Assignment Unit 2

1. Explain the concept and types of inheritance in Java and its benefits.
2. What is the `super` keyword used for in Java? Describe the concept of the super keyword in Java with an example.
3. **Basic Inheritance: Vehicle and Car**

* **Problem:** Create a class Vehicle with attributes make, model, and year. Create a subclass Car that adds numDoors and fuelType. Write methods for starting and stopping the vehicle. Override the start() method in the Car class.
* **Objective:** Demonstrate basic inheritance and method overriding.

**4. Multilevel Inheritance: Animal Kingdom**

* **Problem:** Create a base class Animal with a method makeSound(). Create two subclasses: Mammal and Bird, each overriding the makeSound() method. Then, create a further subclass Dog (extending Mammal) and Parrot (extending Bird), and override the method again.
* **Objective:** Demonstrate multilevel inheritance and method overriding.

**5. Constructor Inheritance and super Keyword: Employee and Manager**

* **Problem:** Create a class Employee with attributes like name and salary, and a constructor to initialize them. Create a subclass Manager that has an additional attribute department. Use the super keyword to invoke the parent class's constructor.
* **Objective:** Demonstrate constructor inheritance and the use of the super keyword.

**6. Hierarchical Inheritance: Shapes**

* **Problem:** Create a base class Shape with methods for calculating the area. Derive three classes from Shape: Circle, Rectangle, and Triangle, each overriding the calculateArea() method.
* **Objective:** Show how multiple classes can inherit from a single base class and override its methods differently.

**7. Protected Members and Inheritance: Person and Student**

* **Problem:** Create a class Person with protected attributes name and age. Create a subclass Student that extends Person and has an additional attribute grade. Show how the subclass can access the protected members of the superclass.
* **Objective:** Demonstrate the use of protected members in inheritance.

**8. Super and This Keywords in Inheritance: Company Hierarchy**

* **Problem:** Create a class Employee with attributes like name and salary. Create a subclass Manager with an additional attribute teamSize. Use this to refer to the current object and super to refer to the superclass.
* **Objective:** Demonstrate the difference between this and super in an inheritance hierarchy..

9. Define Array in JAVA? Write a program to reverse an Array.

10. Write a program to replace a substring from a string using string functions.