;
    }

    public function calcFuelNeeds()
    {
        $fuel = $this->calcFuelEfficiency();
        $trip = $this->calcTripDistance();
```

No1.php - Visual Studio Code

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More

```
C:\xampp\htdocs>No1> No1.php
13     {
14         $fuel = $this->calcFuelEfficiency();
15         $trip = $this->calcTripDistance();
16
17         return ceil($fuel /=$trip);
18     }
19 }
20
21 class RiverBarge extends Vehicle {
22     public function __construct($maxLoad, $name)
23     {
24         $this->maxLoad = $maxLoad;
25         $this->name = $name;
26     }
27
28     public function calcFuelNeeds()
29     {
30         $fuel = $this->calcFuelEfficiency();
31         $trip = $this->calcTripDistance();
32
33         return ceil($fuel /=$trip);
34     }
35 }
36 $truck = new Truck(20000, 'Truk');
37 $riverBarge = new RiverBarge(12000, 'Perahu');
```

Tab Moves Focus In 37, Col 47 Spaces: 4 UTF-8 CRLF PHP ⚙️

No1abstract.php - Visual Studio Code

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```
C:\xampp\htdocs>No1> No1abstract.php
1 <?php
2
3 abstract class Vehicle {
4     private $load = 0;
5     protected $maxLoad = 0, $name;
6
7     protected function __construct($maxLoad, $name) {
8         $this->$maxLoad = $maxLoad;
9         $this->$name = $name;
10    }
11
12    public function getLoad() {
13        return $this->load;
14    }
15
16    public function getMaxLoad() {
17        echo 'Maksimal muatan ' . $this->name . ' ';
18        return $this->maxLoad;
19    }
20
21    public function addBox($weight) {
22        if ($this->load >= $this->maxLoad) {
23            echo "$this->name menambah muatan sebesar $weight <br>";
24            echo 'Muatan telah penuh tidak bisa menambah lagi';
25        }else {
26            $this->load += $weight;
27            echo "$this->name menambah muatan sebesar $weight";
28        }
29    }
30
31    abstract public function calcFuelNeeds();
```

Tab Moves Focus In 42, Col 2 Spaces: 4 UTF-8 CRLF PHP ⚙️

No1abstract.php - Visual Studio Code

File Edit Selection View Go Run Terminal Help

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More

```
C:\xampp\htdocs\No1> No1abstract.php
```

```
16     public function getMaxLoad() {
17         echo 'Maksimal muatan ' . $this->name . ' ';
18         return $this->maxLoad;
19     }
20
21     public function addBox($weight) {
22         if ($this->load >= $this->maxLoad) {
23             echo "$this->name menambah muatan sebesar $weight <br>";
24             echo 'Muatan telah penuh tidak bisa menambah lagi';
25         }else {
26             $this->load += $weight;
27             echo "$this->name menambah muatan sebesar $weight";
28         }
29     }
30
31     abstract public function calcFuelNeeds();
32
33     protected function calcFuelEfficiency() {
34         $range = 50000000;
35         $range /= $this->load;
36         return $range;
37     }
38
39     protected function calcTripDistance() {
40         return 500;
41     }
42 }
```

Tab Moves Focus In 42, Col 2 Spaces: 4 UTF-8 CRLF PHP ⚡

No1index.php - Visual Studio Code

File Edit Selection View Go Run Terminal Help

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More

```
C:\xampp\htdocs\No1> No1index.php
```

```
1 <?php
2 |     require_once 'No1.php';
3 ?>
4
5 <!DOCTYPE html>
6 <html lang="id">
7
8     <head>
9         <!-- Bootstrap CSS -->
10        <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.1.3/dist/css/bootstrap.min.css" rel="stylesheet"
11             integrity="sha384-18mE4kWBq78iYhFdVfTAU6auU8tT94WrHftjDbrCEXSU1oBoqyl2QvZ6jIW3" crossorigin="anonymous">
12
13     <title>Modul Praktikum 6</title>
14 </head>
15
16 <body>
17     <div class="container">
18         <br>
19         <h2 class="text-center">Modul Praktikum 6</h2>
20         <div class="row">
21             <div class="col-5 mx-auto border p-3 mt-2">
22                 <h4 class="text-center"><strong>Soal NO 1</strong></h4>
23                 <br><br>
24                 <b><?= $truck->getMaxLoad() . ' kg'; ?> <br></b>
25                 <br>
26                 <?= $truck->addBox(2000) . ' kg'; ?> <br>
27                 <?= $truck->addBox(3000) . ' kg'; ?> <br>
28                 <?= $truck->addBox(4000) . ' kg'; ?> <br>
29
30                 <?php
31                     echo "Jadi. Butuh Bahan Bakar sebanyak " . $truck->calcFuelNeeds() . ' Liter'. '<br>';
32             </div>
33         </div>
34     </div>
35 
```

