Write a Java program to create a base class Vehicle with methods startEngine() and stopEngine(). Create two subclasses Car and Motorcycle. Override the startEngine() and stopEngine() methods in each subclass to start and stop the engines differently.

Sample Solution:

Java Code:

```
// Vehicle.java
// Define the abstract Vehicle class
abstract class Vehicle {
  // Abstract method to start the engine
  public abstract void startEngine();

  // Abstract method to stop the engine
  public abstract void stopEngine();
}
```

Copy

```
// Car.java
// Define the Car class that extends Vehicle
class Car extends Vehicle {
  // Override the startEngine method
  @Override
  public void startEngine() {
    // Print that the car engine started with a key
    System.out.println("Car engine started with a key.");
  }

  // Override the stopEngine method
  @Override
  public void stopEngine() {
    // Print that the car engine stopped when the key was turned off
    System.out.println("Car engine stopped when the key was turned off.");
  }
}
```

```
// Motorcycle.java
// Define the Motorcycle class that extends Vehicle
class Motorcycle extends Vehicle {
  // Override the startEngine method
```

```
    @Override
    public void startEngine() {
      // Print that the motorcycle engine started with a kick-start
      System.out.println("Motorcycle engine started with a kick-start.");
    }

    // Override the stopEngine method
    @Override
    public void stopEngine() {
      // Print that the motorcycle engine stopped when ignition was turned of
      System.out.println("Motorcycle engine stopped when ignition was turned
    }
  }
```

```
// Main.java
// Define the Main class
public class Main {
  // Main method, program entry point
  public static void main(String[] args) {
    // Create a Vehicle reference to a Car object
    Vehicle car = new Car();
    // Create a Vehicle reference to a Motorcycle object
    Vehicle motorcycle = new Motorcycle();

    // Start and stop the engine for the car
    startAndStopEngine(car);
    // Start and stop the engine for the motorcycle
    startAndStopEngine(motorcycle);
  }

  // Method to start and stop the engine of a given vehicle
  public static void startAndStopEngine(Vehicle vehicle) {
    // Start the engine of the vehicle
    vehicle.startEngine();
    // Stop the engine of the vehicle
    vehicle.stopEngine();
  }
}
```

Output:

```
Car engine started with a key.
Car engine stopped when the key was turned off.
Motorcycle engine started with a kick-start.
Motorcycle engine stopped when ignition was turned off.
```

Explanation: