Code assignment Java developer v2.0

Welcome to the code assignment of Singtel. You are expected to spend 1 to 1.5 hours on

the assignment. If you run out of time, please submit the results as far as you got within this

amount of time. We value quality over quantity.

**Please create a repository in Github and share the link with results.** To set the correct

expectations: There is no “right” or “wrong” answer. We would like to see how you model

the objects in the assignment and learn your coding style. Stay close to how you would code

if this were an assignment in your regular day job.

**Furthermore:**

• Please keep a fine grained commit history with separate commits for each question.

• Please create meaningful Unit Tests.

• Please modify the code snippets provided to optimize for maintainability. Be aware

that the code snippets are deliberately flawed. We like to see you improve them.

• A README.md with basic documentation and a simple visualisation is appreciated. A

picture of a whiteboard or drawing on a paper is sufficient here.

• You are encouraged to be opinionated how you solve this. Show us your way of

working! Take creative liberty where you feel it is needed.

A. Let’s start with the basics

Given the following code...

**class Animal {**

**void walk(){**

**System.out.println("I am walking");**

**}**

**}**

**class Bird extends Animal {**

**void fly() {**

**System.out.println("I am flying");**

**}**

**}**

**public class Solution {**

**public static void main(String[] args) {**

**Bird bird = new Bird();**

**bird.walk();**

**bird.fly();**

**bird.sing();**

**}**

**}**

1. Can you implement the sing() method for the bird? Please refer to the source code

a. How did you unit test it? by calling all the method: walk, fly, and sing. Either manually or using unit test tools.

b. How did you optimize the code for maintainability?

(Ask yourself the same question for all following exercises)

Avoid do harcode in the class, use parameter instead.

Separate each class into different java file.

2. Now, we have 2 special kinds of birds: the Duck and the Chicken... Can you

implement them to make their own special sound? Please refer to the source code

a. A duck says: “Quack, quack”

b. A duck can swim

*c.* A chicken says: “Cluck, cluck”

*d.* A chicken cannot fly *(assumption: its wings are clipped but ignore that)*

3. Now how would you model a rooster? Rooster extends Chicken

a. A rooster says: “Cock-a-doodle-doo”

b. How is the rooster related to the chicken? Rooster is sub class of Chicken

c. Can you think of other ways to model a rooster without using inheritance?

Please refer to the source code

4. Can you model a parrot? We are specifically interested in three parrots, one that

lived in a house with dogs one in a house with cats, the other lived on a farm next to

the rooster.

a. A parrot living with dogs says: “Woof, woof”

b. A parrot living with cats says: “Meow”

c. A parrot living near the rooster says: “Cock-a-doodle-doo”

d. How do you keep the parrot maintainable? What if we need another parrot

lives near a Duck? Or near a phone that rings frequently? By using constructor. Please refer to the source code.

B. Model fish as well as other swimming animals

1. In addition to the birds, can you model a fish? Please refer to the source code.

a. Fishes don’t sing

b. Fishes don’t walk

c. Fishes can swim

2. Can you specialize the fish as a Shark and as a Clownfish? Please refer to the source code.

a. Sharks are large and grey

b. Clownfish are small and colourful (orange)

c. Clownfish make jokes

d. Sharks eat other fish

3. Dolphins are not exactly fish, yet, they are good swimmers

a. Can you model a dolphin that swims without inheriting from a fish class? Please refer to the source code.

b. How do you avoid duplicating code or introducing unneeded overhead? Put the general attribute and function in the Animal class. i.e: move walk and fly method in Animal class. Please refer to the source code.

D. Model animals that change their behaviour over time

1. Can you model a butterfly? Please refer to the source code.

a. A butterfly can fly

b. A butterfly does not make a sound

2. Can you optimize your model to account for the metamorphosis from caterpillar to

butterfly? Please refer to the source code.

a. A caterpillar cannot fly

b. A caterpillar can walk (crawl)

E. Counting animals

Suppose you have an array of animals, e.g.

**Animal[] animals = new Animal[]{**

**new Bird(),**

**new Duck(),**

**new Chicken(),**

**new Rooster(),**

**new Parrot(),**

**new Fish(),**

**new Shark(),**

**new Clownfish(),**

**new Dolhpin(),**

**new Frog(),**

**new Dog(),**

**new Butterfly(),**

**new Cat()**

**};**

**Note**: The above instantiation may be different if you chose to set up your object model

differently… *(hopefully you did)*

1. Can you share the code to count:

a. how many of these animals can fly?

b. how many of these animals can walk?

c. how many of these animals can sing?

d. how many of these animals can swim?

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| --- |
| int countCanFly = 0;  int countCanWalk = 0;  int countCanSwim = 0;  int countCanSing = 0;  for (Animal tmpAnimal : animals) {  if (tmpAnimal.canFly) {  countCanFly++;  }  if (tmpAnimal.canWalk) {  countCanWalk++;  }  if (tmpAnimal.canSwim) {  countCanSwim++;  }  if (tmpAnimal.canSing) {  countCanSing++;  }  }  System.out.println("canFly: " + countCanFly  + "; canWalk: " + countCanWalk  + "; canSwim: " + countCanSwim  + "; canSing: " + countCanSing); |

BONUS

If you still have time left, please consider the following:

1. Can you add a second language (if you know a language other than English) Use the

rooster as a PoC for demonstrating this. For example, this is how the Rooster sounds

differently depending on language. Please add the rooster sound in your native

tongue.

• Danish: kykyliky

• Dutch: kukeleku

• Finnish: kukko kiekuu

• French: cocorico

• German: kikeriki

• Greek: kikiriki

• Hebrew: coo-koo-ri-koo

• Hungarian: kukuriku

• Italian: chicchirichi

• Japanese: ko-ke-kok-ko-o

• Portuguese: cucurucu

• Russian: kukareku

• Swedish: kuckeliku

• Turkish: kuk-kurri-kuuu

• Urdu: kuklooku

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| --- |
| I assume this question is related on how to create our own localization implementation of Rooster sound based on the different country language.  We can create hashmap and put the language/sound pair into it.  Otherwise use java ResourceBunle and create different properties files, each properties file for one language. |

2. Can you design a RESTful API for querying these animals?