NAMA : RIZQI CAHYA ANGELITA

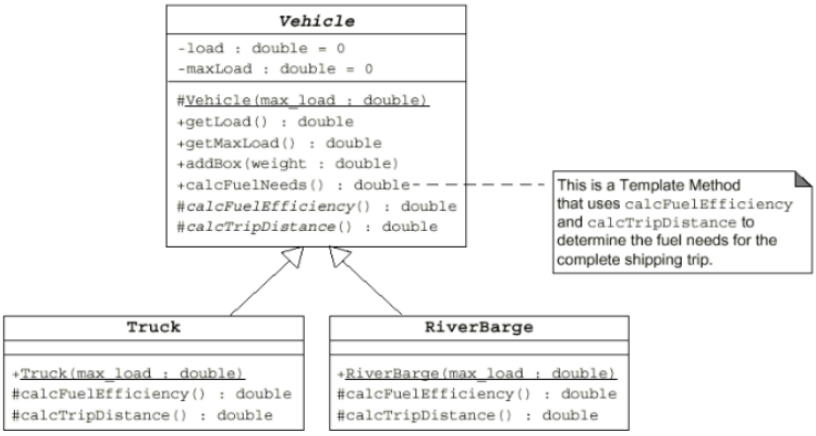
NIM : 21091397047

KELAS : 2021A

PRODI : DIV MANAJEMEN INFORMATIKA

# TUGAS PRAKTIKUM 6

1. Buat program berdasarkan UML berikut.




- PHP

047_Rizqi Cahya Angelita_index no1.php

```php
<!-- RIZQI CAHYA ANGELITA
     21091397047 -->

<?php
    require_once '047_Rizqi Cahya Angelita_prak6 no1.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>Praktikum 6</title>
</head>

<body>
    <div class="container">
        <br>
        <div class="row">
            <div class="col-5 mx-auto border p-3 mt-2">
                <h4 class="text-center"><strong><u>Soal No.1</u></strong></h4>
                <br><br>
                <b><?= $truck->getMaxLoad() . ' kg'; ?> <br></b>
                <br>
                <?= $truck->addBox(2000) . ' kg'; ?> <br>
                <?= $truck->addBox(7000) . ' kg'; ?> <br>
                <?= $truck->addBox(9000) . ' kg'; ?> <br>

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

```
                        '<br>';
                ?>
            <br>
            <hr>
            <br>
            <b><?= $riverBarge->getMaxLoad() . ' kg'; ?> <br></b>
            <br>
            <?= $riverBarge->addBox(5000) . ' kg'; ?> <br>
            <?= $riverBarge->addBox(7000) . ' kg'; ?> <br>
            <?= $riverBarge->addBox(8000) . ' kg'; ?> <br>

                <?php
                    echo "Jadi, Butuh Bahan Bakar sebanyak " . $riverBarge->calcFuelNeeds() . '
                        Liter';
                ?>
        </div>
    </div>
  </div>
</body>

</html>
```

047_Rizqi Cahya Angelita_prak6 no1.php

```
<!-- RIZQI CAHYA ANGELITA
     21091397047 -->
<?php

require_once '047_Rizqi Cahya Angelita_abstract no1.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();

