

Unit 5

The new material in this unit covers the remaining major features for object-oriented programming in Java, particularly the essential topics of inheritance and polymorphism. The unit also covers interfaces, which are intended to replace multiple inheritances, a feature Java does not support.

The reading assignment is the second half of Chapter 5 of Eck (2019). Sections 5, 6, and 7 are all very important, while Section 8 covers newer, advanced features of Java that may be less important for beginning programmers.

A critical feature that enables much of the power of inheritance in Java is the ability for variables to reference objects of any subclass of their class, as Eck (2014) emphasizes in Section 5.5:

A variable that can hold a reference to an object of class A can also hold a reference to an object belonging to any subclass of A.

The behavior of a variable depends on the subclass of the object it references. In particular, methods defined in the class of the variable can be overridden in the subclass of the object it refers to. *It is important to understand that only methods can be overridden in subclasses, not constructors or member variables.* It will take practice to understand the complex interplay of methods, member variables, and constructors in subclasses.

LECTURES

UniProgrammer. (2018, July 18). *Java Programming Tutorial - 31 - Inheritance, Abstract Classes and Abstract Methods* [Video]. YouTube. <https://www.youtube.com/watch?v=pQKg5SuGdPg>

Appficial. (2018). *Java Inheritance - Creating Constructors using the Super Method Example - APPFICIAL* [Video]. <https://www.youtube.com/watch?v=MHZHwbUZYJM>

Aprint. G. (2019, September 11). *How to use Nested Classes in Java (Static, Inner, Local, and Anonymous)* [Video]. YouTube. <https://www.youtube.com/watch?v=sB3WX6uoU8Y>

Reading Assignment

Eck, D. J. (2019). *Introduction to programming using Java, version 8.1*. <http://math.hws.edu/javanotes>.

Read the following:

Chapter 5, sections 5-8

Supplementary Reading

Gallardo, R., Hommel, S., Kannan, S., Gordon, J., and Zakhour, S.B. (2016). *The Java tutorials*. Oracle.

- What is inheritance? <https://docs.oracle.com/javase/tutorial/java/concepts/inheritance.html>
- What is an interface? <https://docs.oracle.com/javase/tutorial/java/concepts/interface.html>
- Lessons: Interfaces and inheritance.
<https://docs.oracle.com/javase/tutorial/java/IandI/index.html>
- Using the this keyword. <https://docs.oracle.com/javase/tutorial/java/javaOO/thiskey.html>