LAPORAN PRAKTIKUM 6

(Abstrak dan Interface)

Mata Kuliah Pemograman Berorientasi Objek

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1.

Source Code

```php
1   <!-- Aini Azzah - 21091397006 - 2021 B -->
2
3   <?php
4       abstract class Vehicle
5       {
6           private $load = 0;
7           protected $maxLoad = 0, $name;
8
9           protected function __construct($maxLoad, $name)
10          {
11              $this->$maxLoad = $maxLoad;
12              $this->$name = $name;
13          }
14
15          public function getLoad()
16          {
17              return $this->load;
18          }
19
20          public function getMaxLoad()
21          {
22              echo 'Muatan Maksimal ' . $this->name . ' ' ;
23              return $this->maxLoad;
24          }
25
26          public function addBox($weight)
27          {
28              if ($this->load >= $this->maxLoad)
29              {
30                  echo "$this->name menambah muatan sebesar" .$weight. "<br>";
31                  echo 'Muatan telah penuh tidak bisa menambah lagi';
32              } else {
33                  $this->load += $weight;
34                  echo "$this->name menambah muatan sebesar" .$weight;
35              }
36          }
37
38          abstract public function calcFuelNeeds();
39
40          protected function calcFuelEfficiency()
41          {
42              $range = 50000000;
43              $range /= $this->load;
44              return $range;
45          }
46
47          protected function calcTripDistance()
48          {
49              return 500;
50          }
51      }
52   ?>
```

```php
1   <!-- Aini Azzah - 21091397006 - 2021 B -->
2
3   <?php
4       require_once 'Prak6No1Abstrak.php';
5
6       class Truck extends Vehicle
7       {
8           public function __construct($maxLoad, $name)
9           {
10              $this->maxLoad = $maxLoad;
11              $this->name = $name;
12          }
```

```php
            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();

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

        $truck = new Truck(16000, 'Truck');
        $riverBarge = new RiverBarge(15000, 'River Barge');
    ?>
```

Prak6No1Index.php

Prak 6 No.1 > Prak6No1Index.php > html > body > div.container > div.row > div.col-5.mx-auto.border.p-3.mt-2 > br

```php
<!-- Aini Azzah - 21091397006 - 2021 B -->

<?php
    require_once 'Prak6No1.php';
?>

<!DOCTYPE html>
<html lang="id">

<head>
    <!-- Bootstrap CSS -->
    <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.1.3/dist/css/bootstrap.min.css" rel="stylesheet"
    integrity="sha384-1BmE4kWBq78iYhFldvKuhfTAU6auU8tT94WrHftjDbrCEXSU1oBoqyl2QvZ6jIW3" crossorigin="anonymous">

    <title>PBO Praktikum 6 No.1</title>
</head>

<body>
    <div class="container">
        <br>
        <h2 class="text-center">PBO - Praktikum 6</h2>
        <div class="row">
            <div class="col-5 mx-auto border p-3 mt-2">
                <h4 class="text-center"><strong>Soal 1</strong></h4>
                <br><br>
                <b><?= $truck->getMaxLoad() . ' kg'; ?> <br></b>
                <br>
                <?= $truck->addBox(6000) . ' kg'; ?> <br>
                <?= $truck->addBox(7000) . ' kg'; ?> <br>
                <?= $truck->addBox(1000) . ' kg'; ?> <br>

                    <?php
                        echo "Jadi, Butuh Bahan Bakar sebanyak " . $truck->calcFuelNeeds() . ' Liter'. '<br>';
                    ?>
                <br>
                -----------------------------------------------
                <br>
                <br>
```

```
39                    <b><?= $riverBarge->getMaxLoad() . ' kg'; ?> <br></b>
40                    <br>
41                    <?= $riverBarge->addBox(8000) . ' kg'; ?> <br>
42                    <?= $riverBarge->addBox(1000) . ' kg'; ?> <br>
43                    <?= $riverBarge->addBox(4000) . ' kg'; ?> <br>
44
45                        <?php
46                            echo "Jadi, Butuh Bahan Bakar sebanyak " . $riverBarge->calcFuelNeeds() . ' Liter';
47                        ?>
48                </div>
49            </div>
50        </div>
51    </body>
52
53    </html>
```

Output

Analisis

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.