Tab Moves Focus In 51, Col 8 Spaces: 4 UTF-8 CRLF PHP ⚡

```
C:\>xampp>htdocs>No1> No1index.php
27     <?= $truck->addBox(3000) . ' kg'; ?> <br>
28     <?= $truck->addBox(4000) . ' kg'; ?> <br>
29
30         <?php
31             echo "Jadi, Butuh Bahan Bakar sebanyak " . $truck->calcFuelNeeds() . ' Liter'. <br>;
32         ?>
33         <br>
34     -----
35     <br>
36     <br>
37     <b><?= $riverBarge->getMaxLoad() . ' kg'; ?> <br></b>
38     <br>
39     <?= $riverBarge->addBox(3000) . ' kg'; ?> <br>
40     <?= $riverBarge->addBox(2000) . ' kg'; ?> <br>
41     <?= $riverBarge->addBox(1000) . ' kg'; ?> <br>
42
43         <?php
44             echo "Jadi, Butuh Bahan Bakar sebanyak " . $riverBarge->calcFuelNeeds() . ' Liter';
45         ?>
46     </div>
47     </div>
48 </body>
49
50 </html>
```

OUTPUT

Modul Praktikum 6

Soal NO 1

Maksimal muatan Truk 20000 kg

Truk menambah muatan sebesar 2000 kg
Truk menambah muatan sebesar 3000 kg
Truk menambah muatan sebesar 4000 kg
Jadi, Butuh Bahan Bakar sebanyak 12 Liter

Maksimal muatan Perahu 12000 kg

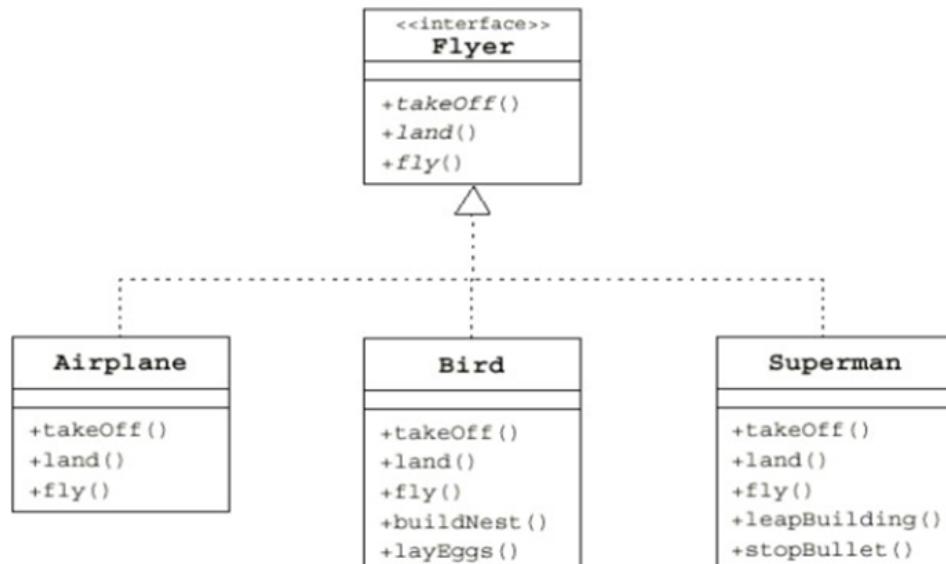
Perahu menambah muatan sebesar 3000 kg
Perahu menambah muatan sebesar 2000 kg
Perahu menambah muatan sebesar 1000 kg
Jadi, Butuh Bahan Bakar sebanyak 17 Liter

ANALISA

Implementasi dari abstract class pada class Vehicle, method calcFuelNeeds digunakan untuk menghitung bahan bakar yang digunakan. Abstract 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. Buat program berdasarkan UML berikut



Source code PHP

```
No2.php - Visual Studio Code
File Edit Selection View Go Run Terminal Help
No2.php - Visual Studio Code
Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More
No2.php x No2index.php No2interface.php
C: > xampp >htdocs > No2 > No2.php
1 <?php
2
3 require_once '../No2/No2interface.php';
4
5 class Airplane implements Flyer {
6     public function takeOff() {
7         return 'Helicopter lepas landas';
8     }
9
10    public function land() {
11        return 'Helicopter mendarat';
12    }
13
14    public function fly() {
15        return 'Helicopter dalam perjalanan';
16    }
17 }
18
19 class Bird implements Flyer {
20     public function takeOff() {
21         return 'Elang mencari makan';
22     }
23
24     public function land() {
25         return 'Elang kembali pulang';
26     }
27
28     public function fly() {
29         return 'Elang terbang';
30     }
31 }
```

The screenshot shows the Visual Studio Code interface with the file **No2.php** open. The code implements the **Flyer** interface for two classes: **Airplane** and **Bird**. The **Airplane** class has methods for takeOff, land, and fly. The **Bird** class also has methods for takeOff, land, and fly, along with additional methods for buildNest and layEggs. The code is written in PHP, using short tags (`<?php`) and implementing the interface with the `implements` keyword.

