

Tentative Agenda
AP Computer Science A Workshop
Summer of 2023

Description:

The **AP Computer Science A course/workshop** is designed for participants with **no previous programming experience to many years of programming experience**. Participants will learn to program using an object-oriented approach using the **JAVA programming language**.

The **goals** of the workshop are to **Understand the Course, Plan the Course, Teach the Course, Assess Student Progress and Understanding** and **become a member of the AP Community**.

Need to have **30 contact hours** to **complete online APSI workshop**.

Topics discussed will include:

- Unit 1 – Primitive Types
- Unit 2 – Using Objects
- Unit 3 – Boolean Expressions and if Statements
- Unit 4 – Iteration
- Unit 5 – Writing Classes Unit
- Unit 6 – Array
- Unit 7 – ArrayList
- Unit 8 – 2D Array
- Unit 9 – Inheritance
- Unit 10 - Recursion

Class discussions will be based on how to present AP Computer Science A topics in a classroom setting, what has worked well in a classroom setting and receiving Best Classroom Practices from other class participants. You are ALWAYS WELCOMED to Share Your BEST PRACTICES and ideas at any time when the topic/unit comes up for discussion! We will look at the **AP Computer Science A resources/AP Classroom**. Participants will be given the opportunity to learn the Java programming language as needed.

Text:

AP College Board Green Binder for Computer Science A (Course and Exam Description)
soloLearn.com and **w3schools.com/java/** (for additional resources)

General Schedule Format:

We will have 3 tracks.

Participants will be broken up into various break-out sessions and hands-on tasks.

Track #1 – Beginners (New to the Java programming language)

Track #2 – Advanced (Know the Java programming language. New to teaching.)

Track #3 – Super Advanced (Know the Java programming language very well and have taught AP CSA for numerous years.)

General Schedule Format:

Morning Sessions:

Synchronous Session: 8:00 a.m. – 9:45 a.m.

General Break: 9:45 a.m. – 10:00 a.m.

Synchronous Session: 10:00 a.m. – Noon

Lunch:

Asynchronous Session: Noon – 12:45 p.m. (.5 hour of video instructional time while eating lunch.)

Afternoon Sessions:

Synchronous Session: 12:45 p.m. – 2:30 p.m.

General Break: 2:30 p.m. – 2:45 p.m.

Synchronous Session: 2:45 p.m. – 4:30 p.m.

Post your Take-Away Tip for the Day and any Reflections you would like to share with the group.
4:30 p.m. – 4:45 p.m.

Asynchronous Session: Work on items in evening or next early morning.
Finish any programming assignments or work you would like to complete.

Total Hours for Synchronous & Asynchronous: ~ 8 hours/day for Monday – Wednesday (24 hours)

Total Hours for Synchronous: ~ 6 hours for Thursday (6 hours)

Total of 30 Contact Hours

Thursday, we could finish up by 3:00 p.m.

**Tentative Schedule
Central Time Zone**

Before Monday, June 13, 2022:

Asynchronous Session:

- Log on to UTC Canvas.
- Navigate around UTC Canvas.

Monday – Welcome, Overview, and Basics:

Session: 8:00 a.m. – 9:00 a.m.

- Welcome (Class Overview)
- Introductions from Participants
- What are we going to learn during the 4 Day Workshop?
 - Day #1 – Understanding the Course, Plan the Course and Teach the Course
Units #1 - #4
 - Day #2 – Continuation of Topics to Teach Units #5 - #7
 - Day #3 – More Advanced Topics and Creating/Modifying a Course
Units #8 - #10, AP Classroom, and AP CSA Test
 - Day #4 – Integrating Diversity and Equity, Additional Tools, Assess Student Learning and Understanding, and Wrap-Up
- AP Classroom
 - *Course at-a-glance*
 - *The CED (Course and Exam Description) Binder Overview*
 - Learn about Audit Process (*for new teachers*)

Understanding the Course, Plan the Course and Teach the Course

Session: 09:00 a.m. – 9:45 a.m.

- Why Learn Java? (1.1)
 - Where did JAVA come from? A brief history of JAVA will be presented.
 - What is Object Oriented Programming (OOP)?
 - Procedural Programming vs. OOP
 - What compilers (IDEs) are available for JAVA?
 - Teachers can share experiences and provide thoughts on IDEs and hardware requirements for students.
 - What does it take to setup an AP CSA lab? (*for new teachers*)

General Break: 9:45 a.m. – 10:00 a.m.