        return ceil($fuel /= $trip);
    }
}
$truck = new Truck(18000, 'Truk');
$riverBarge = new RiverBarge(20000, 'Tongkang Sungai');
```

- OUTPUT

## Soal No.1

**Maksimal muatan Truk 18000 kg**

Truk menambah muatan sebesar 2000 kg
Truk menambah muatan sebesar 7000 kg
Truk menambah muatan sebesar 9000 kg
Jadi, Butuh Bahan Bakar sebanyak 6 Liter

---

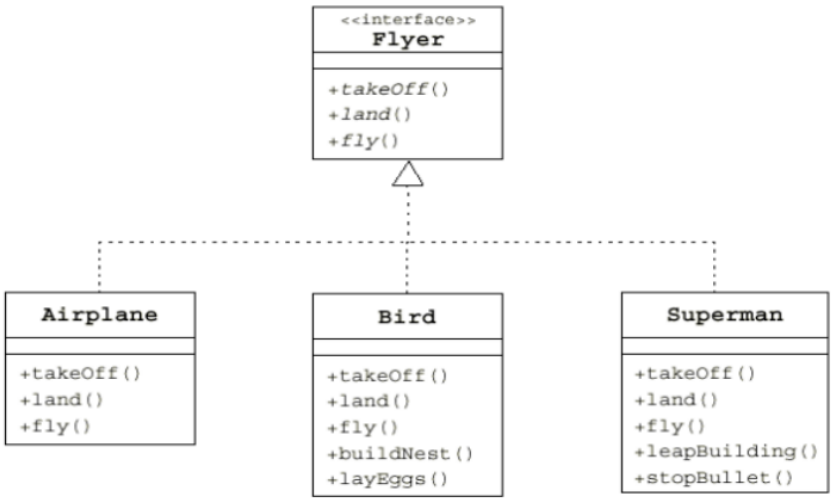
**Maksimal muatan Tongkang Sungai 20000 kg**

Tongkang Sungai menambah muatan sebesar 5000 kg
Tongkang Sungai menambah muatan sebesar 7000 kg
Tongkang Sungai menambah muatan sebesar 8000 kg
Jadi, Butuh Bahan Bakar sebanyak 5 Liter

- Analisa

  Program tersebut merupakan 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.




- PHP

047_Rizqi Cahya Angelita_index no2.php

```php
<!-- RIZQI CAHYA ANGELITA
     21091397047 -->

<?php
    require_once '047_Rizqi Cahya Angelita_prak6 no2.php';
?>

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

<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</title>
</head>

<body>
    <div class="container">
        <br>
        <div class="row">
            <div class="col-5 mx-auto border p-3 mt-2">
                <h4 class="text-center"><strong><u>Soal 2</u></strong></h4>
                <br><br>
                <b><?php
                        echo "Superman";
                    ?></b> <br>
                <?= $superman->land(); ?> <br>
                <?= $superman->takeOff(); ?> <br>
                <?= $superman->fly(); ?> <br>
                <?= $superman->leapBuilding(); ?> <br>
                <?= $superman->stopBullet(); ?> <br>
                <?= $superman->stopBullet(); ?> <br>
                <br>
                <b><?php
                        echo "Bird";
                    ?></b> <br>
                <?= $bird->buildNest(); ?> <br>
                <?= $bird->takeOff(); ?> <br>
                <?= $bird->fly(); ?> <br>
                <?= $bird->land(); ?> <br>
                <?= $bird->layEggs(); ?> <br>
                <br>
                <b><?php
                        echo "Airplane";
                    ?></b> <br>
                <?= $airplane->takeOff(); ?> <br>
                <?= $airplane->fly(); ?> <br>
                <?= $airplane->land(); ?> <br>
            </div>
        </div>
    </div>
</body>

</html>
```

047_Rizqi Cahya Angelita_prak6 no2.php

```php
<!-- RIZQI CAHYA ANGELITA
     21091397047 -->

<?php

require_once '047_Rizqi Cahya Angelita_interface no2.php';

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 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() {
```

```php
        return 'Burung membuat sarang';
    }

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

class Superman implements Flyer {
    public function takeOff() {
        return 'Superman mengejar Batman';
    }

    public function land() {
        return 'Superman melawan Batman';
    }

    public function fly() {
        return 'Superman melancarkan pukulan';
    }

    public function leapBuilding() {
        return 'Batman terpental menabrak bangunan pencakar langit';
    }

    public function stopBullet() {
        return 'Polisi menembaki superman namun ditangkis';
    }
}

$airplane = new Airplane;
$bird = new Bird;
$superman = new Superman;
```

047_Rizqi Cahya Angelita_interface no2.php

