Java Programming 2-3:
Java Class Design –Abstract Classes Practice Activities

JavaBank.java Updates:

a. AbstractBankAccount

b. displayAccountDetails(AbstractBankAccount account)

c. account.toString()

d. Ensure method calls pass AbstractBankAccount objects.

(1 TO 3)

1.Reason for Abstract Class: Abstract classes can provide common behavior (methods) with some implementation, while interfaces cannot.

2.Update Bike Class: Make Bike abstract: public abstract class Bike.

3.Remove bike4 Code: Delete or comment out bike4 instantiation from the driver class.

```java
public class Animal {
        public void makeNoise() {
                System.out.println("talk");
        }//end method makeNoise
}//end class Animal
```

```java
public class Dog extends Animal {
        public void makeNoise() {
                System.out.println("Bark");
        }//end method makeNoise
}//end class Dog
```

4. Convert printDescription to toString: Change method name to toString() in all classes, then update console display code

```java
Animal animal = new Animal();
animal.makeNoise();
Dog dog = new Dog();
dog.makeNoise();
Animal animaldog = new Dog();
animaldog.makeNoise();
```

Output:
talk
Bark
Bark

6.The makeNoise method in Dog overrides the one in Animal, so Dog instances use Bark.B

```java
if (animal instanceof Animal)
        System.out.println("animal is Animal");
if (dog instanceof Animal)
        System.out.println("dog is Animal");
if (animaldog instanceof Animal)
        System.out.println("animaldog is Animal");
if (animal instanceof Dog)
        System.out.println("animal is Dog");
```

Output:
animal is Animal
dog is Animal
animaldog is Animal
animal and dog are instances of Animal and dog respectively, while animaldog is an instance of Dog, which is a subclass of Animal. animal is not a Dog.

7.Casting Description:
Primitives: Convert between data types, e.g., int to double (automatic) or double to int (explicit).
Objects: Change object type reference, e.g., upcasting to a superclass or downcasting to a subclass.

8.Casting Examples:
A:Upcast: Animal animal = new Dog();
Downcast: Dog dog = (Dog) animaldog; (after checking instanceof)