This course supports the assessments for TXP1. The course covers 3 competencies and represents 2 competency units.

Introduction

Overview
Welcome! This course outlines the sequence of steps required to develop the necessary competence in introductory programming using Java.

Watch the following video introduction for this course:

Competencies
This course provides guidance to help you demonstrate the following 3 competencies:

- **Competency 440.1.1: Control Structures**
  The graduate develops working programs that use appropriate control structures and accurately evaluates execution paths in program code.

- **Competency 440.1.2: Algorithm Design and Development**
  The graduate designs and develops algorithms for problem solving and implements those algorithms using appropriate program code.

- **Competency 440.1.3: Use of Data Structures**
  The graduate develops working programs that use appropriate data structures for problem solving.

Course Instructor Assistance
As you prepare to successfully demonstrate competency in this subject, remember that course instructors stand ready to help you reach your educational goals. As subject matter experts, mentors enjoy and take pride in helping students become reflective learners, problem solvers, and critical thinkers. Course instructors are excited to hear from you and eager to work with you.

Successful students report that working with a course instructor is the key to their success. Course instructors are able to share tips on approaches, tools, and skills that can help you apply the content you're studying. They also provide guidance in assessment preparation strategies and troubleshoot areas of deficiency. Even if things don’t work out on your first try, course instructors act as a support system to guide you through the revision process. You should expect to work with course instructors for the duration of your coursework, so you are welcome to contact them as soon as you begin. Course instructors are fully committed to your success!

Preparing for Success
The information in this section is provided to detail the resources available for you to use as you complete this course.
Learning Resources

The learning resources listed in this section are required to complete the activities in this course. For many resources, WGU has provided automatic access through the course. However, you may need to manually enroll in or independently acquire other resources. Read the full instructions provided to ensure that you have access to all of your resources in a timely manner.

Automatically Enrolled Learning Resources

You will be automatically enrolled at the activity level for the following learning resources. Simply click on the links provided in the activities to access the learning materials.

WileyPLUS: Java for Everyone

The following textbook is available to you as an e-text within this course. You will be directly linked to the specific readings and resources required within the activities that follow.


In addition to the provided text listed above, the WileyPLUS learning resource is a completely online resource which includes readings, videos, and interactive exercises. Targeted feedback and self-assessment tools, as well as trackable exercises, will help you assess your strengths and quickly address misconceptions.

The assignments provided in this course are designed to guide you through the full WileyPLUS learning resource.

*Note: The e-text is available to you as part of your program tuition and fees, but you may purchase hard copies at your own expense through a retailer of your choice. If you choose to do so, please use the ISBN listed to ensure that you receive the correct edition.*

Supplemental Lynda.com Videos

To supplement your understanding, you may wish to access Lynda.com video modules to reinforce course concepts. Specific Lynda.com courses will be suggested within the following activities, and other topics are available by accessing Lynda.com.

Other Learning Resources

You will also utilize the following resources:

NetBeans and/or the Java SE Development Kit (JDK)

You will be required to develop Java applications for this course, Introduction to Programming.

NetBeans is the recommended integrated development environment (IDE). This IDE will provide you an editor, debugger, and the Java Development Kit.

*Note: If you choose NetBeans as your IDE, you will not have to download the Java SE Development Kit (SDK) as a separate activity. You can download the SDK bundled with
NetBeans (recommended).

Download NetBeans (which contains the Java SE Development Kit) from the following web page. Then follow the installation instructions for Java SE NetBeans IDE Download Bundle.

- "Java SE Downloads"

Demonstration Screenshots in NetBeans
Download the following document:

- Demonstrations of First 4 Activities

This document provides screenshots of step-by-step demonstrations for completing the activities in the "Editing, Compiling, Running, and Debugging in NetBeans" subsection within the "Getting Familiar With the Integrated Development Environment" section of this course.

Pacing Guide
The pacing guide suggests a weekly structure to pace your completion of learning activities. It is provided as a suggestion and does not represent a mandatory schedule. Follow the pacing guide carefully to complete the course in the suggested timeframe.