```php
<!-- RIZQI CAHYA ANGELITA
     21091397047 -->

<?php

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

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

- OUTPUT

## Soal 2

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

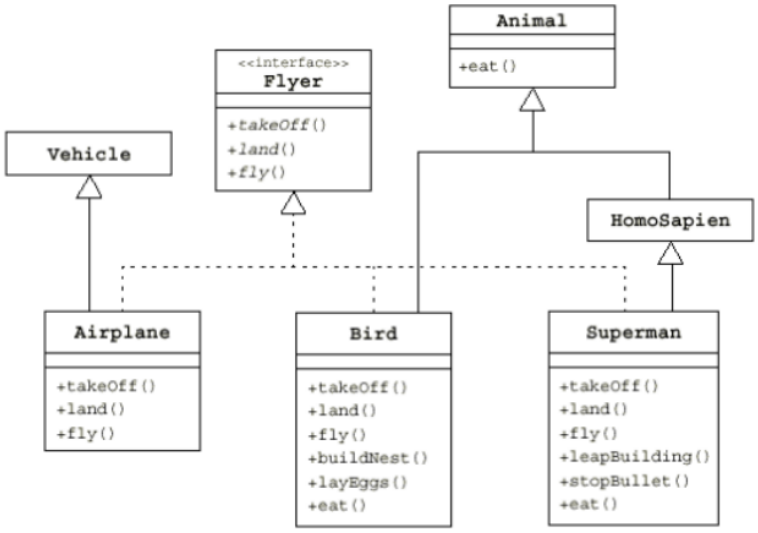
**Bird**
Burung membuat sarang
Burung mencari makan
Burung terbang
Burung kembali pulang
Burung bertelur

**Airplane**
Pesawat lepas landas..
Pesawat dalam perjalanan
Pesawat mendarat

- Analisa

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

3. Buat program berdasarkan UML berikut.




- PHP

047_Rizqi Cahya Angelita_index no3.php | 047_Rizqi Cahya Angelita_prak6 no3.php | 047_Rizqi Cahya Angelita_interface no3.php

```
<!-- RIZQI CAHYA ANGELITA
     21091397047 -->

<?php
    require_once '047_Rizqi Cahya Angelita_prak6 no3.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>Praktikum 6</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>
                <?= $manusia->eat(); ?> <br>
                <br>

                <b><?= $airplane2->getMaxLoad() . ' kg'; ?> <br></b>
                <?= $airplane2->addBox(6000) . ' kg'; ?> <br>
                <?= $airplane2->addBox(2000) . ' kg'; ?> <br>
                <?= $airplane2->addBox(7000) . ' kg'; ?> <br>
                <?= $airplane2->addBox(5000) . ' kg'; ?> <br>
                <?= $airplane2->takeOff(); ?> <br>
                <?= $airplane2->fly(); ?> <br>
                <?= $airplane2->land(); ?> <br>

                <?php
                        echo "Jadi, Butuh Bahan Bakar sebanyak " . $airplane2->calcFuelNeeds() . '
                            Liter'. '<br>';
                    ?>
                <br>
                <?= $superman2->eat(); ?> <br>
                <?= $superman2->land(); ?> <br>
                <?= $superman2->takeOff(); ?> <br>
                <?= $superman2->fly(); ?> <br>
                <?= $superman2->leapBuilding(); ?> <br>
                <?= $superman2->stopBullet(); ?> <br>
            </div>
        </div>
    </div>
</body>

</html>
```

