

Proposal for 2024 summer Option II course: Introduction to Computer Science with Java

In accordance with the WWP requirements, the Quakerbridge Learning Center will implement the Option II Java Programming course as a 12 week program beginning May 13th. the course will be given online 2 days per week until June 21st, then from June 24th until August 2nd all students will be required to meet in person at the Quakerbridge Learning Center every weekday morning. Our curriculum provides content identical to the Johns Hopkins course. However, our course will be more ‘hands on’ and will include more hours of instruction.

1. **Installing Java and the Eclipse IDE**
2. **How to declare, initialize, and synthesize Java variables**
3. **How to use primitive data types, operators, and constants**
4. **How to use conditional statements to control a program’s flow and using the correct logical operators and expressions when designing a solution to a selection-based programming project**
5. **How to recognize Boolean expressions and use them in programming projects**
6. **How to implement relational operators & expressions in Java programs**
7. **How to identify appropriate usage of iterative constructs**
8. **How to design and use methods to effectively improve the efficiency of programs and reduce code redundancy**
9. **How to store, access, and manipulate large sets of data values through the usage of arrays**
10. **How to use String objects and associated methods**
11. **How to create and design classes using an object-oriented approach**
12. **How to implement inheritance in your Java programs, the pros and cons of inheritance, method overloading and overriding, and runtime polymorphism**
13. **How to implement abstract classes and abstract methods, cast objects in an inheritance hierarchy, and how to apply good inheritance design guidelines in your Java programs**
14. **How to design Java programs that use interfaces and write code that creates and uses interfaces**
15. **How to evaluate exception handling strategies and learn about the Java exception handling mechanisms**
16. **How to introduce Graphical User Interface, or GUI, components into your programs**
17. **How to use external files with your Java programs, to allow input and output of data to and from your programs**
18. **How to write objects to files and read objects from files using object serialization**
19. **How to use Java collections and generics to enhance your program robustness and flexibility**
20. **How to incorporate several common algorithms into your programs, and you'll learn how to discern which algorithm patterns will best solve your programming challenges**
21. **How Java is in use today in a variety of industries and applications**

In addition to the above course content, students will be required to analyze and program several projects of escalating complexity.