Session: 10:00 a.m. – 11:00 a.m.

- Learn how to program (Class Demonstration-Ice Breaker)
Participants can learn to program while more experienced participants can get ideas on how to present topics in a classroom environment.

- 10:00 a.m. – 10:10 a.m. - Explanation of Group Task
- 10:10 a.m. – 10:20 a.m. - Break into Break-out Rooms (Engagement Activity)
- 10:20 a.m. – 11:00 a.m. - Each group will relate commands to instructor. Discuss activity.

Session: 11:00 a.m. to 11:30 a.m.

What are those mysterious 0's and 1's???

Track #1: Learn binary in detail. -- What is ASCII? Using binary 0's and 1's. How is information stored on a hard drive?

[History of ASCII](#)

<http://www.asciitable.com/>

Demonstrate ASCII game.

<https://games.penjee.com/https://games.penjee.com/binary-numbers-game/> [binary-numbers-game/](#)

Can try out the Binary Bonanza Game, too.

Track #2: Discuss various teaching methods for binary.

Bring back ideas to the main session group.

Track #3: Can go into a breakroom and work on various projects and discussions.

11:30 a.m. to Noon Start PROGRAMMING!

Quick Brief overview of the following topics:

Unit 1 – Primitive Types (Breakout into Tracks #1 - #3)

- Primitives, Variables and Constants
- Expressions and Assignment Statements
- Compound Assignment Operators
- Casting and Ranges of Variables
- Special Escape Sequence Characters

Talk about computer memory in depth. Knowing how items are stored in memory is so CRITICAL to the Java programming language.

Track #1: Start programming an ASCII Art program with escape sequence characters.

Extra Stuff: Input from a Keyboard

Track #2: Discuss various teaching methods for Unit #1.

Bring back ideas to the main session group.

Track #3: Can go into a breakroom and work on various projects and discussions.

Asynchronous Session: Noon – 1:00 p.m. (.5 hour of instructional time)

Complete the Binary Homework Assignment

Play Binary Games

Watch videos

[What is Binary?](#)

[Math Bytes - Binary Numbers](#)

Lunch on Your Own

Session: 1:00 – 1:30 p.m.

Track #2 will present teaching methods ideas for Unit #1

Session: 1:30 p.m. – 2:30 p.m.

Quick Brief overview of the following topics:

Unit 2 - Using Objects – What is OOP?

- Objects: Instances of Classes
- Casting and Storing Objects (Instantiation)
- Calling a Void Method
- Calling a Void Method with Parameters
- Calling a Non-void Method

Track #1: Start programming an MadLib game.

Track #2: Discuss various teaching methods for Unit #2.

Bring back ideas to the main session group.

Track #3: Can go into a breakroom and work on various projects and discussions.

General Break: 2:30 p.m. – 2:45 p.m.

Session: 2:45 p.m. – 4:00 p.m.

Unit 3 - Boolean expressions and if Statements

- If statements
 - if/else and else if
- switch/case statements (not tested)
- Boolean expressions
 - Compound, Equivalent, and Comparing Objects

Unit 4 - Iteration

- for, while, and do/while (not tested) loop statements

Track #1: Start programming an RPG game.

Track #2: Discuss various teaching methods for Units #3-#4.

Bring back ideas to the main session group.

Track #3: Can go into a breakroom and work on various projects and discussions.

Session: 4:00 p.m. – 4:30 p.m.

Track #2 will present teaching methods ideas for Units #2-4

Wrap-Up: 4:30 p.m. – 4:45 p.m.

- Post your Take-Away Tip for the Day and any Reflections you would like to share with the group on Canvas.

Brand new teachers: May want to complete soloLearn or w3schools.com/java Modules for topics covered during the day.

Tuesday – Game Day:

Understanding the Course, Plan the Course and Teach the Course

Synchronous Session: 8:00 a.m. – 8:15 a.m.

General announcements and comments

Session: 08:15 a.m. – 9:00 a.m.

Unit #2 (Continued):

- String Objects: Concatenation, Literals and More
- String Methods
 - String *variable name*
 - int length()
 - String substring(int from, int to)
 - int indexOf(String str)
 - Boolean equals(String other)
 - int compareTo(String other)
- Wrapper Classes: Integer and Double
- Using the Math class: Math.random()

Track #1: Learn how to program working with strings.

Track #2: Discuss various teaching methods for programming with strings.