- Pacing Guide: Project in Introduction to Programming

Note: This pacing guide does not replace the course. Please continue to refer to the course for a comprehensive list of the resources and activities.

Control Structures

This section will give you practice with using control structures to create execution paths. The majority of the applications you will develop require the use of control structures for development of the logical flow of events, behavior, and actions.

Using the WileyPLUS Introduction to Programming Course
This section teaches how to navigate and use the WileyPLUS resource.

This topic addresses the following competencies:

- Competency 440.1.1: Control Structures
  The graduate develops working programs that use appropriate control structures and accurately evaluates execution paths in program code.
- Competency 440.1.2: Algorithm Design and Development
  The graduate designs and develops algorithms for problem solving and implements those algorithms using appropriate program code.
- Competency 440.1.3: Use of Data Structures
  The graduate develops working programs that use appropriate data structures for problem solving.
When you enter the WileyPLUS course, you will be automatically directed to the Assignment page. You will start work on Assignment 01 and work through the assignments sequentially through assignment 27.

The course consists of the following components for each chapter; each chapter must be read in its entirety.

- Reading Assignments
- Review Exercises*
- Programming Exercises*

*Note: The Review and Programming Exercises are not instructor-graded.

If you would like to preview the WileyPLUS resource, you may do so by accessing the following web page:

- WileyPLUS: Java for Everyone Assignment

**Introduction to Software Development**

Programming is the act of designing or organizing tasks in sequences using a language that can be translated to machine code which is understood by a computer.

This topic addresses the following competencies:

- Competency 440.1.1: Control Structures
  The graduate develops working programs that use appropriate control structures and accurately evaluates execution paths in program code.
- Competency 440.1.2: Algorithm Design and Development
  The graduate designs and develops algorithms for problem solving and implements those algorithms using appropriate program code.
- Competency 440.1.3: Use of Data Structures
  The graduate develops working programs that use appropriate data structures for problem solving.

This topic highlights the following key concepts:

- Software development process
- Compile-time and run-time errors

**An Introduction**

Read chapter 1 ("Introduction") in *Java for Everyone* from the following web page:

- WileyPLUS Assignment

Watch the corresponding videos and animations. Complete the following Review Exercises:
You can find the answers to review exercises by scrolling to the bottom of each chapter’s Introduction. Under the heading “Instructor-Provided,” click the chapter’s solutions to “Review Exercises."

Programming is an active discipline. It is a skill that requires practice, like playing tennis or parallel parking. Learning to program without coding practice is either extremely difficult or virtually impossible for most people. DO NOT SKIP THE PROGRAMMING EXERCISES. The WileyPLUS resource provides exercises at the end of every chapter; if your degree program has an emphasis in programming, or you are preparing for the second attempt at the exam, completing all additional exercises for ALL chapters is recommended.

Complete the following chapter 1 programming exercises. If you would like to see the solutions to the programming exercises to check your work, please contact a Course Instructor.

- P1.1
- P1.2
- P1.3

If you would like to check your work by reviewing the solutions to the programming exercises too, please contact a Course Instructor.

Algorithm Development and Pseudocode

An algorithm is a way of solving a problem. Part of the development process is to develop algorithms to solve a problem presented by the software requirements. Pseudocode is used to represent algorithms in an English-like language rather than using a programming language.

This topic addresses the following competencies:

- **Competency 440.1.1: Control Structures**
  The graduate develops working programs that use appropriate control structures and accurately evaluates execution paths in program code.
- **Competency 440.1.2: Algorithm Design and Development**
  The graduate designs and develops algorithms for problem solving and implements those algorithms using appropriate program code.
- **Competency 440.1.3: Use of Data Structures**
  The graduate develops working programs that use appropriate data structures for problem solving.

