



Dominican International School

AP Computer Science Principles

SY: 2024-25

Grade Level 11/12
1 Year



Teacher Tim Sampson
Email: tsampson@dishs.tp.edu.tw

Description

As described by the [College Board](#), AP Computer Science Principles offers a multidisciplinary approach to teaching the underlying principles of computation. The course will introduce students to the creative aspects of programming, abstractions, algorithms, large data sets, the Internet, cybersecurity concerns, and computing impacts. AP Computer Science Principles also gives students the opportunity to use current technologies to create computational artifacts for both self-expression and problem solving. Together, these aspects of the course make up a rigorous and rich curriculum that aims to broaden participation in computer science.

[CS50](#) is Harvard University's introduction to the intellectual enterprises of computer science and the art of programming for students with a diversity of technological background and experience. CS50 for AP Computer Science Principles is an adaptation of CS50 specifically tailored to align with the AP Computer Science Principles curriculum framework. The course assignments, materials, and resources are all identical to the version of the course taught at the college-level, albeit adapted to suit a secondary school audience.

This Syllabus has been adapted from the CS50 APCS pre approved syllabus CS50 submitted for approval to the College Board. Our course will follow the original approved syllabus, with supplemental content and exercises from [Code.org AP CSP](#) curriculum [MakeCode AP CSP](#) and [Khan Academy AP CSP](#).

In February the students will compete in the CEMC Competition from The University of Waterloo's Center for Education in Mathematics and Computing. Along with the AP exam this is an excellent opportunity for the students to participate in an event and apply their computational thinking skills outside of DIS.

The Big Ideas and Thinking practices

Seven Big Ideas

- Big Idea 1: Creativity
- Big Idea 2: Abstraction
- Big Idea 3: Data
- Big Idea 4: Algorithms
- Big Idea 5: Programming

Six Computational Thinking Practices

- P1: Connecting Computing
- P2: Creating Computational Artifacts
- P3: Abstracting
- P4: Analyzing Problems and Artifacts
- P5: Communicating

Requirements

It is recommended that a student in the AP Computer Science Principles course should have successfully completed a first year high school algebra course with a strong foundation on basic linear functions and composition of functions, and problem solving strategies that require multiple approaches and collaborative efforts. In addition, students should be able to use a Cartesian (x, y) coordinate system to represent points in a plane. It is important that students and their advisers understand that any significant computer science course builds upon a foundation of mathematical and computational reasoning that will be applied throughout the study of the course. [AP Computer Science Principles Course Overview](#)

How this course can benefit students

Among this course's objectives is to supply students with a comprehensive introduction to the fundamentals of the discipline of computer science. We will do so using programming in several different languages as a vehicle to introduce these fundamentals, including such topics as algorithms, abstraction, data, global impact, and internet technologies. Though the course is programming-heavy, it should be stressed that this is not a "programming course"; rather, this course should be considered one of problem-solving, creativity, and exploration. By year's end, students will have a richer understanding of the key principles of the discipline of computer science. They will be able to speak intelligently about how computers work and how they enable us to become better problem-solvers, and will hopefully be able to communicate that knowledge to others.

Primary Textbook and Other Resources

Books and Online Instructional Material

- [CS50 Reference](#)
- [Kahn AP® Computer Science Principles Review](#)
- [CS Principles: Big Ideas in Programming](#)

Videos

- [Code.org Video library](#) Topical Videos
- [This is CS50 Youtube.com](#) Lectures, seminars, shorts and walkthroughs
- [PBS Crash Course Computer Science](#)

Programming Environment

- [Visual Studio Code for CS50](#)

Assessment

Assignments 30%
Quizzes 30%
Quarter Exam 30%
Department 10 %

Additional Information:

Course Design and Labs

This course is a four quarter course, with approximately 34 weeks of instructional time before the AP exams. All classes will regularly take place in the school's computer lab, except on occasions when students will be completing on off-line activities. Students will meet for five 45 minute class periods per week, which are arranged in two class blocks 3 times per week. A topic is usually completed within two weeks. The time after the AP exam will be used for enrichment activities and project work. In addition to the graded activities and labs there will be a test after each unit and also a final exam each quarter that covers all material covered up to that point in time.

