Unit B: Introduction to Computers and Java

Content Area: **Business/Tech.**
Course(s): **Advance Placement Computer Science A - Java**
Time Period: **September**
Length: **5 days**
Status: **Published**

Unit Overview

In unit B, students will learn some basic Java fundamentals and some common errors that may creep up on them. The students will cover the following:

- Computer Systems: Hardware and Software

- Parts of a Program

- Programming Languages

- Object Oriented Programming

Career Readiness, Life Literacies, & Key Skills

12.9.3.IT-PRG.1	Analyze customer software needs and requirements.
12.9.3.IT-PRG.2	Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
12.9.3.IT-PRG.3	Analyze system and software requirements to ensure maximum operating efficiency.
12.9.3.IT-PRG.4	Demonstrate the effective use of software development tools to develop software applications.
12.9.3.IT-PRG.5	Apply an appropriate software development process to design a software application.
12.9.3.IT-PRG.6	Program a computer application using the appropriate programming language.
12.9.3.IT-PRG.7	Demonstrate software testing procedures to ensure quality products.
12.9.3.IT-PRG.8	Perform quality assurance tasks as part of the software development cycle.
12.9.3.IT-PRG.9	Perform software maintenance and customer support functions.
12.9.3.IT-PRG.10	Design, create and maintain a database.
WRK.9.2.12.CAP.3	Investigate how continuing education contributes to one's career and personal growth.
TECH.9.4.12.CI.2	Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).
TECH.9.4.12.CI.3	Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).
TECH.9.4.12.CT.1	Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).
	Career planning requires purposeful planning based on research, self-knowledge, and informed choices.

Enduring Understandings

- Students should be able to choose the appropriate material and tools to perform a given task whether for input or output.

- Knowing the scope of a variable is necessary for a program to give to correct data.

- Knowing the benefits and abilities on debugging your own code is essential to programmers.

- Students should understand the uses of the arithmetic operators and operations, and the methods of how they affect a programs output.

- Students should understand the uses of presedent ored of mathematic functions in their codes outcome.

- Students whould be able to declaere, name and use variables and constants in theri codes.

- Students should be able to declare string and numeric variables and know the different data types.

Essential Questions

TEC.K-12.8.1.A.a	In a world of constant technological change, what skills should we learn?
TEC.K-12.8.1.A.b	How do I choose which technological tools to use and when it is appropriate to use them?
TEC.K-12.8.1.B.a	How can I transfer what I know to new technological situations/experiences?
TEC.K-12.8.1.B.b	What are my responsibilities for using technology? What constitutes misuse and how can it best be prevented?
TEC.K-12.8.2.B.a	How does technology extend human capabilities? What are the positive and negative consequences of technology? Should technologies that produce negative impact continue to be used?
TEC.K-12.8.2.B.b	When are the most sophisticated tools required and when are the simplest tools best?
TEC.K-12.8.2.C.a	Can a system continue to operate with a missing or malfunctioning component?

Lesson Titles/Objectives

- Homework: Chapter 2 Review Questions and Exercises
- Lesson: Computer Systems
- Lesson: First Program
- Lesson: Object-Oriented Programming
- Lesson: Programming Languages

Standards

TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.B.2	Apply previous content knowledge by creating and piloting a digital learning game or

	tutorial.
TECH.8.1.12.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.12.C.1	Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
TECH.8.1.12.E.CS1	Plan strategies to guide inquiry.
TECH.8.1.12.E.CS2	Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
TECH.8.1.12.E.CS4	Process data and report results.
TECH.8.2.12.C.1	Explain how open source technologies follow the design process.
TECH.8.2.12.C.CS1	The attributes of design.

Indicators

TECH.8.1.12.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.12.E.CS4	Process data and report results.
TECH.8.2.12.A.CS1	The characteristics and scope of technology.
TECH.8.2.12.A.CS2	The core concepts of technology.
TECH.8.2.12.C.CS1	The attributes of design.
TECH.8.2.12.D.CS1	Apply the design process.
TECH.8.2.12.E.1	Demonstrate an understanding of the problem-solving capacity of computers in our world.
TECH.8.2.12.E.2	Analyze the relationships between internal and external computer components.
TECH.8.2.12.E.3	Use a programming language to solve problems or accomplish a task (e.g., robotic functions, website designs, applications, and games).
TECH.8.2.12.E.4	Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).
TECH.8.2.12.E.CS1	Computational thinking and computer programming as tools used in design and engineering.

Inter-Disciplinary Connections

- Art
- English
- History
- Math
- Music
- Science

CRP.K-12.CRP12	Work productively in teams while using cultural global competence.
	Some equations have no solutions in a given number system, but have a solution in a larger system. For example, the solution of $x + 1 = 0$ is an integer, not a whole number; the solution of $2x + 1 = 0$ is a rational number, not an integer; the solutions of $x^2 - 2 = 0$ are real numbers, not rational numbers; and the solutions of $x^2 + 2 = 0$ are complex numbers,

not real numbers.

The same solution techniques used to solve equations can be used to rearrange formulas. For example, the formula for the area of a trapezoid, $A = ((b_1 + b_2)/2)h$, can be solved for h using the same deductive process.

An equation can often be solved by successively deducing from it one or more simpler equations. For example, one can add the same constant to both sides without changing the solutions, but squaring both sides might lead to extraneous solutions. Strategic competence in solving includes looking ahead for productive manipulations and anticipating the nature and number of solutions.