This topic highlights the following key concepts:
- Steps for documenting an algorithm using pseudocode
- Algorithmic solution for programming problem statements

**Algorithm Design**

You might want to review section 1.7 ("Problem Solving: Algorithm Design"). This section provides you with an introduction to algorithm development. Most of your applications will require algorithm development. Algorithm development is very important and requires practice.

To review section 1.7 of chapter 1 ("Introduction") and complete the activities in this section, access the following web page:

- WileyPLUS Assignment

Complete the following Chapter 1 Review Exercises:

- R1.12
- R1.14

Complete the following Chapter 1 Programming Exercise:

- P1.5

**Data Types and Variables**

Variables and data are a part of most applications and certainly a part of the applications you will need to write for your student project. This section introduces you to variables and the data types provided by Java.

This topic addresses the following competencies:

- Competency 440.1.1: Control Structures
  The graduate develops working programs that use appropriate control structures and accurately evaluates execution paths in program code.
- Competency 440.1.2: Algorithm Design and Development
  The graduate designs and develops algorithms for problem solving and implements those algorithms using appropriate program code.
- Competency 440.1.3: Use of Data Structures
  The graduate develops working programs that use appropriate data structures for problem solving.

This topic highlights the following key concepts:

- Assignment operators
- Specified variable types
- Primitive data types
- Specified primitive data types
• String data structures

Input/Output and Exception Handling

Read chapter 2 (“Fundamental Data Types”) in *Java for Everyone* from the following web page:

- WileyPLUS Assignment

Watch the corresponding videos and animations.

Complete the following Chapter 2 Review Exercises:

- R2.1
- R2.3
- R2.4
- R2.5
- R2.8
- R2.9
- R2.10
- R2.12
- R2.13
- R2.14
- R2.21
- R2.22
- R2.23

Complete the following chapter 2 Programming Exercises:

- P2.3
- P2.4
- P2.6
- P2.7
- P2.15
- P2.19
- P2.26B

As a supplemental learning resource, you may also find the following Java Essential Training from Lynda.com videos helpful:

- section 4 (“Using Primitive Data Types”)
- section 6 (“Working with Complex Objects”) > (“Using the String class”)
- section 6 (“Working with Complex Objects”) > (“Parsing string values”)

**Comments and Documentation**

Virtually every modern programming language provides a way to insert comments among the
code. Comments are used to describe program functions and document algorithms.

This topic addresses the following competencies:

- Competency 440.1.1: Control Structures
  The graduate develops working programs that use appropriate control structures and accurately evaluates execution paths in program code.

- Competency 440.1.2: Algorithm Design and Development
  The graduate designs and develops algorithms for problem solving and implements those algorithms using appropriate program code.

- Competency 440.1.3: Use of Data Structures
  The graduate develops working programs that use appropriate data structures for problem solving.

This topic highlights the following key concepts:

- Single line comments and multiline comments for documenting a programmed algorithm

Comments

You might want to review section 2.1.6 ("Comments").

To review section 2.1.6 of chapter 2 ("Fundamental Data Types") and complete the activities in this section, access the following web page:

- WileyPLUS Assignment

After reviewing section 2.1.6, please complete the following Chapter 2 Programming Exercise:

- P2.1

Decisions and Conditional Expressions/Operators

The purpose of conditional statements is to execute a block of code based on whether a certain condition is true or false. If true, the block of code is executed; if false, the block of code is ignored. Decision structures are frequently required to develop the logic required for a program.

This topic addresses the following competencies:

- Competency 440.1.1: Control Structures
  The graduate develops working programs that use appropriate control structures and accurately evaluates execution paths in program code.

- Competency 440.1.2: Algorithm Design and Development
  The graduate designs and develops algorithms for problem solving and implements those algorithms using appropriate program code.

- Competency 440.1.3: Use of Data Structures
  The graduate develops working programs that use appropriate data structures for
problem solving.