Source Code

```php
<!-- Aini Azzah - 21091397006 - 2021 B -->

<?php
    interface Flyer {
        public function takeOff();
        public function land();
        public function fly();
    }
?>
```

```php
<!-- Aini Azzah - 21091397006 - 2021 B -->

<?php
    require_once 'Prak6No2Interface.php';

    class Airplane1 implements Flyer
    {
        public function takeOff()
        {
            return 'Pesawat lepas landas';
        }

        public function land()
        {
            return 'Pesawat mendarat';
        }

        public function fly()
        {
            return 'Pesawat terbang';
        }
    }

    class Bird implements Flyer
    {
        public function takeOff()
        {
            return 'Burung mencari makan';
        }

        public function land()
        {
            return 'Burung kembali pulang';
        }

        public function fly()
        {
            return 'Burung terbang';
        }

        public function buildNest()
        {
            return 'Burung membuat sarang';
        }

        public function layEggs()
        {
            return 'Burung bertelur';
        }
    }

    class Superman1 implements Flyer
    {
        public function takeOff()
        {
            return 'Superman lepas landas';
        }

        public function land()
        {
            return 'Superman mendarat';
        }

        public function fly()
        {
            return 'Superman terbang';
        }
```

```php
68
69            public function leapBuilding()
70            {
71                return 'Superman melompati gedung-gedung tinggi';
72            }
73
74            public function stopBullet()
75            {
76                return 'Superman menghindari peluru';
77            }
78        }
79
80        $airplane = new Airplane1;
81        $bird = new Bird;
82        $superman = new Superman1;
83    ?>
```

```php
1    <!-- Aini Azzah - 21091397006 - 2021 B -->
2
3    <?php
4        require_once 'Prak6No2.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="sha384-1BmE4kWBq78iYhFldvKuhfTAU6auU8tT94WrHftjDbrCEXSU1oBoqyl2QvZ6jIW3" crossorigin="anonymous">
14
15       <title>Praktikum 6 No.2</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>
25                       <b><?php
26                           echo "Airplane";
27                       ?>
28                   </b> <br>
29                       <?= $airplane->takeOff(); ?> <br>
30                       <?= $airplane->fly(); ?> <br>
31                       <?= $airplane->land(); ?> <br>
32                       <br>
33                       <b><?php
34                           echo "Bird";
35                       ?>
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 "Superman";
45                       ?>
46                   </b> <br>
47                       <?= $superman->land(); ?> <br>
48                       <?= $superman->takeOff(); ?> <br>
49                       <?= $superman->fly(); ?> <br>
50                       <?= $superman->leapBuilding(); ?> <br>
51                       <?= $superman->stopBullet(); ?> <br>
52                       <br>
53                   </div>
54               </div>
55           </div>
56       </body>
57   </html>
```
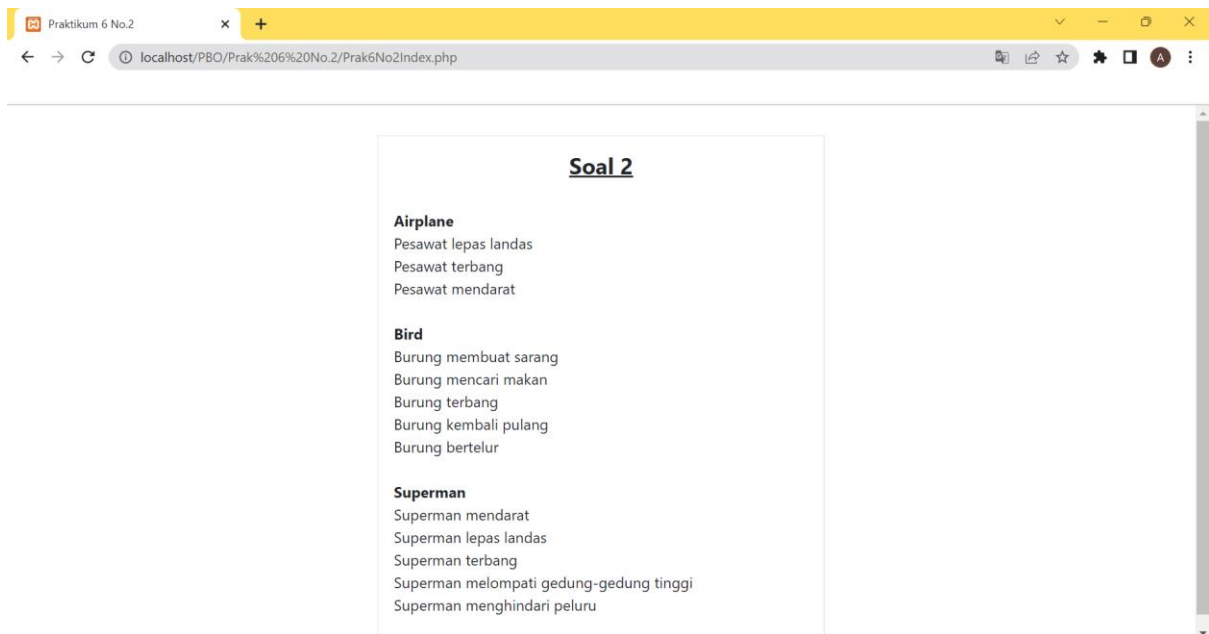
Output