047_Rizqi Cahya Angelita_index no3.php | 047_Rizqi Cahya Angelita_prak6 no3.php | 047_Rizqi Cahya Ange

```php
<?php

require_once '047_Rizqi Cahya Angelita_abstract no3.php';
require_once '047_Rizqi Cahya Angelita_interface no3.php';

class Animal
{
    protected $name;

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

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

class Homosapiens extends Animal {}

class Airplane2 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 dalam perjalanan";
    }

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



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

class Superman2 extends Homosapiens implements Flyer
{
    public function takeOff()
    {
        return "$this->name mengejar Batman";
    }

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

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

    public function leapBuilding()
    {
        return "Batman terpental menabrak bangunan pencakar langit";
    }

    public function stopBullet()
    {
        return "Polisi menembaki $this->name namun ditangkis";
    }
}

$burung = new Animal('Burung');
$manusia = new Homosapiens('Aransha');
$airplane2 = new Airplane2(25000, 'Batik Air');
$superman2 = new Superman2('Superman');
```

```php
<!-- RIZQI CAHYA ANGELITA
     21091397047 -->

<?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
<?php

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

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

- OUTPUT

**Soal 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

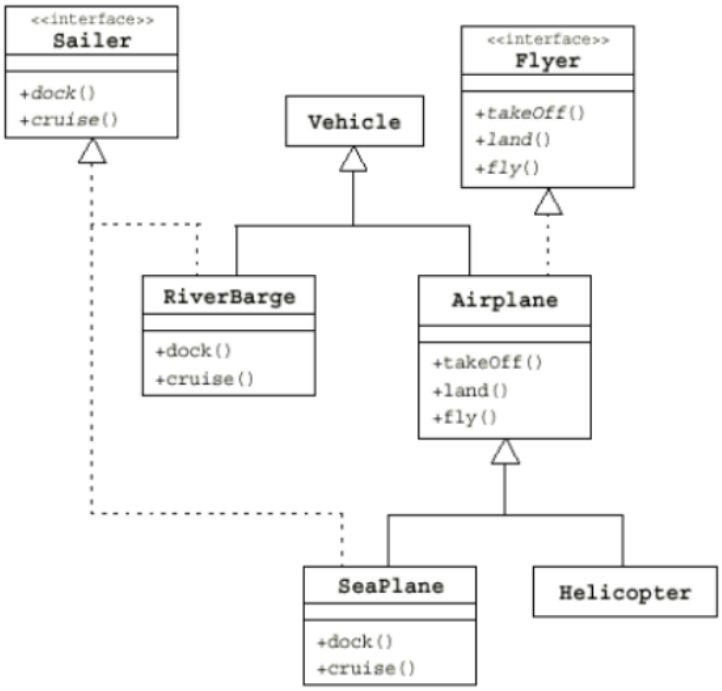
Superman sedang makan
Superman melawan Batman
Superman mengejar Batman
Superman melancarkan pukulan
Batman terpental menabrak bangunan pencakar langit
Polisi menembaki Superman namun ditangkis

- Analisa

Pada Program tersebut terdapat interface Flyer dan abtract 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 dan implementasi dari interface Flyer. Maka class Superman memiliki method eat, takeoff, land, fly.

4. Buat program berdasarkan UML berikut.




- PHP

047_Rizqi Cahya Angelita_index no4.php

```
<!-- RIZQI CAHYA ANGELITA
     21091397047 -->

<?php
    require_once '047_Rizqi Cahya Angelita_prak6 no4.php';
?>

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

<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</title>
</head>
<body>
        <div class="container">
  <div class="row">
  <h4 class="text-center"><strong><u>Soal No.4</u></strong></h4>
  <br><br>
    <div class="col-4 mx-auto border p-2 mt-2">
                <b><?= $riverBarge2->getMaxLoad() . ' kg'; ?> <br></b>
                <?= $riverBarge2->addBox(15000) . ' kg'; ?> <br>
                <?= $riverBarge2->addBox(10000) . ' kg'; ?> <br>
                <?= $riverBarge2->addBox(8000) . ' kg'; ?> <br>
                <?= $riverBarge2->addBox(2000) . ' kg'; ?> <br>
                <?= $riverBarge2->dock(); ?> <br>
                <?= $riverBarge2->cruise(); ?> <br>
                <?php
                        echo "Jadi, Butuh Bahan Bakar sebanyak " . $riverBarge2->calcFuelNeeds() . '
                            Liter'. '<br>';
```