This topic highlights the following key concepts:

- Decision statements
- Nested decision statements
- Break statements within a switch statement
- Develop a coded algorithm that uses an arithmetic operator to solve a particular problem.
- Relational operators
- Logical operators
- Boolean operators

**Decisions**

Read chapter 3 ("Decisions") in *Java for Everyone* from the following web page:

- [WileyPLUS Assignment](#)

Watch the corresponding videos and animations.

Complete the following Chapter 3 Review Exercises:

- R3.1
- R3.2
- R3.3
- R3.8
- R3.9
- R3.10
- R3.21
- R3.22
- R3.26
- R3.27
- R3.28

Complete the following Chapter 3 Programming Exercises:

- P3.1
- P3.4
- P3.9
- P3.10
- P3.12
- P3.18
- P3.19
- P3.21
Watch the following Java Essential Training section 5 (“Exploring Syntax and Flow”) videos helpful:

- “Writing conditional code”
- “Using the switch statement”
- “Understanding Operators”

**Loops**

This section demonstrates how to use for, while, and do-while loops. Computer applications are often developed to handle repetitive tasks. These control structures provide the ability to repeat program statements.

This topic addresses the following competencies:

- Competency 440.1.1: Control Structures
  The graduate develops working programs that use appropriate control structures and accurately evaluates execution paths in program code.
- Competency 440.1.2: Algorithm Design and Development
  The graduate designs and develops algorithms for problem solving and implements those algorithms using appropriate program code.
- Competency 440.1.3: Use of Data Structures
  The graduate develops working programs that use appropriate data structures for problem solving.

This topic highlights the following key concepts:

- For, do-while, or while loops
- Infinite loops
- Nested for-loops for displaying content of two dimensional arrays
- Arrays
- Array lists

**Understanding Loops**

Some loop structures might seem very similar. Although the differences might seem subtle to you, in programming, small variances can make big differences. Pay attention to the differences in the mechanics of each loop. For instance, the while and the do loop are often perceived as equal by new programmers, but there is one fundamental difference, the do loop will execute at least once, whereas the while loop might never execute if the condition is false.

Read chapter 4 (“Loops”) in Java for Everyone from the following web page:

- WileyPLUS Assignment

Watch the corresponding videos and animations. Complete the following Chapter 4 Review Exercises:
Complete the following Chapter 4 Programming Exercises:

- P4.1
- P4.2
- P4.3
- P4.4
- P4.9
- P4.12
- P4.19

As a supplemental learning resource, you may also find the following Java Essential Training section 5 (“Exploring Syntax and Flow”) videos helpful:

- (“Repeating code blocks with loops”)

**Methods**

You have learned how to develop algorithms using pseudocode; this section covers how to design and implement methods so that you are able to provide encapsulated functionality.

This topic addresses the following competencies:

- **Competency 440.1.1: Control Structures**
  The graduate develops working programs that use appropriate control structures and accurately evaluates execution paths in program code.

- **Competency 440.1.2: Algorithm Design and Development**
  The graduate designs and develops algorithms for problem solving and implements those algorithms using appropriate program code.

- **Competency 440.1.3: Use of Data Structures**
  The graduate develops working programs that use appropriate data structures for problem solving.

This topic highlights the following key concepts:
- Execution paths
- Methods that receive a specified set of passed parameters
- Methods that return specified return types
- Invoking a given method performing a specified behavior
- Variable scope

**Understanding Methods**

Read chapter 5 (“Methods”) in *Java for Everyone* from the following web page:

- WileyPLUS Assignment

Watch the corresponding videos and animations.

Complete the following Chapter 5 Review Exercises:

- R5.1
- R5.2
- R5.3
- R5.4
- R5.13

Complete the following Chapter 5 Programming Exercises:

- P5.1
- P5.2
- P5.6
- P5.7
- P5.15

As a supplemental learning resource, you may also find the following *Java Essential Training* section 5 (“Exploring Syntax and Flow”) videos helpful:

- (“Creating reusable code with methods”)
- (“Declaring methods with arguments”)
- (“Overloading method names with different signatures”)
- (“Passing arguments by reference or by value”)
- (“Creating a more complex calculator application”)

**Arrays and Array Lists**

Collections allow you to store and manipulate a collection of objects. The Java API provides several reusable data structures that are efficiently written. Knowing how to use these collection types will save you time—writing your own will likely be less efficient. This section introduces you to collection types, arrays, and array lists.
This topic addresses the following competencies:

- **Competency 440.1.1: Control Structures**
  The graduate develops working programs that use appropriate control structures and accurately evaluates execution paths in program code.