Analisis

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

3.

Source Code

```php
<!-- Aini Azzah - 21091397006 - 2021 B -->

<?php

    abstract class Vehicle
    {
        private $load = 0;
        protected $maxLoad = 0, $name;

        protected function __construct($maxLoad, $name)
        {
            $this->$maxLoad = $maxLoad;
            $this->$name = $name;
        }

        public function getLoad()
        {
            return $this->load;
        }

        public function getMaxLoad()
        {
            echo 'Maksimal muatan ' . $this->name . ' ' ;
            return $this->maxLoad;
        }
```

```php
        public function addBox($weight)
        {
            if ($this->load >= $this->maxLoad) {
                echo "$this->name menambah muatan sebesar" .$weight. "<br>";
                echo 'Muatan telah penuh tidak bisa menambah lagi';
            }else {
                $this->load += $weight;
                echo "$this->name menambah muatan sebesar" .$weight;
            }
        }

        abstract public function calcFuelNeeds();

        protected function calcFuelEfficiency()
        {
            $range = 50000000;
            $range /= $this->load;
            return $range;
        }

        protected function calcTripDistance()
        {
            return 500;
        }
    }
?>
```

Prak6No3Interface.php

Prak 6 No.3 > Prak6No3Interface.php > ...

```php
<!-- Aini Azzah - 21091397006 - 2021 B -->

<?php
    interface Flyer
    {
        public function takeOff();
        public function land();
        public function fly();
    }

    interface Sailer
    {
        public function dock();
        public function cruise();
    }
?>
```

Prak6No3.php

Prak 6 No.3 > Prak6No3.php > ...

```php
<!-- Aini Azzah - 21091397006 - 2021 B -->

<?php
    require_once 'Prak6No3Abstrak.php';
    require_once 'Prak6No3Interface.php';

    class Animal
    {
        protected $name;

        public function __construct($name)
        {
            $this->name = $name;
        }

        public function eat()
        {
            return $this->name . ' sedang makan';
        }
    }

    class Homosapiens extends Animal {}
```

```php
class Airplane extends Vehicle implements Flyer
{
    public function __construct($maxLoad, $name)
    {
        $this->maxLoad = $maxLoad;
        $this->name = $name;
    }

    public function takeOff()
    {
        return "$this->name lepas landas";
    }

    public function land()
    {
        return "$this->name mendarat";
    }

    public function fly()
    {
        return "$this->name terbang";
    }

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

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

class Superman extends Homosapiens implements Flyer
{
    public function takeOff()
    {
        return "$this->name lepas landas";
    }

    public function land()
    {
        return "$this->name mendarat";
    }

    public function fly()
    {
        return "$this->name terbang";
    }

    public function leapBuilding()
    {
        return "Superman melompati gedung-gedung tinggi";
    }

    public function stopBullet()
    {
        return "Superman menghindari peluru";
    }
}

$burung = new Animal('Bird');
$airplane = new Airplane(25000, 'Airplane');
$superman = new Superman('Superman');
?>
```

