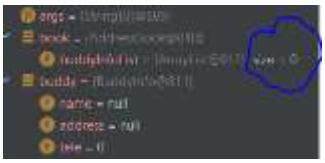
Lab 3

Section 1: Git and Debug

Part 1

Step 5: size = 0



Step 7: size value has changed, size = 1

Part 2

Step 7: https://github.com/mralifahd/Lab3

Step 11: change is not automatically shown online, you need to push

Section 2: Definitions

Tight vs loose coupling:

Loose coupling is minimizing the dependencies for a class that uses another class directly.

Tight coupling is when classes and their instances(objects) are dependent on each other.

Source: https://www.interviewsansar.com/loose-coupling-and-tight-coupling-in-java/

Ex:

```
class A {
   public int a = 0;
   public int getA() {
      System.out.println("getA() method");
      return a;
   }
   public void setA(int aa) {
      if(!(aa > 10))
         a = aa;
   }
}
public class B {
   public static void main(String[] args) {
      A aObject = new A();
      aObject.a = 100; // Not suppose to happen as defined by class A, this causes ti
      System.out.println("aObject.a value is: " + aObject.a);
   }
}
```

If we change variable A then class B breaks, tight coupling

```
class A {
   private int a = 0;
   public int getA() {
      System.out.println("getA() method");
      return a;
   }
   public void setA(int aa) {
      if(!(aa > 10))
         a = aa;
   }
}
public class B {
   public static void main(String[] args) {
      A aObject = new A();
      aObject.setA(100); // No way to set 'a' to such value as this method call will
                         // fail due to its enforced rule.
      System.out.println("aObject value is: " + aObject.getA());
   }
}
```

If class A changes internally class B will not break, loose coupling

Source: https://www.tutorialspoint.com/what-are-the-differences-between-tight-coupling-and-loose-coupling-in-java

Encapsulation:

Encapsulation is the wrapping of data (variables) and code acting on the data (methods) together as a single unit. Variables of a class will be hidden from other classes, and can only be accessed through the methods of their current class.

For example, If I have a train system with multiple car objects and a separate class called booking, in order to adjust the setting in the car object from my booking object I would have to call get or set methods of the car class. For example, if I want to book a seat in a car. Seats will be a private field in car class that can only be changed/booked via a set method in the class which I call from my booking object.

Also called data hiding.

Source:
https://www.tutorialspoint.com/java/java_encapsulation.htm#:~:text=Encapsulation%20in%20Java%20is%20a,methods%20of%20their%20current%20class.

Class cohesion:

Cohesion is making sure that a class is designed with a single, well-focused purpose.
The more focused a class is, the cohesiveness of that class is more. Classes become easier to maintain and easier to reuse

Ex: like in the image below just specify the different possible methods you would have in their own classes. Different actions in different classes.

Pictorial view of high cohesion and low cohesion:

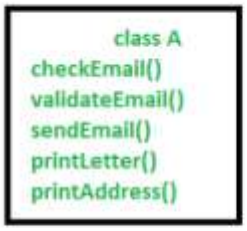


Fig: Low cohesion

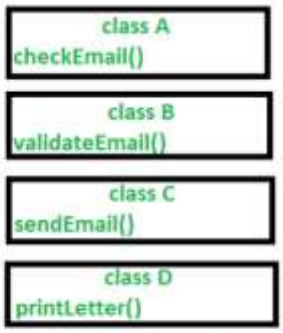


Fig: High cohesion

Sources: https://www.geeksforgeeks.org/cohesion-in-java/#:~:text=Cohesion%20is%20the%20Object%20Oriented,of%20that%20class%20is%20more.

Law of Demeter:

The Law of Demeter attempts to minimize coupling between classes in any program. The idea is to prevent reaching into an object and gaining access to a third object's methods or more.

Ex: "Only talk to your immediate friends." "Don't talk to strangers."
The idea is to not do code like this:

objectA.getObjectB().doSomething();

Source: https://alvinalexander.com/java/java-law-of-demeter-java-examples/#:~:text=Summary%3A%20The%20Law%20of%20Demeter,using%20Java%20source%20code%20examples.&text=The%20Law%20of%20Demeter%20for,to%20a%20third%20object's%20methods.