- **Competency 440.1.2: Algorithm Design and Development**
  The graduate designs and develops algorithms for problem solving and implements those algorithms using appropriate program code.

- **Competency 440.1.3: Use of Data Structures**
  The graduate develops working programs that use appropriate data structures for problem solving.

This topic highlights the following key concepts:

- Nested for-loops to display contents of two dimensional arrays.
- Arrays
- Array lists

**Understanding Arrays and Array Lists**

Read chapter 6 (“Arrays and Array Lists”) in *Java for Everyone* from the following web page:

- [WileyPLUS Assignment](#)

Watch the corresponding videos and animations.

Complete the following Chapter 6 Review Exercises:

- R6.1
- R6.2
- R6.4
- R6.7
- R6.8
- R6.11

Complete the following Chapter 6 Programming Exercises:

- P6.1
- P6.2
- P6.3
- P6.12
- P6.24
- P6.26

As a supplemental learning resource, you may also find the following [Java Essential Training](#) section 8 (“Using Data Collections”) videos helpful:
• (“Using simple arrays”)
• (“Using two-dimensional arrays”)
• (“Managing resizable arrays with ArrayList”)

Exceptions
When an error occurs in a Java application, an exception occurs. Exception handling is very important, but often overlooked. In this section you will learn how to catch, throw, and handle exceptions.

This topic addresses the following competencies:

• Competency 440.1.1: Control Structures
  The graduate develops working programs that use appropriate control structures and accurately evaluates execution paths in program code.
• Competency 440.1.2: Algorithm Design and Development
  The graduate designs and develops algorithms for problem solving and implements those algorithms using appropriate program code.
• Competency 440.1.3: Use of Data Structures
  The graduate develops working programs that use appropriate data structures for problem solving.

This topic highlights the following key concepts:

• Exceptions

Exception Handling

Read chapter 7 (“Input/Output and Exception Handling”) in Java for Everyone from the following web page:

• WileyPLUS Assignment

Watch the corresponding videos and animations.

Complete the following Chapter 7 Review Exercises:

• R7.1
• R7.2
• R7.3
• R7.5
• R7.6
• R7.8
• R7.9
• R7.15

Complete the following Chapter 7 Programming Exercises:
As a supplemental learning resource, you may also find the following Java Essential Training section 7 (“Exception Handling and Debugging) videos helpful:

- (“Handling exceptions with try/catch”)
- (“Throwing exceptions in methods”)

**Algorithm Design and Development**

Algorithms are methods of arriving at the solution of a particular problem. Algorithms are used extensively in programming. Describing algorithms in pseudocode can save you time by helping you eliminate errors before the programming takes place.

**Input, Output, and File Processing**

Oftentimes, algorithms require the use of data. You need a way to read and write data from sources such as files, ports, databases, the screen, and the keyboard. Input and output using the Java API I/O streams is usually a challenging subject. In this section you will focus on reading and writing to text files.

This topic addresses the following competencies:

- **Competency 440.1.2: Algorithm Design and Development**
  The graduate designs and develops algorithms for problem solving and implements those algorithms using appropriate program code.
- **Competency 440.1.3: Use of Data Structures**
  The graduate develops working programs that use appropriate data structures for problem solving.

This topic highlights the following key concepts:

- User input
- Command line input
- Print, printf, and println to display program output
- Working programs to Read and write a text file

**Input/Output Review**

If you need a refresher on Input and Output, read chapter 7 (Input/Output and Exception Handling”) and section 2.3 of chapter 2 (“Fundamental Data Types”) from the following web page:

- WileyPLUS Assignment
You can also review the videos and animation for chapter 7.