Typically, students will watch the CS50 lecture video before the unit starts in class. During the next few classes the class will participate in Section style periods where students will review blocks of topics followed by demonstrations and code along activities where students are encouraged to try out the concepts together. Next the students will pair up in groups and complete a Lab which provides the opportunity for students to work on a medium sized activity with support. Units end with a PSET, which is a programming activity which is meant to be done individually, and finally a Unit exam. This syllabus has been adapted from the AP50 Syllabus to accommodate our student's CS background and school schedule. APCSP CS50 syllabus can be accessed

<https://cs50.harvard.edu/ap/2025/syllabus/>

AP CS A Exam

Students who complete this course will be prepared to take the AP CS A Exam in May.

LTO's D'TORCH (Truthful, Organized, Reflective, Courageous and Helpful)

In CS classes the categories of the D'TORCH most practiced and assessed are:

- Organized - Students utilize Google Classroom to edit, submit and keep track of their assignments.
- Reflective - Students will regularly write activity reflections in their online journal.
- Helpful - Students are empowered to ask for and provide explanations and give examples to help classmates through particularly difficult problems.

Class Expectations

- Come to class on time and be prepared
- Have a positive attitude and be willing to learn.
- Respect yourself, others, and our school.
- Always complete your work and try your best.
- Actively participate, listen carefully, but don't speak out of turn.
- All assignments must be completed.

Homework and Quiz Rules

- All assignments must be turned in on the day they are due.
- 1 day late = Maximum of only 60%
- 2+ days late = Project-I & Only 60%
- If a student has been absent, it is his/her duty to find out what work is due, and hand it in a day later.
- All assignments must satisfactorily be completed.

- If you are absent on the day of a quiz, you will only be able to get a maximum of 60%.

Classroom Rules

- All students are expected to follow the rules. Consequences will follow if rules are broken.
- Read and follow the standard school rules.
- Be on time and neatly dressed, in full school uniform.
- Speak in ENGLISH ONLY.
- Respect your teachers, fellow students and their property.
- Keep your seating space and classroom clean and neat.
- No eating or drinking in the ICT Labs.
- Ask permission to leave the class.
- Neither cheating nor copying in any form will be accepted. Anyone caught doing either during an activity, project or assessment will be given a zero.

Academic Honesty (Plagiarism)


HS CS at DIS is adopting the Harvard CS guidelines on academic honesty. From the Harvard Syllabus “The essence of all work that you submit to this course must be your own. Collaboration on problems is not permitted (unless explicitly stated otherwise) except to the extent that you may ask classmates and others for help so long as that help does not reduce to another doing your work for you. Generally speaking, when asking for help, you may show your code or writing to others, but you may not view theirs, so long as you and they respect this policy’s other constraints.”

More details can be found at this link:

<https://cs50.harvard.edu/ap/2023/syllabus/#academic-honesty>



WEEKLY SCHEDULE

Week / Date	Topic / Projects / Assessments
Week 1 Aug 12th to 16th 4 Days of Class 12~ First Day / Orientation Day 15~ Opening Mass & Assumption of Our Lady 8:00 15~ Induction of Class, Student Council Officers and DYM	<u>Module Impact of Computing</u> How Computing Technology is Changing Our Lives Welcome to CSP, Get to Know the course, communication innovations
Week 2 Aug 19th to 23rd	<u>Module Impact of Computing</u> Collaboration and Communications Research Collaboration and Communications Presentation Crowdsourcing and Monitoring Innovations Research
Week 3 Aug 26st to 30th 26~Fire drill? 26~Middle and High School Catholic Bridge Program (after assembly) 28~St. Dominic de Guzman Feast Day Celebration	<u>Module Impact of Computing</u> Simulations: Beneficial and Harmful Effects Simulations: Beneficial and Harmful Effects Presentation Digital Divide Unit Quiz and Notes