Bring back ideas to the main session group.

Track #3: Can go into a breakroom and work on various projects and discussions.

9:00 a.m. – 9:45 a.m. Go to assigned break-out room. (Engagement Activity)

*Learn as a group how to play **BUNCO** (dice game). With this activity, participants will manually learn about the concepts from Units #3 and #4. [Each participant will need **3 dice and 1 sheet of paper.**]*

Physically play BUNCO and keep score.

General Break: 9:45 a.m. – 10:00 a.m.

Session: 10:00 a.m. – Noon

- Developing Algorithms
- Nested Iteration
- Informal Code Analysis

Program one BUNCO Game as a group in Java.

Plan out as a group steps to complete the process.

Discuss any needed algorithms.

Have one person type in code and others will tell person what to type.

Person typing in code can also contribute ideas for programming code.

Test out to make sure program does not have bugs in it.

Asynchronous Session: Noon – 1:00 p.m. (.5 hour of instructional time)

- Watch AP Classroom videos on topics of the day from Units #1 through Units #4.

I would recommend the Unit 2.8 videos.

(30 minutes)

- **Finish any programs or projects.**
- **Lunch on your own**

Session: 1:00 – 1:15 p.m.

General announcements and comments

Session: 1:15 – 2:00 p.m.

Unit 5 - Writing Classes

- Anatomy of a Class (What is a class?)
- Constructors
- Documentation with Comments
- Accessor Method
- Mutator Method
- Writing Methods
- static Variables and Methods
- this Keyword
- Ethical and Social Implications of Computing Systems

Track #1: Learn how to program writing their own classes.

Track #2: Discuss various teaching methods for programming with writing classes.

Bring back ideas to the main session group.

Track #3: Can go into a breakroom and work on various projects and discussions.

Session: 2:00 p.m. – 2:30 p.m.

Track #2 will present teaching methods ideas for working with strings and Unit #5.

General Break: 2:30 p.m. – 2:45 p.m.

Session: 2:45 – 3:30 p.m.

Unit 6 - Arrays

- Array Creation and Access
- Traversing Arrays
- Enhanced for Loop for Arrays
- Developing Algorithms Using Arrays

Unit 7 – ArrayList

- Introduction to ArrayList
- ArrayList Methods
 - int size()
 - boolean add(E obj)
 - void add(int index, E obj)
 - get(int index)
 - set(int index, E obj)
 - remove(int index)
- Traversing ArrayLists
- Developing Algorithms Using ArrayLists
- Searching
- Sorting
- Ethical Issues Around Data Collection

Track #1: Learn how to program an array and ArrayList. Learn for each loop.

Track #2: Discuss various teaching methods for Units #6 and #7.

Bring back ideas to the main session group.

Track #3: Can go into a breakroom and work on various projects and discussions.

Session: 3:30 – 4:00 p.m.

Track #2 will present teaching methods ideas for working with strings and Units #6 and #7.

Session: 4:00 – 4:30 p.m.

Participants will learn how to play Yahtzee. With this activity, participants will manually learn about the concepts from Units #5 and #6.

- Go into break-out rooms. Go to <https://buddyboardgames.com/yahtzee>
- Play Yahtzee until participants learn how to play game.

Wrap-Up: 4:30 p.m. – 4:45 p.m.

- Post your Take-Away Tip for the Day and any Reflections you would like to share with the group on Canvas.

Brand new teachers: May want to complete soloLearn and w3schools/java Modules for topics covered during the day.

Wednesday – Advanced CSA Topics:

Finish Understanding the Course, Plan the Course and Teach the Course

Synchronous Session: 8:00 a.m. – 8:15 a.m.

General announcements and comments

Session: 08:15 a.m. – 9:45 a.m.

Discuss how to design out Yahtzee project and program Parts A and B in your groups.

General Break: 9:45 a.m. – 10:00 a.m.

Session: 10:00 a.m. – 10:30 a.m.

Unit 8 – 2D Array

- 2D Array
- Traversing 2D Arrays

Learn as a group how to print stars and numbers.

Track #1: Learn how to program working with 2D Arrays.

Track #2: Discuss various teaching methods for programming with 2D Arrays.

Bring back ideas to the main session group.

Track #3: Can go into a breakroom and work on various projects and discussions.

Session: 10:30 a.m. – 11:30 a.m.