Complete the following Chapter 7 Review Exercises:

- R7.3
- R7.15

As a supplemental learning resource, you may also find the following Java Advanced Training section 8 ("Working with I/O Streams) videos helpful:

- "Reading and writing character streams"
- "Using buffered streams"
- "Scanning tokenized text"

**Introduction to Programming Project**

Complete the following project in TaskStream:

- Introduction to Programming: ITEC 3110 Project

For details about this student project, see the "Assessment" tab in this course.

**Classes and Objects**

Encapsulation is a key strategy for developing applications that are maintainable. Classes should be created to encapsulate data and to create code that is cohesive and easy to maintain.

When designing methods for your classes, you want to apply the algorithm development techniques used in your earlier activities to help you develop behavior that meets requirements.

This section provides an overview of classes, objects, attributes (instance variables), getters and setters, instance methods, and constructors.

This topic addresses the following competencies:

- 440.1.2: Algorithm Design and Development
  The graduate designs and develops algorithms for problem solving and implements those algorithms using appropriate program code.
- 440.1.3: Use of Data Structures
  The graduate develops working programs that use appropriate data structures for problem solving.

This topic highlights the following key concepts:

- Simple classes
- Instance methods for a class
- Constructors for a class
Understanding Objects and Classes

Read chapter 8 (“Objects and Classes”) in *Java for Everyone* from the following web page:

- [WileyPLUS Assignment](#)

Watch the corresponding videos and animations.

Complete the following Chapter 8 Review Exercises:

- R8.1
- R8.2
- R8.3
- R8.4
- R8.7
- R8.11
- R8.12
- R8.16

Complete the following Chapter 8 Programming Exercises:

- P8.1
- P8.2
- P8.5
- P8.8
- P8.11
- P8.16B

As a supplemental learning resource, you may also find the following [Java Essential Training](#) videos helpful:

- section 9 (“Creating Custom Classes”)

Use of Data Structures

You have already been introduced to data structures in the arrays section of this study plan. Different data structures can be used to create solutions for different types of problems. This section introduces you to a more sophisticated use of data structures, including the Java collection classes.

**Collections**

This section provides an introduction to collection hierarchy and how to collect objects in an application. Maps, which store key/value pairs, are also covered.

This topic addresses the following competency:
440.1.3: Use of Data Structures
The graduate develops working programs that use appropriate data structures for problem solving.

This topic highlights the following key concepts:

- Specified core Collection interfaces, sets, lists, and maps

**Arrays and Array Lists Review**

The subsequent activities build on the concepts learned during the chapter 6 reading and activities; if you feel like you need to refresh those concepts, review chapter 6 (“Arrays and Array Lists”) by accessing the following web page:

- [WileyPLUS Assignment](#)

**The Java Collections Framework**

Read chapter 15 (“The Java Collections Framework”) in *Java for Everyone* from the following web page:

- [WileyPLUS Assignment](#)

Watch the corresponding videos and animations.

Complete the following Chapter 15 Review Exercises:

- R15.1
- R15.3
- R15.4
- R15.9
- R15.14
- R15.15

Complete the following Chapter 15 Programming Exercises:

- P15.1
- P15.3
- P15.4
- P15.6
- P15.9
- P15.16

As a supplemental learning resource, you may also find the following [Java Essential Training](#) section 8 (“Using Data Collections”) videos helpful:
• (“Looping through collections with iterators”)

You may also find the following Java Advanced Training videos helpful:

• section 5 (“More of the Collections Framework”)

**Final Steps**

Congratulations on completing the activities in this course! This course has prepared you to complete the assessments associated with this course. If you have not already been directed to complete the assessments, schedule and complete your assessments now.

**Student Support**

WGU values your input! Please submit any feedback you have using the following form:

[Course Feedback](#)