<p>Week 4 Sep 2nd to 6th 2~House Ceremony</p>	<p>Module CS50 Week 1 C Video Lecture and Notes CS50 Course Introduction Practice Activity: Hello and Hello, It's Me Practice Activity: Sum and Contacts Practice Activity: Debug, Half, & Prime Lab: Population Growth </p>
<p>Week 5 Sep 9th to 13th 9~ Mass & Birthday Mother Mary& VIP Induction</p>	<p>Module CS50 Week 1 C Problem Set: Mario! Problem Set: Cash Problem Set: Credit</p>
<p>Week 6 Sep 16th to 20th 1 Day of Class 17~Moon Festival 18-20~ Teacher's Conference</p>	<p>Module CS50 Week 1 C Unit Quiz and Notes</p>
<p>Week 7 Sep 23rd to 27th 24-26~Pre-Exam Days</p>	<p>Module CS50 Arrays Video Lecture and Notes Practice Activity: Hours Practice Activity: Password Practice Activity: No Vow3ls Lab: Scrabble PSET: Readability</p>
<p>Week 8 Sep 30th to Oct 4th</p>	<p>Module CS50 Arrays PSET: Bulbs PSET: Caesar Part 1 PSET: Substitution PSET: Wordle50</p>
<p>Week 9 Oct 7th to 11th 1 Day of Class 7~Launching - Rosary Month and Bullying Prevention Day 8-9 ~Q1 Exams 10~Double Ten 11~Record Day</p>	<p>NO Class on Monday.</p>

2nd QUARTER – TENTATIVE COURSE CONTENT

Week / Date	Topic / Projects / Assessments
<p>Week 1 (10) Oct 14th to 18th 14~ Second Quarter Begins</p>	<p><u>CS50 Algorithms</u> Video Lecture and Notes Practice Activity: atoi Recursive Practice Activity: Average Temperatures Practice Activity: Max Lab: Sort PSET: Plurality</p>

<p>Week 2 (11) Oct 21st to 25th 25 – Book Fair 25- Masquerade Night</p>	<p><u>CS50 Algorithms</u> PSET: Runoff PSET: Tideman Part 1 of 4 - Preparation and Design PSET: Tideman Part 2 of 4 - Core Function Implementation PSET: Tideman Part 3 of 4 - Sorting and Graph Construction PSET: Tideman Part 4 of 4 - Finalization and Reflection Unit Quiz and Notes</p>
<p>Week 3 (12) Oct 28th to Nov 1st 1-All Saint's Day Mass</p>	<p><u>CS50 Memory</u> Video Lecture and Notes Practice: Bottom Up Practice: License Lab: Smiley Lab: Volume PSET: Filter Part 1 of 4 - BMP Structure and Planning PSET: Filter Part 2 of 4 - Basic Filters Implementation PSET: Filter Part 3 of 4 - Advanced Filters and Edge Cases PSET: Filter Part 4 of 4 - Optimization and Refactoring PSET: Recover PSET: Reverse Unit Quiz and Notes</p>
<p>Week 4 (13) Nov 4th to Nov 8th</p>	<p><u>CS50 Data Structures</u> Practice Activity: Trie Part 1 Practice Activity: Trie Part 2 Lab: Inheritance Part 1</p>
<p>Week 5 (14) Nov 11th to 15th</p>	<p>Lab: Inheritance Part 2 Problem Set: Speller Part 1 - Preparation and Pseudocode Problem Set: Speller Part 2 - Hash Table Implementation</p>
<p>Week 6 (15) Nov 18th to 22nd 22-Gr.12 Q2 Exam 22 - YSC Contest</p>	<p>Problem Set: Speller Part 3 - Hash Function and Check Function Problem Set: Speller Part 4 - Review and Refactor Problem Set: Speller Part 5 - Unload and Size Functions</p>
<p>Week 7 (16) Nov 25th to 29th 25-Gr.12 Q2 Exam 26-28~Pre-Exam Day</p>	<p>Problem Set: Speller Part 6 - Reflection and Optimization Unit Quiz and Notes Q2 Final Exam</p>
<p>Week 8 (17) Dec 2nd to Dec 6th 6~Half Day Foundation Day Celebrations</p>	<p>Create Performance Preparation Prepare Part 1: Review the Task Prepare Part 2: Deep Dive</p>
<p>Week 9 (18) Dec 9th to 13th 3 Days of Class 12-13 ~Q2 Exams</p>	<p>College Board Create Task - Preparation Prepare Part 3: Make a Plan</p>
<p>Dec 16th to Jan 3rd</p>	<p> Christmas Break </p>