```
                    ?>
    </div>
    <div class="col-4 mx-auto border p-2 mt-2">
                <b><?= $seaPlane->getMaxLoad() . ' kg'; ?> <br></b>
                <?= $seaPlane->addBox(15000) . ' kg'; ?> <br>
                <?= $seaPlane->addBox(7000) . ' kg'; ?> <br>
                <?= $seaPlane->dock(); ?> <br>
                <?= $seaPlane->cruise(); ?> <br>
                <?= $seaPlane->takeOff(); ?> <br>
                <?= $seaPlane->fly(); ?> <br>
                <?= $seaPlane->land(); ?> <br>
                <?php
                        echo "Jadi, Butuh Bahan Bakar sebanyak " . $seaPlane->calcFuelNeeds() . '
                            Liter'. '<br>';
                    ?>
    </div>
    <div class="col mx-auto border p-2 mt-2">
                <b><?= $helicopter->getMaxLoad() . ' kg'; ?> <br></b>
                <?= $helicopter->addBox(5000) . ' kg'; ?> <br>
                <?= $helicopter->addBox(7000) . ' kg'; ?> <br>
                <?= $helicopter->takeOff(); ?> <br>
                <?= $helicopter->fly(); ?> <br>
                <?= $helicopter->land(); ?> <br>
                <?php
                        echo "Jadi, Butuh Bahan Bakar sebanyak " . $helicopter->calcFuelNeeds() . '
                            Liter'. '<br>';
                    ?>
    </div>
  </div>
</div>
</body>

</html>
```

047_Rizqi Cahya Angelita_prak6 no4.php

```
<!-- RIZQI CAHYA ANGELITA
     21091397047 -->

<?php

require_once '047_Rizqi Cahya Angelita_abstract no4.php';
require_once '047_Rizqi Cahya Angelita_interface no4.php';

class RiverBarge2 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';
    }
}

class Airplane2 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;
    }

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

        return ceil($fuel /= $trip);
    }
    public function takeOff() {
        return $this->name . ' lepas landas';
    }

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

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

$riverBarge2 = new RiverBarge2(40000, 'Atomic');
$seaPlane = new SeaPlane(30000, 'Titanic');
$helicopter = new Helicopter(15000, 'Brocklyn');
```

047_Rizqi Cahya Angelita_abstract no4.php

```php
<!-- RIZQI CAHYA ANGELITA
     21091397047 -->

<?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;
    }
}
```

047_Rizqi Cahya Angelita_interface no4.php

```php
<!-- RIZQI CAHYA ANGELITA
     21091397047 -->

<?php

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

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

- OUTPUT

**Soal No.4**

| | | |
|---|---|---|
| **Maksimal muatan Atomic 40000 kg** | **Maksimal muatan Titanic 30000 kg** | **Maksimal muatan Brocklyn 15000 kg** |
| Atomic menambah muatan sebesar 15000 kg | Titanic menambah muatan sebesar 15000 kg | Brocklyn menambah muatan sebesar 5000 kg |
| Atomic menambah muatan sebesar 10000 kg | Titanic menambah muatan sebesar 7000 kg | Brocklyn menambah muatan sebesar 7000 kg |
| Atomic menambah muatan sebesar 8000 kg | Titanic berada di dermaga | Brocklyn lepas landas |
| Atomic menambah muatan sebesar 2000 kg | Titanic sedang berlayar | Brocklyn dalam perjalanan |
| Atomic berada di dermaga | Titanic lepas landas | Brocklyn mendarat |
| Atomic sedang berlayar | Titanic dalam perjalanan | Jadi, Butuh Bahan Bakar sebanyak 9 Liter |
| Jadi, Butuh Bahan Bakar sebanyak 3 Liter | Titanic mendarat | |
| | Jadi, Butuh Bahan Bakar sebanyak 5 Liter | |

- Analisa

Program tersebut merupakan implementasi polymhorphism dengan interface dan abstract class di tunjukkan 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.