The screenshot shows a Visual Studio Code interface with the following details:

- File Bar:** File, Edit, Selection, View, Go, Run, Terminal, Help.
- Title Bar:** No2.php - Visual Studio Code.
- Status Bar:** Tab Moves Focus, Ln 46, Col 29, Spaces: 4, UTF-8, CRLF, PHP.
- Header:** Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage, Learn More.
- Left Sidebar:** Shows file navigation: No2.php, No2index.php, and No2interface.php. It also includes icons for file operations like Open, Save, Find, and Settings.
- Right Sidebar:** Shows a tree view of the project structure, including No2, No2index.php, and No2interface.php.
- Code Editor:** The main area contains the following PHP code:

```
41 class Superman implements Flyer {
42     public function takeOff() {
43         return 'superman mengejar batman';
44     }
45
46     public function land() {
47         return 'superman melawan batman';
48     }
49
50     public function fly() {
51         return 'superman melancarkan pukulan';
52     }
53
54     public function leapBuilding() {
55         return 'batman terpental menabrak bangunan pencakar langit';
56     }
57
58     public function stopBullet() {
59         return 'Polisi menembaki superman namun ditangkis';
60     }
61 }
62
63 $airplane = new Airplane;
64 $bird = new Bird;
65 $superman = new Superman;
```

The code defines a `Superman` class that implements the `Flyer` interface. It contains methods for `takeOff`, `land`, `fly`, `leapBuilding`, and `stopBullet`. It also creates instances of `Airplane`, `Bird`, and `Superman`.

No2.php No2index.php X No2Interface.php

```
C: > xampp > htdocs > No2 > No2index.php
1  <?php
2  |    require_once 'No2.php';
3  ?>
4
5  <!DOCTYPE html>
6  <html lang="en">
7
8  <head>
9      <!-- Bootstrap CSS -->
10     <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.1.3/dist/css/bootstrap.min.css" rel="stylesheet"
11          integrity="sha384-1mMqoVwQJYcIzCnDZUyjzW0Lw5cP63c4ZKqGd2V0OZ81c065DxuH6X0vZo" crossorigin="anonymous">
12
13     <title>Modul Praktikum 6</title>
14 </head>
15
16 <body>
17     <div class="container">
18         <br>
19         <h2 class="text-center">Modul Praktikum 6</h2>
20         <div class="row">
21             <div class="col-5 mx-auto border p-3 mt-2">
22                 <h4 class="text-center"><strong>Soal NO 2</strong></h4>
23                 <br>
24                 <b><?php
25                     echo "Superman";
26                 ?></b> <br>
27                 <?= $superman->land(); ?> <br>
28                 <?= $superman->takeOff(); ?> <br>
29                 <?= $superman->fly(); ?> <br>
30                 <?= $superman->leapBuilding(); ?> <br>
31                 <?= $superman->stopBullet(); ?> <br>
32             <br>
33             <b><?php
34                 echo "Bird";
35             ?></b> <br>
36             <?= $bird->buildNest(); ?> <br>
37             <?= $bird->takeOff(); ?> <br>
38             <?= $bird->fly(); ?> <br>
39             <?= $bird->land(); ?> <br>
40             <?= $bird->layEggs(); ?> <br>
41             <br>
42             <b><?php
43                 echo "Airplane";
44             ?></b> <br>
45             <?= $airplane->takeOff(); ?> <br>
46             <?= $airplane->fly(); ?> <br>
47             <?= $airplane->land(); ?> <br>
48         </div>
49     </div>
50 </body>
51
52
53 </html>
```

No2.php No2index.php X No2Interface.php

```
C: > xampp > htdocs > No2 > No2index.php
25             <?= $superman->land(); ?> <br>
26             <?= $superman->takeOff(); ?> <br>
27             <?= $superman->fly(); ?> <br>
28             <?= $superman->leapBuilding(); ?> <br>
29             <?= $superman->stopBullet(); ?> <br>
30             <br>
31             <b><?php
32                 echo "Bird";
33             ?></b> <br>
34             <?= $bird->buildNest(); ?> <br>
35             <?= $bird->takeOff(); ?> <br>
36             <?= $bird->fly(); ?> <br>
37             <?= $bird->land(); ?> <br>
38             <?= $bird->layEggs(); ?> <br>
39             <br>
40             <b><?php
41                 echo "Airplane";
42             ?></b> <br>
43             <?= $airplane->takeOff(); ?> <br>
44             <?= $airplane->fly(); ?> <br>
45             <?= $airplane->land(); ?> <br>
46         </div>
47     </div>
48 </body>
49
50
51
52
53 </html>
```

The screenshot shows a Visual Studio Code window with a dark theme. The title bar says "No2interface.php - Visual Studio Code". The status bar at the bottom shows "Tab Moves Focus" and "Line 2, Col 1". The code editor contains the following PHP code:

