Java Programming II
Lab3

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Kyoung Shin Park
Computer Engineering
Dankook University

Lab3

❑ Practice to write a program that shows AnimalKingdom displays using **Observer pattern.**
- The concrete Subject (AnimalKingdom) takes List<Animal> and then updates(add/remove) Animal using random Thread.sleep.
- The 3 concrete Observers (PopulationDisplay, ListDisplay, SurveyDisplay) can be added or deleted at any time using random Thread.sleep.
- When there is new added/removed Animal in AnimalKingdom, it is notified to all registered observers.

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❑ The abstract class **Animal** contains **name, move, breath, reproduce, numberOfLegs, and abstract method AnimalType type().**
- "Dog", "walk", "lungs", "live birth", 4, AnimalType.MAMMAL
- "Ostrich", "fly", "lungs", "lay eggs", 2, AnimalType.BIRD
- "Turtle", "walk", "lungs", " lay eggs", 4, AnimalType.REPTILE
- "Frog", "walk & swim", " lung & gills", " lay eggs", 4, AnimalType.AMPHIBIAN
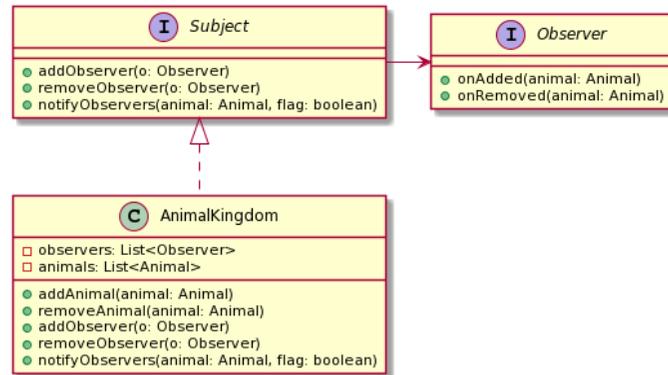- "Salman", "swim", "gills", "lay eggs", 0, AnimalType.FISH

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❑ **Mammal, Bird, Reptile, Amphibian, Fish** extends Animal and contains its characteristics.
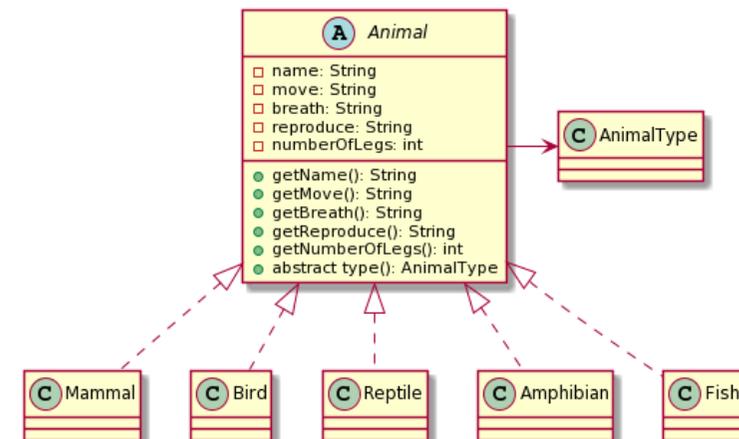
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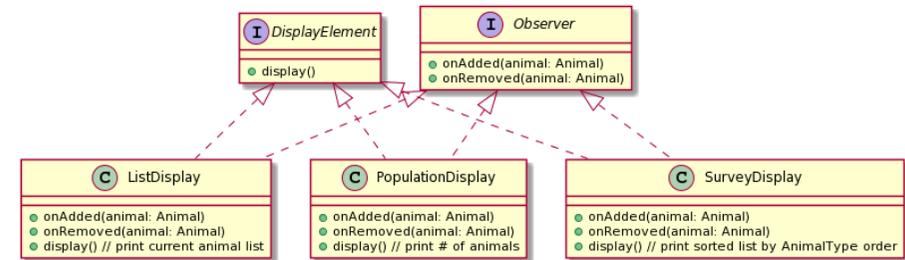- **AnimalKingdom** updates(add/remove) Animal.
  - The constructor takes List<Animal>.
  - notifyObservers(Animal animal, Boolean flag) **updates Animal** to **all registered observers**.
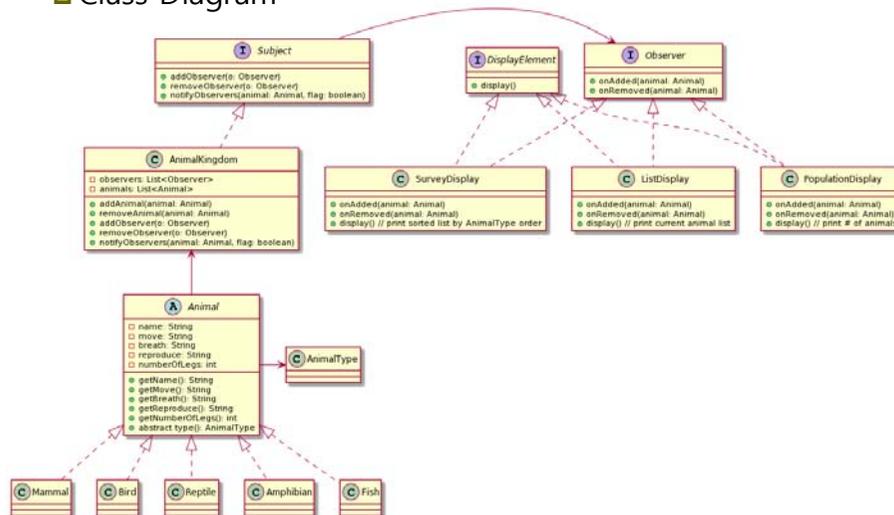

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- Observers
  - ListDisplay - displays the current list of animals.
  - PopulationDisplay - displays the total # of animals
  - SurveyDisplay - displays the list of animals sorted by Mammal, Bird, Reptile, Amphibian, Fish order.

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- Class Diagram

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- MainTest class tests add new observers and delete observers at random time to see if the registered observers can display its data using the data updates.
  - First, initiate AnimalKingdom.
  - Then, add/remove Animal in AnimalKingdom.
  - For each add/remove Animal, Sleep randomly using Thread.sleep(1000) // sleep 1 second
  - Then, add observers (ListDisplay, PopulationDisplay, SurveyDisplay) with short term sleep.
  - Then, delete observers.
  - Then, stop thread.

Submit to e-learning

- Add your code (e.g., additional method, class, routine, etc) in the Lab3 assignment.
- Submit the Lab3 assignment (JAVA21-2-HW3-ID-name.zip including the report) to e-learning.