Expressions can define functions, and equivalent expressions define the same function. Asking when two functions have the same value for the same input leads to an equation; graphing the two functions allows for finding approximate solutions of the equation. Converting a verbal description to an equation, inequality, or system of these is an essential skill in modeling.

Equity Considerations

LGBTQ and Disabilities Mandate

Topic (Person and Contribution Addresses): Software developers from the LGBT Community

Materials Used:
https://queerbio.com/wiki/index.php?title=Software_Programmers_and_Developers_From_the_LGBTQ_Community

Addresses the Following Component of the Mandate:

- Economic
- Political
- Social

Climate Change

Topic (Person and Contribution Addresses): How Coding can help fight climate change

Materials Used: https://www.technologyreview.com/2010/08/31/200618/how-coders-can-help-fight-climate-change/

Addresses the Following Component of the Mandate:

- Economic
- Political
- Social

Asian American Pacific Islander Mandate

Topic (Person and Contribution Addresses): Stereotyping Asian Americans and computers

Materials Used: https://www.npr.org/2014/01/23/265239095/people-assumed-i-was-a-tech-whiz-because-im-asian

Addresses the Following Component of the Mandate:

- Economic
- Political
- Social

Holocaust Mandate

Topic (Person and Contribution Addresses): Bias in Java and programming

Materials Used: https://medium.datadriveninvestor.com/algorithms-are-not-inherently-biased-its-a-result-of-expectations-with-unintended-consequences-1d8c144f52af

Addresses the Following Component of the Mandate:

- Bias
- Bigotry
- Bullying

- Holocaust Studies
- Prejudice

Amistad

Instructional Strategies, Learning Activities, and Levels of Blooms/DOK:

- Apply Concepts learned
- Connect Previous Lessons
- Create Programs
- Critically Think
- Debug Programs
- Design Programs
- IS: • Extra Time to complete Programs
- IS: • NHS Assistance and Tutoring
- IS: • One on One tutoring during Delsea One
- Organize

ELL Modifications
-
  - Choice of test format (multiple-choice, essay, true-false)
  - Continue practicing vocabulary
  - Provide study guides prior to tests
  - Read directions to the student
  - Read test passages aloud (for comprehension assessment)
  - Vary test formats

IEP & 504 Modifications
-
  - Allow for redos/retakes
  - Assign fewer problems at one time (e.g., assign only odds or evens)
  - Differentiated center-based small group instruction
  - Extra time on assessments
  - Highlight key directions
  - If a manipulative is used during instruction, allow its use on a test
  - Opportunities for cooperative partner work

- Provide reteach pages if necessary
- Provide several ways to solve a problem if possible
- Provide visual aids and anchor charts
- Test in alternative site
- Tiered lessons and assignments
- Use of a graphic organizer
- Use of concrete materials and objects (manipulatives)
- Use of word processor

G&T Modifications

-
  - Alternate assignments/enrichment assignments
  - Enrichment projects
  - Extension activities
  - Higher-level cooperative learning activities
  - Pairing direct instruction with coaching to promote self-directed learning
  - Provide higher-order questioning and discussion opportunities
  - Provide texts at a higher reading level
  - Tiered assignments
  - Tiered centers

At Risk Modifications

- Additional time for assignments
- Adjusted assignment timelines
- Agenda book and checklists
- Answers to be dictated
- Assistance in maintaining uncluttered space
- Books on tape
- Concrete examples
- Extra visual and verbal cues and prompts
- Follow a routine/schedule
- Graphic organizers
- Have students restate information
- No penalty for spelling errors or sloppy handwriting
- Peer or scribe note-taking
- Personalized examples
- Preferential seating

- Provision of notes or outlines
- Reduction of distractions
- Review of directions
- Review sessions
- Space for movement or breaks
- Support auditory presentations with visuals
- Teach time management skills
- Use of a study carrel
- Use of mnemonics
- Varied reinforcement procedures
- Work in progress check

Alternative Assessments

Alternative Assessments
Performance tasks
Project-based assignments
Problem-based assignments
Presentations
Reflective pieces
Concept maps
Case-based scenarios
Portfolios

Benchmark Assessments

Skills-based assessment
Reading response
Writing prompt
Lab practical

Summative Assessment

- Quiz: Computer Systems

Resources & Materials

- Eclipse IDE

- Internet
- Lynda.com
- Student Handouts
- Tony Gaddis: Starting Out with Java: Early Objects. 4/E., 2010, Pearson

Technology

- ClearTouch
- Computer
- Google Classroom
- Google Docs
- Internet
- Sporcle Quiz: Computer Programming Languages
- SychronEyes

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.B	Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
TECH.8.1.12.C	Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
TECH.8.1.12.D	Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
TECH.8.1.12.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
TECH.8.1.12.F	Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
TECH.8.2.12.A	The Nature of Technology: Creativity and Innovation: Technology systems impact every aspect of the world in which we live.
TECH.8.2.12.B	Technology and Society: Knowledge and understanding of human, cultural and society values are fundamental when designing technology systems and products in the global society.
TECH.8.2.12.C	Design: The design process is a systematic approach to solving problems.
TECH.8.2.12.D	Abilities for a Technological World: The designed world is the product of a design process that provides the means to convert resources into products and systems.
TECH.8.2.12.E	Computational Thinking: Programming: Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.