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

OUTPUT

IV. SOAL PRAKTIKUM 6

Soal NO 2

Superman

superman melawan batman
superman mengejar batman
superman melancarkan pukulan
batman terpental menabrak bangunan pencakar langit
Polisi menembaki superman namun ditangkis

Bird

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

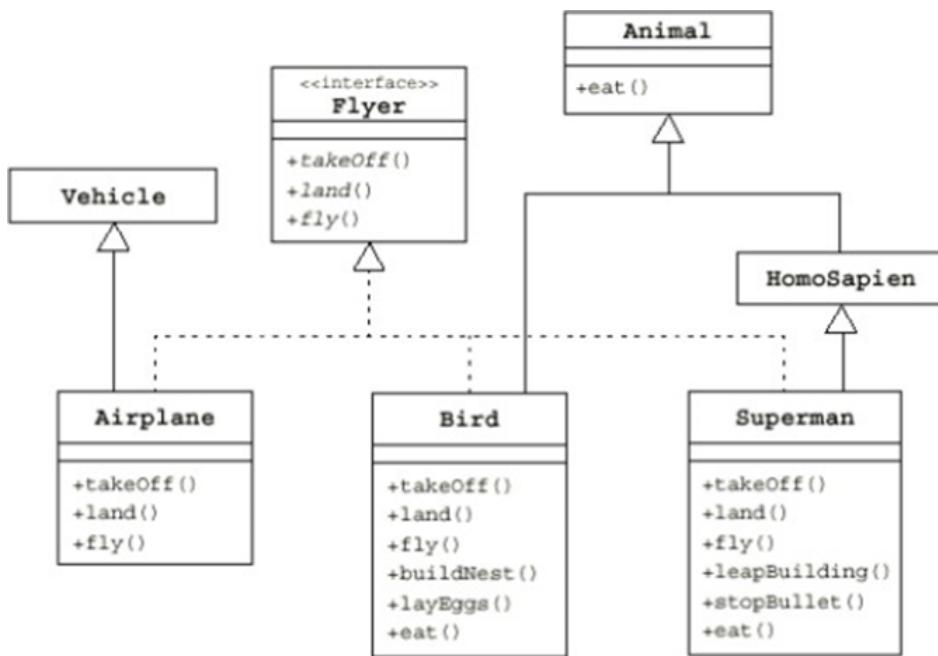
Airplane

Helicopter lepas landas
Helicopter dalam perjalanan
Helicopter mendarat

ANALISA

Implementasi Polymorphism dengan penggunaan Interface Flyer sehingga semua class yang Implements dari interface Flyer harus memiliki method takeoff, land, dan fly.

3. Buat program berdasarkan UML berikut



Source Code PHP

The screenshot shows the Visual Studio Code interface with the following details:

- File Bar**: File, Edit, Selection, View, Go, Run, Terminal, Help.
- Title Bar**: No3.php - Visual Studio Code.
- Status Bar**: Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More.
- Code Editor**: The code for `No3.php` is displayed, which includes imports for `No3abstract.php` and `No3interface.php`, and defines classes `Animal`, `Homosapiens`, and `Airplane2` with their respective methods and implementations.
- Terminal**: Shows the command line path: C: > xampp >htdocs > No3 > No3.php.
- Bottom Status Bar**: Tab Moves Focus, Ln 86, Col 39, Spaces: 4, UTF-8, CRLF, PHP, and other icons.

No3.php - Visual Studio Code

File Edit Selection View Go Run Terminal Help

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More

```
C:\xampp>htdocs>No3> No3.php

29     }
30
31     public function takeOff()
32     {
33         return "$this->name lepas landas";
34     }
35
36     public function land()
37     {
38         return "$this->name mendarat";
39     }
40
41     public function fly()
42     {
43         return "$this->name dalam perjalanan";
44     }
45
46     public function calcFuelNeeds()
47     {
48         $fuel = $this->calcFuelEfficiency();
49         $trip = $this->calcTripDistance();
50
51
52         return ceil($fuel / $trip);
53     }
54
55 }
56
57 class Superman2 extends Homosapiens implements Flyer
58 {
59     ...
60 }
```

Tab Moves Focus Ln 86, Col 39 Spaces: 4 UTF-8 CRLF PHP ⚡

No3.php - Visual Studio Code

File Edit Selection View Go Run Terminal Help

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More

```
C:\xampp>htdocs>No3> No3.php

60     {
61         return "$this->name mengejar Batman";
62     }
63
64     public function land()
65     {
66         return "$this->name melawan Batman";
67     }
68
69     public function fly()
70     [
71         return "$this->name melancarkan pukulan";
72     ]
73
74     public function leapBuilding()
75     {
76         return "Batman terpalung menabrak bangunan pencakar langit";
77     }
78
79     public function stopBullet()
80     {
81         return "Polisi menembaki $this->name namun ditangkis";
82     }
83 }

84
85 $singa = new Animal('Singa');
86 $manusia = new Homosapiens('Salsabilla');
87 $airplane2 = new Airplane2(25000, 'Lion Air');
88 $superman2 = new Superman2('Superman');
```

