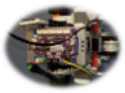
REGISTER NOW

# Schedule At-A-Glance

## Grade 8-12

| | Wk1:6/24-28 • Wk2:7/8-12 • Wk3:7/15-19 • Wk4: 7/22-26 Wk5: 7/29-8/2 • Wk6:8/5-9 • Wk7: 8/12-16 • Wk8: 8/17-23 | Week 1 | | Week 2 | | Week 3 | | Week 4 | | Week 5 | | Week 6 | | Week 7 | | Week 8 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM |
| Grades 8-12 | | | | | | | | | | | | | | | | | |
|  | Programming with Computational Thinking<br>Levels Progression: B & I<br>AM or PM or AM+PM • Mon to Fri | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ | - | - | - | - | ☑ | ☑ | ☑ | ☑ |
|  | Programming with Computational Thinking<br>Levels Progression: II & III<br>AM or PM or AM+PM • Mon to Fri | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ | ☑ | - | - | - | - | - | - | - | - |
|  | Robotics and Electronic – Arduino Projects<br>Levels Progression: B & I<br>AM or PM or AM+PM • Mon to Fri | - | - | - | - | ☑ | ☑ | ☑ | ☑ | - | - | ☑ | ☑ | ☑ | ☑ | - | - |
|  | Computer Vision on Windows/Linux<br>*(Bridge to Machine Learning)*<br>2 Weeks of Full-Day Programs<br>9 AM to 3 PM • Mon to Fri | - | - | - | - | - | - | - | - | - | - | - | - | 2 WKs Full Day Program 9-3 | | | |
|  | Tele-Robot with Shared Autonomy:<br>2 Weeks of Full-Day Programs<br>9 AM to 3 PM • Mon to Fri | - | - | - | - | - | - | - | - | - | - | - | - | 2 WKs Full Day Program 9-3 | | | |
| Grades 9-12 | | | | | | | | | | | | | | | | | |
|  | Advanced Placement CS -A (ONLINE)<br>Levels Progression: B & I<br>5 Weeks Program<br>1:30 PM to 4 PM • Mon and Fri | - | - | - | - | 5 WKS (2 sessions per week) Monday and Friday 1:30 PM to 4 PM | | | | | | | | | | - | - |

# Programming with Computational Thinking

Register Now

Grade 8-12 | AM or PM | AM+PM

## Levels Progression: B, I, II, & III

As always, our CS track goes beyond just programming languages – it focuses on cultivating problem-solving abilities through computational thinking (CT), preparing students for a technology-driven future.

We follow our proven successful Algorithms in C/C++ curriculum. If you are currently in our Algorithms in C/C++ program, you will continue well you leave off.

## Characteristics:


- **Problem Solving with CT:** from Abstraction to Algorithmics Skills
- **Comparable to College Level:** Covers Freshman to junior year topics in CS, including data structures, algorithms, and complexity analysis.
- **Proven Effectiveness:** Excellent student records, empowering self-learning and independent projects.
- **Duration for Each Level:** Progress at your own pace, not confined to a single week.

## Learning Objectives in each level

**Level B & I:** Fundamental programming structure to Linear Data Structure including basic OOPS.

**Level II:** Advanced topics such as memory pointers, string manipulation, recursion, etc. Sorting | Searching Algorithms.

**Level III:** Non-linear data structures, typically covered in the 2nd and 3rd year of college.

**Level IV:** Advanced Algorithms—available only during the school year.

# Programming with Computational Thinking

Register Now

Grade 8-12 | AM or PM | AM+PM

More details at https://cspdf.stormingrobots.com.

## Direct Benefits:

- Elevate your problem-solving and development skills to tackle more sophisticated robotics and engineering.
- Gain true software development skills, not just programming. Improve performance in various contests such as AI-oriented competition, CS Competition.