Prak6No3Index.php ×

Prak 6 No.3 > Prak6No3Index.php > html

```php
<!-- Aini Azzah - 21091397006 - 2021 B -->

<?php
    require_once 'Prak6No3.php';
?>
```

```html
<!DOCTYPE html>
<html lang="id">

    <head>
        <!-- Bootstrap CSS -->
        <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.1.3/dist/css/bootstrap.min.css" rel="stylesheet"
        integrity="sha384-1BmE4kWBq78iYhFldvKuhfTAU6auU8tT94WrHftjDbrCEXSU1oBoqyl2QvZ6jIW3" crossorigin="anonymous

        <title>Praktikum 6 No.3</title>
    </head>
    <body>
        <div class="container">
            <div class="row">
                <div class="col-5 mx-auto border p-3 mt-2">
                    <h4 class="text-center"><strong><u>Soal 3</u></strong></h4>
                    <br><br>
                    <?= $burung->eat(); ?> <br>
                    <?= $superman->eat(); ?> <br>
                    <br>

                    <b><?= $airplane->getMaxLoad() . ' kg'; ?> <br></b>
                    <?= $airplane->addBox(6000) . ' kg'; ?> <br>
                    <?= $airplane->addBox(2000) . ' kg'; ?> <br>
                    <?= $airplane->addBox(7000) . ' kg'; ?> <br>
                    <?= $airplane->addBox(5000) . ' kg'; ?> <br>
                    <?= $airplane->takeOff(); ?> <br>
                    <?= $airplane->fly(); ?> <br>
                    <?= $airplane->land(); ?> <br>

                    <?php
                        echo "Jadi, Butuh Bahan Bakar sebanyak " . $airplane->calcFuelNeeds() . ' Liter'.'<br>';
                    ?>
                    <br>
                    <?= $superman->eat(); ?> <br>
                    <?= $superman->land(); ?> <br>
                    <?= $superman->takeOff(); ?> <br>
                    <?= $superman->fly(); ?> <br>
                    <?= $superman->leapBuilding(); ?> <br>
                    <?= $superman->stopBullet(); ?> <br>
                </div>
            </div>
        </div>
    </body>

</html>
```

Output

4.

Source Code

```php
<!-- Aini Azzah - 21091397006 - 2021 B -->

<?php
    interface Flyer {
        public function takeOff();
        public function land();
        public function fly();
    }

    interface Sailer {
        public function dock();
        public function cruise();
    }
?>
```

```php
<!-- Aini Azzah - 21091397006 - 2021 B -->

<?php
    abstract class Vehicle
    {
        private $load = 0;
        protected $maxLoad = 0, $name;

        protected function __construct($maxLoad, $name)
        {
            $this->$maxLoad = $maxLoad;
            $this->$name = $name;
        }

        public function getLoad()
        {
            return $this->load;
        }

        public function getMaxLoad()
        {
            echo 'Maksimal muatan ' . $this->name . ' ' ;
            return $this->maxLoad;
        }

        public function addBox($weight)
        {
            if ($this->load >= $this->maxLoad) {
                echo "$this->name menambah muatan sebesar $weight <br>";
                echo 'Muatan telah penuh tidak bisa menambah lagi';
            }else {
                $this->load += $weight;
                echo "$this->name menambah muatan sebesar $weight";
            }
        }

        abstract public function calcFuelNeeds();

        protected function calcFuelEfficiency()
        {
            $range = 50000000;
            $range /= $this->load;
            return $range;
        }

        protected function calcTripDistance()
        {
            return 500;
        }
    }
?>
```

```php
<!-- Aini Azzah - 21091397006 - 2021 B -->

<?php

    require_once 'Prak6No4Abstrak.php';
    require_once 'Prak6No4Interface.php';

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

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

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

```php
    public function dock()
    {
        return $this->name . ' berada di dermaga';
    }

    public function cruise()
    {
        return $this->name . ' sedang berlayar';
    }
}

class Airplane implements Flyer
{
    public function takeOff()
    {
        return 'Pesawat lepas landas';
    }
    public function land()
    {
        return 'Pesawat mendarat';
    }
    public function fly()
    {
        return 'Pesawat dalam perjalanan';
    }
}