Tab Moves Focus Ln 71, Col 50 Spaces: 4 UTF-8 CRLF PHP ⚡

File Edit Selection View Go Run Terminal Help No3abstract.php - Visual Studio Code

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More

```
C: > xampp >htdocs >No3 > No3abstract.php
```

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

Tab Moves Focus In 42, Col 2 Spaces: 4 UTF-8 CRLF PHP ⚙

File Edit Selection View Go Run Terminal Help No3abstract.php - Visual Studio Code

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More

```
C: > xampp >htdocs >No3 > No3abstract.php
```

```
21    public function addBox($weight) {
22        if ($this->load >= $this->maxLoad) {
23            echo "$this->name menambah muatan sebesar $weight <br>";
24            echo 'Muatan telah penuh tidak bisa menambah lagi';
25        }else {
26            $this->load += $weight;
27            echo "$this->name menambah muatan sebesar $weight";
28        }
29    }
30
31    abstract public function calcFuelNeeds();
32
33    protected function calcFuelEfficiency() {
34        $range = 50000000;
35        $range /= $this->load;
36        return $range;
37    }
38
39    protected function calcTripDistance() {
40        return 500;
41    }
42 }
```

Tab Moves Focus In 42, Col 2 Spaces: 4 UTF-8 CRLF PHP ⚙

File Edit Selection View Go Run Terminal Help

No3Index.php - Visual Studio Code

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More

```
C: > xampp >htdocs >No3 > No3index.php x No3abstract.php No3Index.php x No3interface.php
```

```
1 <?php
2 | require_once 'No3.php';
3 |
4
5 <!DOCTYPE html>
6 <html lang="id">
7
8 <head>
9   <!-- Bootstrap CSS -->
10  <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.1.3/dist/css/bootstrap.min.css" rel="stylesheet"
11    integrity="sha384-1mMqoVwQJYUxPfCZP+PdFk9rHl6X0QfTfHJvPzWZMnE&lt;script&gt;</script&gt;" crossorigin="anonymous">
12
13 <title>Modul Praktikum 6</title>
14 </head>
15 <body>
16   <div class="container">
17     <h2 class="text-center">Modul Praktikum 6</h2>
18     <div class="row">
19       <div class="col-5 mx-auto border p-3 mt-2">
20         <h4 class="text-center"><strong>Soal NO 3</strong></h4>
21         <br><br>
22         <?= $singa->eat(); ?> <br>
23         <?= $manusia->eat(); ?> <br>
24         <br>
25
26         <b><?= $airplane2->getMaxLoad() . ' kg'; ?> <br></b>
27         <?= $airplane2->addBox(6000) . ' kg'; ?> <br>
28         <?= $airplane2->addBox(8000) . ' kg'; ?> <br>
29         <?= $airplane2->addBox(2000) . ' kg'; ?> <br>
30         <?= $airplane2->addBox(3000) . ' kg'; ?> <br>
31         <?= $airplane2->takeOff(); ?> <br>
```

Tab Moves Focus In 50, Col 8 Spaces: 4 UTF-8 CRLF PHP ⚡ Q

File Edit Selection View Go Run Terminal Help

No3Index.php - Visual Studio Code

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More

```
C: > xampp >htdocs >No3 > No3index.php x No3abstract.php No3Index.php x No3interface.php
```

```
25
26   <b><?= $airplane2->getMaxLoad() . ' kg'; ?> <br></b>
27   <?= $airplane2->addBox(6000) . ' kg'; ?> <br>
28   <?= $airplane2->addBox(8000) . ' kg'; ?> <br>
29   <?= $airplane2->addBox(2000) . ' kg'; ?> <br>
30   <?= $airplane2->addBox(3000) . ' kg'; ?> <br>
31   <?= $airplane2->takeOff(); ?> <br>
32   <?= $airplane2->fly(); ?> <br>
33   <?= $airplane2->land(); ?> <br>
34
35   <?php
36     echo "Jadi, Butuh Bahan Bakar sebanyak " . $airplane2->calcFuelNeeds() . ' Liter'. '<br>';
37   ?>
38   <br>
39   <?= $superman2->eat(); ?> <br>
40   <?= $superman2->land(); ?> <br>
41   <?= $superman2->takeOff(); ?> <br>
42   <?= $superman2->fly(); ?> <br>
43   <?= $superman2->leapBuilding(); ?> <br>
44   <?= $superman2->stopBullet(); ?> <br>
45
46   </div>
47 </div>
48 </body>
49 </html>
```