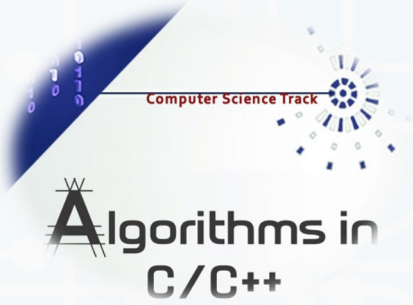
DEBUG

**Level B & I:**

- Excel in Adv. Placement CS-A studies. (Large majority of SR students score 5 in AP CS-A)

**Level II & III:**

- Gain competitive edge in students' own HS robotic activities. At SR, they can participate robotics and electronic group. Gain competitive edge for internships available for high school students.
- High proficiency students possess the adaptability to excel in diverse technologies and frequently achieve advanced in highly selective competitions such as the ACSL (high school levels) and USA Computing Olympiad (USACO).




## Half-Day Sessions

AM: 9-12 PM: 1-4

Weeks: 6/24, 7/8, 7/15, 7/22, 8/12, 8/19. Choose only one week, or multiple weeks when students will continue to progress and advance to high levels at their own pace.

Computer Science Track

Advanced Placement Computer Science A and Beyond

# Advanced Placement Computer Science – A

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Grade 9+ • Five weeks—10 2.5-hr (M+F) • 7/15 to 8/16

Dive into College Board's Advanced Placement Computer Science and Beyond!

Five weeks of total 25 hours of enriching workshop that bridges the gap for students with little prior experience, guiding them through the essential ideas of Computer Science AP CS—A.

## Direct Benefits:


AP Exam Excellence: Large majority of our students who achieve proficiency in program achieve top score of 5 in their AP Computer Science Exam.

Advanced Software Development Skills: hands-on practice in programming implementation, writing algorithms instead of relying solely on intrinsic libraries.

## Learning Objectives:

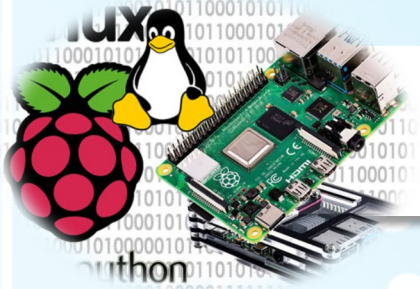
- Cover complete list of concepts required by College Board Advanced Placement Computer Science—A such as String Class, Wrapper Classes, ArrayList, etc.
- Dive into Fundamental Search Algorithms: Binary Search, Quick Sort with Recursion—not just know how to use it, but creating them.
- Learn and take advantage of Bitwise operation
- Basic understanding of Inheritance, polymorphism.

## Software:

Utilize text editor so that students will gain more in-depth experience of the process from compiling to execution instead of using just a black-box IDE.

## 5 week (two 2.5-hr meetings per week) Sessions

Weeks: 7/15 to 8/16. Total 25 hours online Instructor-led sessions.



# Computer Vision on Windows/Linux

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Grade 8+ • Two weeks • M-F • August 12-16, and 19-23

## Bridge to Machine Learning

Ready to delve into the fascinating realm of Computer Vision technology? Join us for an immersive two-part workshop series designed to dive into the intricacies of Open Computer Vision technology, with a special emphasis on Raspberry Pi, Linux systems, and the formidable OpenCV library. Bridge to ML—Data Understanding: Lay the groundwork for diving into the complexities of Machine Learning. Vision enables machines to interpret and make decisions based on visual data.

## Learning Objectives:

**Part I - Raspberry Pi & Linux Fundamentals:**

- **Linux on Raspberry Pi B+:** Linux stands as the stalwart workhorse of the computer science and technical community — embraced by professionals, academia, and enthusiasts alike. Mastering the essential functionality of the Linux environment provides a significant head-start for students entering college. In today's increasingly digital world, proficiency in Linux is not just advantageous but often essential for success in various academic and professional endeavors.

- **Python and essential Numpy library:** Harnessing the power of the robust Python Numpy Library. Master the basics of Python programming for effective programming.
- **GPIO Utility:** (if time allows) Explore the basics of General-Purpose Input/Output for digital and analog devices.