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

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

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

    public function dock()
    {
        return $this->name . ' berada di dermaga';
    }

    public function cruise()
    {
        return $this->name . ' sedang berlayar';
    }

    public function takeOff()
    {
        return $this->name . ' lepas landas';
    }

    public function land()
    {
        return $this->name . ' mendarat';
    }

    public function fly()
    {
        return $this->name . ' dalam perjalanan';
    }
}

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

```php
100
101        public function calcFuelNeeds()
102        {
103            $fuel = $this->calcFuelEfficiency();
104            $trip = $this->calcTripDistance();
105
106            return ceil($fuel /= $trip);
107        }
108        public function takeOff()
109        {
110            return $this->name . ' lepas landas';
111        }
112
113        public function land()
114        {
115            return $this->name . ' mendarat';
116        }
117
118        public function fly()
119        {
120            return $this->name . ' dalam perjalanan';
121        }
122    }
123
124    $riverBarge = new RiverBarge(30000, 'River Barge');
125    $seaPlane = new SeaPlane(20000, 'Sea Plane');
126    $helicopter = new Helicopter(10000, 'Helicopter');
127 ?>
```

Prak6No4Index.php ×

Prak 6 No.4 > Prak6No4Index.php > ⊘ html

```php
 1  <!-- Aini Azzah - 21091397006 - 2021 B -->
 2
 3  <?php
 4      require_once 'Prak6No4.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="sha384-1BmE4kWBq78iYhFldvKuhfTAU6auU8tT94WrHftjDbrCEXSU1oBoqyl2QvZ6jIW3" crossorigin="anonymous
14
15          <title>Praktikum 6 No.4</title>
16      </head>
17
18      <body>
19          <div class="container">
20              <div class="row">
21                  <h4 class="text-center"><strong><u>Soal No.4</u></strong></h4>
22                  <br><br>
23                  <div class="col-4 mx-auto border p-2 mt-2">
24                          <b><?= $riverBarge->getMaxLoad() . ' kg'; ?> <br></b>
25                          <?= $riverBarge->addBox(17000) . ' kg'; ?> <br>
26                          <?= $riverBarge->addBox(6000) . ' kg'; ?> <br>
27                          <?= $riverBarge->addBox(11000) . ' kg'; ?> <br>
28                          <?= $riverBarge->addBox(1000) . ' kg'; ?> <br>
29                          <?= $riverBarge->dock(); ?> <br>
30                          <?= $riverBarge->cruise(); ?> <br>
31                          <?php
32                              echo "Jadi, Butuh Bahan Bakar sebanyak ".$riverBarge->calcFuelNeeds().' Liter'.'<b
33                          ?>
34                  </div>
35
```

```
36                    <div class="col-4 mx-auto border p-2 mt-2">
37                            <b><?= $seaPlane->getMaxLoad() . ' kg'; ?> <br></b>
38                            <?= $seaPlane->addBox(14000) . ' kg'; ?> <br>
39                            <?= $seaPlane->addBox(8000) . ' kg'; ?> <br>
40                            <?= $seaPlane->dock(); ?> <br>
41                            <?= $seaPlane->cruise(); ?> <br>
42                            <?= $seaPlane->takeOff(); ?> <br>
43                            <?= $seaPlane->fly(); ?> <br>
44                            <?= $seaPlane->land(); ?> <br>
45                            <?php
46                                echo "Jadi, Butuh Bahan Bakar sebanyak " . $seaPlane->calcFuelNeeds() . ' Liter'.
47                            ?>
48                    </div>
49
50                    <div class="col mx-auto border p-2 mt-2">
51                            <b><?= $helicopter->getMaxLoad() . ' kg'; ?> <br></b>
52                            <?= $helicopter->addBox(6000) . ' kg'; ?> <br>
53                            <?= $helicopter->addBox(7000) . ' 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'
59                            ?>
60                    </div>
61            </div>
62        </div>
63    </body>
64 </html>
```

Output

Analisis

Implementasi polymhorphism dengan interface dan abstact class detinjukkan 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.