Tab Moves Focus In 26, Col 69 Spaces: 4 UTF-8 CRLF PHP ⚡ Q

The screenshot shows a Visual Studio Code interface with a dark theme. The top menu bar includes File, Edit, Selection, View, Go, Run, Terminal, Help, and a note about Restricted Mode. The title bar says "No3interface.php - Visual Studio Code". The left sidebar has icons for file explorer, search, and other tools. The main editor area contains the following PHP code:

```
C: > xampp >htdocs > No3 > No3interface.php
1 <?php
2
3 interface Flyer {
4     public function takeOff();
5     public function land();
6     public function fly();
7 }
8
9 interface Sailer {
10    public function dock();
11    public function cruise();
12 }
```

The status bar at the bottom shows "Restricted Mode", "Tab Moves Focus", "Ln 12, Col 2", "Spaces: 4", "UTF-8", "CRLF", "PHP", and a gear icon.

OUTPUT

Soal NO 3

Singa sedang makan
Salsabilla sedang makan

Maksimal muatan Lion Air 25000 kg

Lion Air menambah muatan sebesar 6000 kg
Lion Air menambah muatan sebesar 8000 kg
Lion Air menambah muatan sebesar 2000 kg
Lion Air menambah muatan sebesar 3000 kg
Lion Air lepas landas
Lion Air dalam perjalanan
Lion Air mendarat
Jadi, Butuh Bahan Bakar sebanyak 6 Liter

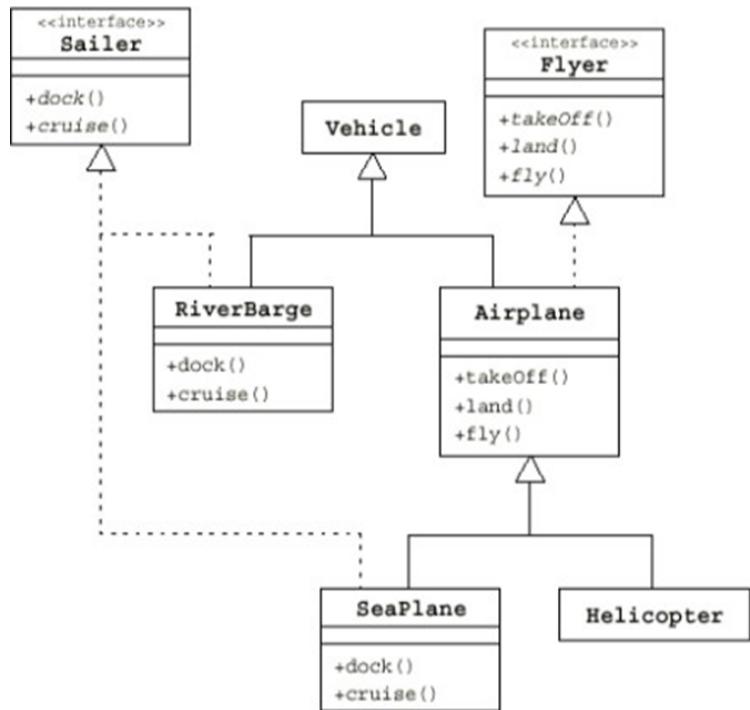
Superman sedang makan
Superman melawan Batman
Superman mengejar Batman
Superman melancarkan pukulan
Batman terpental menabrak bangunan pencakar langit
Polisi menembaki Superman namun ditangkis

ANALISA

Terdapat interface Flyer dan abstract class Vehicle. Class airplane implementasi dari interface Flyer dan turunan dari Vehicle sehingga class Airplane harus memiliki method calcFuelNeeds, takeoff, land, dan fly. **Class** Bird

implementasi dari Flyer dan turunan dari Animal sehingga memiliki method takeoff, land, fly, dan eat. Class Superman turunan dari homosapiens yang juga turunan dari Animal, serta implementasi dari interface Flyer. Maka class Superman memiliki method eat, takeoff, land, fly.

4. Buat program berdasarkan UML berikut



Source Code PHP

No4.php - Visual Studio Code

File Edit Selection View Go Run Terminal Help

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More

```
C:\xampp\htdocs>No4> No4.php
1 <?php
2
3 require_once '../No4/No4abstract.php';
4 require_once '../No4/No4interface.php';
5
6 class RiverBarge2 extends Vehicle implements Sailer {
7     public function __construct($maxLoad, $name) {
8         $this->maxLoad = $maxLoad;
9         $this->name = $name;
10    }
11
12    public function calcFuelNeeds() {
13        $fuel = $this->calcFuelEfficiency();
14        $trip = $this->calcTripDistance();
15
16        return ceil($fuel / $trip);
17    }
18
19    public function dock() {
20        return $this->name . ' berada di dermaga';
21    }
22
23    public function cruise() {
24        return $this->name . ' sedang berlayar';
25    }
26 }
27
28 class Airplane2 implements Flyer {
29     public function takeOff() {
30         return 'Pesawat lepas landas';
31     }
32
33     public function land() {
34         return 'Pesawat mendarat';
35     }
36
37     public function fly() {
38         return 'Pesawat dalam perjalanan';
39     }
40
41 class SeaPlane extends Vehicle implements Sailer {
42     public function __construct($maxLoad, $name) {
43         $this->maxLoad = $maxLoad;
44         $this->name = $name;
45     }
46
47     public function calcFuelNeeds() {
48        $fuel = $this->calcFuelEfficiency();
49        $trip = $this->calcTripDistance();
50
51        return ceil($fuel / $trip);
52    }
53
54    public function dock() {
55        return $this->name . ' berada di dermaga';
56    }
57
58    public function cruise() {
59        return $this->name . ' sedang berlayar';
60    }
61 }
```