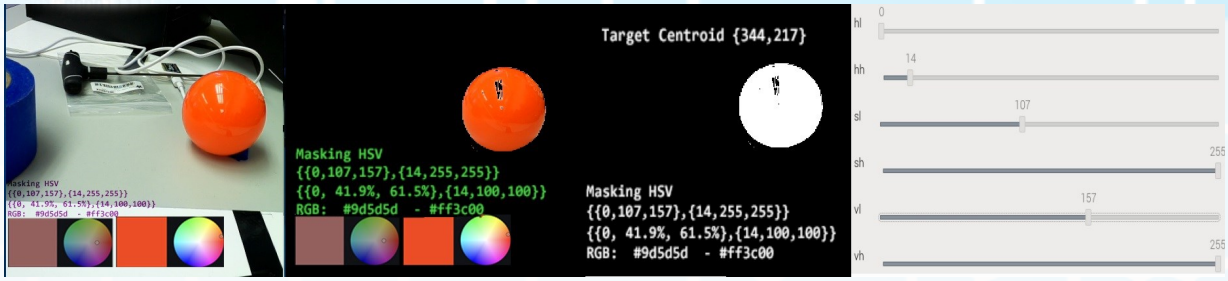
**Part II - OpenCV Mastery**

- Open Source Computer Vision Control: Delve into controlling OpenCV with both Python and C++ for flexibility, and performance.

# Computer Vision on Windows/Linux

REGISTER NOW

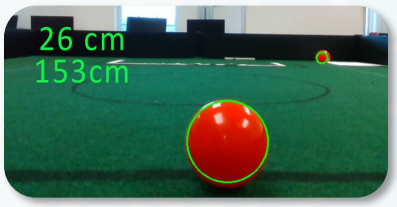
Grade 8+ • Two weeks • M-F (9-3) • August 12-16 and 19-23




- Learn how to utilize Computer Vision control to prepare for future ML activities. Mastering the basics of image processing— Delving into advanced topics such as Canny Edge Detection and the KNN Algorithm.
- Utilizing OpenCV to identify objects in real-time scenario, and identify objects in real time.
- Utilize Numpy Library: Leverage indispensable tools for efficient data manipulation.


## Hands-on with AI-Oriented Robotics Challenges:

- Maze Scenario Challenges: Navigating AI-oriented robotics challenges.
- Soccer Game Simulation: Experience the thrill of incorporating Computer Vision into a soccer game scenario.
- Hands-On Experience: Apply your knowledge through practical projects and real-world challenges.



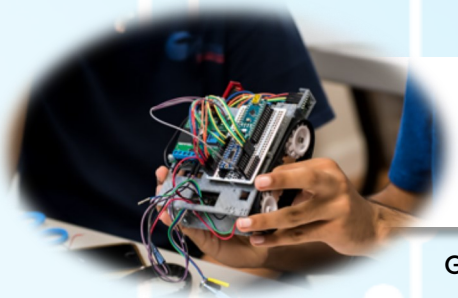

- AI-Driven Competitions: Engage in exciting AI-oriented competitions for a comprehensive learning experience.

## Prerequisites:

Programming Experience—Minimum in control structure and linear Data Structure.

## 2-week Series Full-Day Workshop

**August 12-16, 19-23: 9AM to 3PM**



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# Robotics and Arduino Projects

Grade 9-12 • AM or PM • AM + PM • 7/15-19, 7/22-26, 8/5-9, 8/12-16

## Progressive Levels: B, I, II

Get ready for an immersive and hands-on workshop filled with Open-ended projects within well-structured scaffolding environment. It guides you through the basics of creating electronic projects and building your own robot using the renowned Arduino-based platform— an award-winning platform widely embraced in college engineering schools and various prototyping endeavors.

## Learning Objectives

**Foundations of Electronics and Programming:**

- Introduction to Arduino: Familiarize yourself with the Arduino platform and its capabilities, such as basics analog/digital interfacing, serial communication to more complex I2C devices communication.
- IDE Mastery: Dive into the Arduino IDE for programming fundamentals.
- Electronic Prototyping: Begin building the foundation for your robotics project.
- Apply applied electronics concepts such as Ohm's law and voltage-current relationship.
- Modularity and Abstraction: Equip students with design principles to enhance robot control.

