Explain the four main concepts of OOP (Object Oriented Programming) and provide examples for each.

Abstraction- Using simpler things to represent complexity. With Java, things like objects, classes and variables represent more complex underlying data and code.

Ex. My wristwatch that I put on every morning provides me with the time and date. However, this is all it does. But to do this simple thing it must have a completely intact and properly functioning interior of complex splined wheels and a tiny battery that must also work. In this way a watch may seem simple but underneath the surface it is very intricate.

Encapsulation- This practice keeps fields within a class private, then provides access to them through public methods. It makes sure code and data stay safe within a class itself. Then this allows us to reuse things like variables or code components without allowing full system-wide access.

Ex. When I logged in to my email, there were processes going on in the background. My password in an encrypted form was retrieved, verified and then allowed me access. I have no idea how it was verified, and this keeps it private.

Inheritance- This is a special feature of Java OOP. Programmers can create new classes that share attributes of already existing ones. Then you can build on prior work without redoing the whole cycle. Reuse fields and methods of existing class.

Ex. I inherited certain genes from my mom and dad, because of that I will have a lot of their same characteristics.

Polymorphism- Allows programmers to use the same word to mean different things in different contexts. Method overloading is one of its forms in Java. Its when different meanings are implied by the code itself. Method overriding is another. Its when different meanings are implied by the values of supplied variables.

Ex. Homographs are words that are spelled the same but have different meanings. Fair, lie, and tear all have two meanings but the words are spelled the same.