Tab Moves Focus In 101, Col 49 Spaces: 4 UTF-8 CRLF PHP ⚡ Q

Restricted Mode 0 △ 0

No4.php - Visual Studio Code

File Edit Selection View Go Run Terminal Help

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More

```
C:\xampp\htdocs>No4> No4.php
29     public function takeOff() {
30         return 'Pesawat lepas landas';
31     }
32     public function land() {
33         return 'Pesawat mendarat';
34     }
35     public function fly() {
36         return 'Pesawat dalam perjalanan';
37     }
38 }
39
40 class SeaPlane extends Vehicle implements Sailer {
41     public function __construct($maxLoad, $name) {
42         $this->maxLoad = $maxLoad;
43         $this->name = $name;
44     }
45
46     public function calcFuelNeeds() {
47        $fuel = $this->calcFuelEfficiency();
48        $trip = $this->calcTripDistance();
49
50        return ceil($fuel / $trip);
51    }
52
53    public function dock() {
54        return $this->name . ' berada di dermaga';
55    }
56
57    public function cruise() {
58        return $this->name . ' sedang berlayar';
59    }
60 }
```

Tab Moves Focus In 101, Col 49 Spaces: 4 UTF-8 CRLF PHP ⚡ Q

Restricted Mode 0 △ 0

No4.php - Visual Studio Code

File Edit Selection View Go Run Terminal Help

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More

```
C: > xampp > htdocs > No4 > No4.php
```

```
56     public function cruise() {
57         return $this->name . ' sedang berlayar';
58     }
59
60     public function takeOff() {
61         return $this->name . ' lepas landas';
62     }
63
64     public function land() {
65         return $this->name . ' mendarat';
66     }
67
68     public function fly() {
69         return $this->name . ' dalam perjalanan';
70     }
71 }
72
73 class Helicopter extends Vehicle {
74     public function __construct($maxLoad, $name) {
75         $this->maxLoad = $maxLoad;
76         $this->name = $name;
77     }
78
79     public function calcFuelNeeds() {
80         $fuel = $this->calcFuelEfficiency();
81         $trip = $this->calcTripDistance();
82
83         return ceil($fuel /=$ trip);
84     }
85     public function takeOff() {
86         return $this->name . ' lepas landas';
87     }
88
89     public function land() {
90         return $this->name . ' mendarat';
91     }
92
93     public function fly() {
94         return $this->name . ' dalam perjalanan';
95     }
96 }
97
98 $riverBarge2 = new RiverBarge2(30000, 'Atomic');
99 $seaPlane = new SeaPlane(20000, 'Titanic');
100 $helicopter = new Helicopter(10000, 'Brocklyn');
```

Tab Moves Focus | Ln 101, Col 49 | Spaces: 4 | UTF-8 | CRLF | PHP | ⚙ | Q

No4.php - Visual Studio Code

File Edit Selection View Go Run Terminal Help

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More

```
C: > xampp > htdocs > No4 > No4.php
```

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

Tab Moves Focus | Ln 86, Col 32 | Spaces: 4 | UTF-8 | CRLF | PHP | ⚙ | Q

A screenshot of Visual Studio Code showing the file No4abstract.php. The code defines an abstract class Vehicle with methods for getting load, maximum load, adding weight, and calculating fuel needs. It includes error handling for adding weight to a vehicle that is already at its maximum load.

```
C: > xampp >htdocs > No4 > No4abstract.php
1 <?php
2
3 abstract class Vehicle {
4     private $load = 0;
5     protected $maxLoad = 0, $name;
6
7     protected function __construct($maxLoad, $name) {
8         $this->$maxLoad = $maxLoad;
9         $this->$name = $name;
10    }
11
12    public function getLoad() {
13        return $this->load;
14    }
15
16    public function getMaxLoad() {
17        echo 'Maksimal muatan ' . $this->name . ' ';
18        return $this->maxLoad;
19    }
20
21    public function addBox($weight) {
22        if ($this->load >= $this->maxLoad) {
23            echo "$this->name menambah muatan sebesar $weight <br>";
24            echo 'Muatan telah penuh tidak bisa menambah lagi';
25        }else {
26            $this->load += $weight;
27            echo "$this->name menambah muatan sebesar $weight";
28        }
29    }
30
31    abstract public function calcFuelNeeds();
32
33    protected function calcFuelEfficiency() {
34        $range = 50000000;
35        $range /= $this->load;
36        return $range;
37    }
38
39    protected function calcTripDistance() {
40        return 500;
41    }
42 }
```