**Design a smart robot**

- Increase self-awareness with various sensing devices.
- Learn more advanced concepts to increase robust autonomy:
  - into utilizing multiplexing, deeper understanding of how to utilize I2C devices, feedback control, and writing a much larger scale project.
  - Feedback control technique;
  - Using Inertial Measurement Unit to increase great orientation
  - Design with state machines to enable a more robust intelligence

Robot Automation Challenges:

- Path Complexity: Progress through challenges, navigating from simple to more complex paths
- Obstacle avoidance, object recognition.

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# Robotics and Arduino Projects

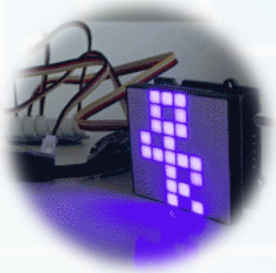
Grade 9-12 • AM or PM • AM + PM • 7/15-19, 7/22-26, 8/5-9, 8/12-16

## Direct Benefits:

- Heighten competency in problem-solving, higher order of thinking, and solution development using both software and hardware.
- Preparation for high school-level AI-oriented robotics competitions involving electronic devices.
- Empower students to conduct independent robotics projects with a custom platform with expandability instead of a box-kit.


## Learning Tools:

- Hardware:
  - Open-source controller – PICO (Arduino-compatible)
  - A multitude of Arduino-compatible electronic devices
- Software:
  - Arduino-C/C++
  - Abstracted libraries from Storming Robots for novice learners, progressing to native libraries for advanced students.



## Prerequisites

Have fundamental programming concepts equivalent Robot to our Algorithms in C/C++ - Level I - see the Level I equivalence in our https://cspdf.stormingrobots.com for more details.

## Half-Day Sessions

AM: 9-12 PM: 1-4

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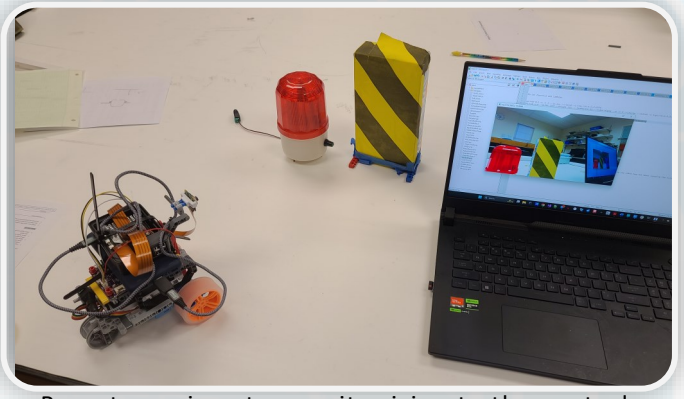
# Tele-Robot with Shared Autonomy

REGISTER NOW

Grade 9-12 | Two Weeks of Full-Day

## Explore the Future: Tele-Robot Workshop Series

Think about the Mars Rover control from the NASA Station on earth, or the telepresence robots! Tele-op with autonomy robotics are increasingly valuable across various industries leveraging artificial intelligence with various industries, even health care. With the advent of high-speed internet and advanced devices, telepresence robots are becoming more intelligent and versatile.



Remote engine streams its vision to the controller; then the controller will work together to set out the perfect path and collect data.

From navigating tight spaces to avoiding potential hazards, the possibilities are endless when you harness the power of real-time visualization in remote engine control.

This workshop offers learning opportunity to gain a practical experience with insights into the capabilities and applications of tele-robot but with shared autonomy.

## Learning Objectives

In this workshop, participants will gain hands-on experience in:

- Build a controller with two joysticks, and a remote wheeled robot with onboard sensers and camera with the intelligence for smart navigation.
- Remotely communicate using WIFI socket communication between two microcontrollers, uni-directionally, and bi-directionally.
- Send onboard sensing data from the remote engine to the controller to perform remote collaboration (like the NASA station controller Rovers on Mars).
- Enable the controller to real-time visualize the remote engine's path. You can control the remote engine through its video feed. You'll also program the remote engine to have the intelligence to navigate smartly, such as navigating tight spaces , avoiding potential hazards.

## Prerequisites

Have fundamental programming concepts equivalent Robot to our Algorithms in C/C++ - Level I - see the Level I equivalence in our CS syllabus.