3rd QUARTER – TENTATIVE COURSE CONTENT

Week / Date	Topic / Projects / Assessments
Week 1 (19) Jan 6th to 10th <u>4 Days of Class</u> 6~Record Day 7~Third Quarter Begins 10 ~ New Year Mass	College Board Create Task - Performance Make CT: Code Development - Part 1 CT: Code Development - Part 2 CT: Code Development - Part 3 CT: Code Development - Part 4 CT: Code Development - Part 5
Week 2 (20) Jan 13th to 17th	CT: Review and Refactor - Part 1 CT: Review and Refactor - Part 2 CT: Documentation - Written Responses Part 1 CT: Documentation - Written Responses Part 2 CT: Documentation - Video Part 1 CT: Documentation - Video Part 2
Week 3 (21) Jan 20th to 24th	CT: Final Review and Submission CT: Presentation Preparation CT: Final Presentation
Jan 27th to Jan 31st	
Week 4 (22) Feb 3rd to 7th	<u>CS50 Python</u> Video Lecture and Notes Practice: Bank Practice: Frank, Ian and Glen's Letters Practice: Jar Practice: Seven Day Average Practice: Taqueria Lab 6: World Cup
Week 5 (23) Feb 10th to 14th 1-14~Catholic Week	PSET: Mario in Python PSET: Cash in Python PSET: Credit in Python PSET: Readability in Python PSET: DNA in Python Part 1 of 4 PSET: DNA in Python Part 2 of 4 PSET: DNA in Python Part 1 of 3 PSET: DNA in Python Part 1 of 4 Unit Quiz and Notes Video Lecture and Notes
Week 6 (24) Feb 17th to 21st	CS50 SQL Practice: Favorites Practice: Hall of Prophecy Lab 7: Songs Part 1 of 2 Lab 7: Songs Part 2 of 2 PSET: Movies Part 1 of 3 PSET: Movies Part 2 of 3 PSET: Movies Part 3 of 3 PSET: Fiftyville Part 1 of 4

	<p>PSET: Fiftyville Part 2 of 4 PSET: Fiftyville Part 3 of 4 PSET: Fiftyville Part 4 of 4 Unit Quiz and Notes</p>
<p>Week 7 (25) Feb 24th to 28th <u>4 Days of Class</u> 24~Lenten Mass? 25-27 ~ Pre-Exam Days 24-27~IOWA Assessments 28 ~ Memorial Day Holiday</p>	<p>CS50 HTML, CSS, JavaScript Practice: Scoreboard Practice: Radio Shack Lab: Trivia PSET: Homepage Part 1 of 3 PSET: Homepage Part 2 of 3 PSET: Homepage Part 3 of 3 Unit Quiz and Notes</p>
<p>Week 8 (26) March 3rd to 7th 5~ Ash Wednesday</p>	<p>CS50 Flask Practice: Hello, Flask Part 1 Practice: Hello, Flask Part 2 Lab 9: Birthdays Part 1 Flask and SQLite Integration Lab 9: Birthdays Part 2 Data Handling and Dynamic Content PSET: Finance Part 1 of 4 App Setup and User Authentication</p>
<p>Week 9 (27) March 10th to 14th <u>4 Days of Class</u> 14 – Q3 Exams</p>	<p>PSET: Finance Part 1 of 4 Stock Quote and Buy Functionality PSET: Finance Part 3 of 4 Portfolio Management and Sell Functionality PSET: Finance Part 4 of 4 Refinement and Additional Features Final Exam</p>

4th QUARTER – TENTATIVE COURSE CONTENT

Week / Date	Topic / Projects / Assessments
<p>Week 1 (28) March 17th 21st <u>4 Days of Class</u> 17 – Q3 Exams 18~ Fourth Quarter Begins 18~ Fire Drill? 19~ Feast of St. Joseph</p>	<p>Final Project Plan and Feedback Begin final Project</p>
<p>Week 2 (29) March 24th to 28th</p>	<p>Final Project Check in</p>
<p>Week 3 (30) March 31st to April 4th <u>4 Days of Class</u> 4~Tomb Sweeping</p>	<p>Final Project</p>
<p>Week 4 (31) Apr 7th to 11th</p>	<p>AP Review</p>
<p>April 14th to April 18th</p>	<p style="text-align: center;">Easter Break</p>

Week 5 (32) Apr 21st to 25th	AP Mock
Week 6 (33) Apr 28th to May 2nd	AP Exams
Week 7 (34) May 5th to 9th	AP Exams
Week 8 (35) May 12th to 16th	AP Exams
Week 9 (36) May 19th to 23rd	Final Project
Week 10 (37) May 26th to 30th	Final Project

The end ~ Have a great summer 😊