A screenshot of Visual Studio Code showing the completed No4abstract.php file. The code now includes additional methods: calcFuelEfficiency() which calculates fuel efficiency based on range and load, and calcTripDistance() which returns a fixed value of 500. The original code for adding weight and calculating fuel needs has been removed.

```
C: > xampp >htdocs > No4 > No4abstract.php
17     echo 'Maksimal muatan ' . $this->name . ' ';
18     return $this->maxLoad;
19 }
20
21 public function addBox($weight) {
22     if ($this->load >= $this->maxLoad) {
23         echo "$this->name menambah muatan sebesar $weight <br>";
24         echo 'Muatan telah penuh tidak bisa menambah lagi';
25     }else {
26         $this->load += $weight;
27         echo "$this->name menambah muatan sebesar $weight";
28     }
29 }
30
31 abstract public function calcFuelNeeds();
32
33 protected function calcFuelEfficiency() {
34     $range = 50000000;
35     $range /= $this->load;
36     return $range;
37 }
38
39 protected function calcTripDistance() {
40     return 500;
41 }
42 ]
```

File Edit Selection View Go Run Terminal Help

No4Index.php - Visual Studio Code

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More

```
C: > xampp >htdocs >No4 > No4index.php
```

```

1  <?php
2  |     require_once 'No4.php';
3  |
4  |
5  <!DOCTYPE html>
6  <html lang="en">
7  |
8  <head>
9      <!-- Bootstrap CSS -->
10     <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.1.3/dist/css/bootstrap.min.css" rel="stylesheet"
11         integrity="sha384-1BmE4kWBq78iYhFldvKuhfTAU6auU8tT94WhHftjDbrCEXSUloBoqyl2QvZ6jIW3" crossorigin="anonymous">
12
13     <title>Modul Praktikum 6</title>
14 </head>
15 <body>
16     <h2 class="text-center">Modul Praktikum 6</h2>
17     <div class="container">
18         <div class="row">
19             <h4 class="text-center"><strong>Soal NO 4</strong></h4>
20             <br><br>
21             <div class="col-4 mx-auto border p-2 mt-2">
22                 <b><?= $riverBarge2->getMaxLoad() . ' kg'; ?> <br><b>
23                 <?= $riverBarge2->addBox(11000) . ' kg'; ?> <br>
24                 <?= $riverBarge2->addBox(13000) . ' kg'; ?> <br>
25                 <?= $riverBarge2->addBox(2000) . ' kg'; ?> <br>
26                 <?= $riverBarge2->addBox(4000) . ' kg'; ?> <br>
27                 <?= $riverBarge2->dock(); ?> <br>
28                 <?= $riverBarge2->cruise(); ?> <br>
29                 <?php
30                     echo "Jadi, Butuh Bahan Bakar sebanyak " . $riverBarge2->calcFuelNeeds() . ' Liter'. '<br>';
31             ?>

```

Tab Moves Focus Tab 1 of 1 Ln 31, Col 23 Spaces: 4 UTF-8 CRLF PHP ⚙

File Edit Selection View Go Run Terminal Help

No4interface.php - Visual Studio Code

Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More

```
C: > xampp >htdocs >No4 > No4interface.php
```

```

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

```

Tab Moves Focus Tab 1 of 1 Ln 7, Col 2 Spaces: 4 UTF-8 CRLF PHP ⚙

OUTPUT

Modul Praktikum 6

Soal NO 4

Maksimal muatan Atomic 3000 kg	Maksimal muatan Titanic 20000 kg	Maksimal muatan Brooklyn 10000 kg
Atomic menambah muatan sebesar 11000 kg	Titanic menambah muatan sebesar 13000 kg	Brooklyn menambah muatan sebesar 7000 kg
Atomic menambah muatan sebesar 13000 kg	Titanic menambah muatan sebesar 9000 kg	Brooklyn menambah muatan sebesar 2000 kg
Atomic menambah muatan sebesar 2000 kg	Titanic berada di dermaga	Brooklyn lepas landas
Atomic menambah muatan sebesar 4000 kg	Titanic sedang berlayar	Brooklyn dalam perjalanan
Atomic berada di dermaga	Titanic lepas landas	Brooklyn mendarat
Atomic sedang berlayar	Titanic dalam perjalanan	Jadi, Butuh Bahan Bakar sebanyak 12 Liter
Jadi, Butuh Bahan Bakar sebanyak 4 Liter	Titanic mendarat	
	Jadi, Butuh Bahan Bakar sebanyak 5 Liter	

ANALISA

Implementasi polymorphism dengan interface dan abstact 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.