Unit 9 – Inheritance (and discuss more in depth on working with classes)

- Creating Superclasses and Subclasses
- Writing Constructors for Subclasses
- Overriding Methods
- super Keyword
- Creating References
- Using Inheritance Hierarchies
- Polymorphism
- Object Superclass

Track #1: Learn how to program a Virtual Pet

Track #2: Discuss various teaching methods for Unit #9.

Bring back ideas to the main session group.

Track #3: Can go into a breakroom and work on various projects and discussions.

Session: 11:30 a.m. - Noon

Track #2 will present teaching methods ideas for working with strings - Unit #8 and inheritance – Unit #9.

Asynchronous Session: Noon – 1:00 p.m. (.5 hour of instructional time)

- *Start working on your long term instructional plan.*

(30 minutes)

- **Lunch on your own**

Session: 1:00 p.m. – 1:15 p.m.

Show Fractal Videos.

Session: 1:15 p.m. – 2:00 p.m.

Unit 10 - Recursion

- Recursion

- Recursive Searching and Sorting

As a class will come up with a scenario to write up java program for factorial and Fibonacci Series.

Track #1: Learn how to program a Factorial and the Fibonacci Series recursively.

Track #2: Discuss various teaching methods for Unit #10.

Bring back ideas to the main session group.

Track #3: Can go into a breakroom and work on various projects and discussions.

Session: 2:00 – 2:30 p.m.

Track #2 will present teaching methods ideas for working with strings and Unit #10.

General Break: 2:30 p.m. – 2:45 p.m.

Assessing Student Progress and Understanding: What is on the AP CSA test and How it is Graded?

Session: 2:45 p.m. – 3:00 p.m.

- **What is the format of the test?**

- **What is on the test?**

MCQs (Multiple Choice Questions)

FRQs (Free Response Questions)

Session: 3:00 p.m. – 3:45 p.m. Go to assigned break-out room. (Engagement Activity)

Try out Free Response Questions

Session: 3:45 p.m. – 4:30 p.m.

Learn How to Grade Them

Wrap-Up: 4:30 p.m. – 4:45 p.m.

Wrap-Up:

- Post your Take-Away Tip for the Day and any Reflections you would like to share with the group on Canvas.

Brand new teachers: May want to complete soloLearn Modules and w3schools/java for topics covered during the day.

Thursday – Additional Classroom Tools:

Synchronous Session: 8:00 a.m. – 8:15 a.m.

General announcements and comments

AP Classroom - Assessing Student Progress and Understanding

Session: 08:15 a.m. – 9:45 a.m.

- Assigning questions to students.
- Question Analysis
- Topic Questions (Bell Ringer or Exit Ticket)
- Personal Progress Checks
Reports
- AP Question Bank (Very useful when doing eLearning.)
- Videos
- What's New to AP Classroom

Participants will discuss what was useful for them using AP Classroom.

Track #1: Walk through of AP Classroom.

Track #2: Discussions of using AP Classroom.

Track #3: Can go into a breakrooms and walk through AP Classroom.

General Break: 9:45 a.m. – 10:00 a.m.

Session: 10:00 a.m. – 11:00 a.m.

Try out Multiple Choice Questions and strategies students can take on answering questions.

Participants will be assigned to breakout rooms to go through questions.

Session: 11:00 a.m. – Noon

Discussion of How to Plan Out Your School Year – Long Term Instructional Plan

Each teacher will work on their class syllabus and calendar for school year.

Have teachers discuss their Long Term Instructional Plans.

Track #1: Discuss specifics about planning out long term instructional plan.

Track #2: Have discussions about present long term instructional plans.

Track #3: Can go into a breakrooms and work on long term instructional plans.

Asynchronous Session: Noon – 1:00 p.m. (.5 hour of instructional time)

- Watch Diversity and Equity Access Ted Talk Video

Video can be found on Canvas.

(30 minutes)

- Lunch on your own

Diversity and Equity in a Classroom

Session: 1:00 p.m. – 2:00 p.m.

- **Share your ideas** on how a Computer Science A curriculum can be changed to meet all needs and how a classroom can be more inclusive.

Your Turn

Session: 2:00 p.m. – 3:00 p.m.

- Discussion of classroom projects and teaching pedagogy of AP Computer Science topics.
- Anything we didn't discuss?

Becoming a Member of the AP Community

Your Take Away Tips and Reflections on Understanding the Course, Planning the Course, Teaching the Course, Assessing Student Progress and Understanding, Diversity and Equity in a Classroom and Becoming a Member of the AP Community