

# Arduino Hands-On

Summer: 24 hours (8 weeks) Mon and Thur : 3:30 – 5 PM

## Who can join the class?

***Any students interested in robotics, electronic devices, and microcontroller.  
(Basic coding skill required)***



## What you will learn:

- Understanding the usage of different sensors to collect data from the real world.
- Work with LED, push button, potentiometers, motors, speakers, ultrasonic sensors.
- Communicate Arduino with your computer to do interactive projects.
- Become confident to create your own Arduino projects and develop an engineer mindset when solving the problems.
- Learn by doing not just by watching.



## What can you get and do?

- **Build up your knowledge on sensors, electronic circuits, and microcontrollers.**
- **Gain practical hands-on experiences using real-world sensors and electronic devices.**
- **Build up skills to apply MIT BWSI Program and opportunity to get certification.**
- **Ability to acquire college research opportunities.**



30年教學經驗，AP及SAT權威

丹尼爾學院  
SATPROFESSIONALS

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21316 Pathfinder Rd, Diamond Bar, CA 91765

(Across street from Diamond Bar High school)

# Arduino Hands-On

Summer: 24 hours (8 weeks) Mon and Thur : 3:30 – 5 PM

## 誰可以參加這門課程?

只要對機器人，電子裝置和微控制器有興趣的同學都可以參加。  
(必須有基本的編程能力)



## 這門課可以讓我學到什麼?

- 了解各種不同感測器的使用方式，並應用於真實世界中搜集資料。
- 學會運用各種電子裝置，例如：發光二極體(LED), 按鈕開關，電位計，馬達，喇叭，超聲波感測器。
- 如何讓電腦與Arduino彼此溝通來完成具有互動能力的項目。
- 具有信心創建個人的Arduino個人項目，同時能運用工程思維來解決問題。
- 通過動手實作方式來進行學習。



## 我可以從這門課獲得什麼?

- 建立對於感測器，電子裝置，和微控制器的知識和使用能力。
- 獲得真實世界中感測器與電子裝置實際的動手實作經驗和能力。
- 具備基本技能並申請參加暑期MIT BWSI Program，並有幾會取得Arduino認證
- 具備爭取暑期大學研究項目的機會。



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# ACSL Junior Division

Summer: 24 hours (8 weeks), Mon. & Thur. 1:30-3:00 PM

## Who can join the classes:

*Any grade 8,9 students interested in computational thinking and computer programming.*



## What you will learn:

### ◆ Computational Thinking

- Decomposition, Pattern Recognition, Algorithm, Abstraction

### ◆ Computer Science Concepts

- Number systems, Recursive function, **Program - Branching**, Prefix/infix/postfix notation, Bit-string, **Program - Looping**, Boolean algebra, Data structure, **Program - Array**, Graph theory, Digital electronics, **Program - String**

### ◆ Python Programming

- Data types, Basic operations, Control structure, Functions, Files, List, Tuple, Dictionary, Set, Object-oriented concepts, Classes design



## What you can get and do?

- **Attend Bebras Computational Thinking Competition on Nov. 2020.**
- **Get two EDX online Python classes certificates.**
- **Attend 4 ACSL Junior Division Contests starting from Dec. 2020 and gain opportunity to attend ACSL All-star Contest on May 2021.**
- **Attend Microsoft Technology Associate Python Programming certification test.**
- **Ability to pass AP Computer Science Principle and AP Computer Science A**
- **Get ready to do personal application project on Game development, Data Science, Machine learning, Artificial Intelligence and more.**

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# ACSL Junior Division

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## Bebras Computing Challenge

- The Bebras® Computing Challenge introduces computational thinking to students.
- It is organized in over 30 countries and designed to get students all over the world excited about computing.
- Each participant gets 45 minutes to answer 15 multiple-choice questions that focus on computational and logical thinking.
- It is completed online in your own school and it shows to school and student how well their skills are developed.
- The Challenge is available for the following grade groups:
  - ♦ Kits grades 1 and 2
  - ♦ Benjamin grades 5 and 6
  - ♦ Junior grades 9 and 10
  - Castors grades 3 and 4
  - Cadet grades 7 and 8
  - Senior grades 11 and 12
- Anyone within these groups can participate; it does not matter if it is a language student or a born mathematician!
- The questions only require some basic reasoning ability.

American Computer Science League



## American Computer Science League Contest

- American Computer Science League (ACSL) is an organization that arranges computer science contests for all grade-levels for more than 40 years.
- Every year over 300 teams in the United States, Canada, Europe, Africa and Asia are participating in various divisions.
- The season consists of 4 contests.
- Each contest is held at the participating school, and a school's score is the sum of the scores of its highest-scoring students.
- In each contest, students are given short theoretical and applied questions, and then a programming problem to solve.
- At the end of the year, an All-Star Contest on May is held at a common site.
- Invitations to the All-Star Contest are based on cumulative *individual scores* in the Junior, Intermediate, and Senior Divisions.

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# ACSL Junior Division

Summer: 24 hours (8 weeks), Mon. & Thur. 1:30-3:00 PM

## 誰可以參加這門課程：

任何對電腦運算思維和電腦編程有興趣的 8、9 年級同學，都可以參加。



## 參加這門課程可以學到：

### ◆ 電腦運算思維

逻辑思维、抽象思维、算法设计、数据结构

### ◆ 電腦科學概念

- Number systems, Recursive function, **Program - Branching**, Prefix/infix/postfix notation, Bit-string, **Program - Looping**, Boolean algebra, Data structure, **Program - Array**, Graph theory, Digital electronics, **Program - String**

### ◆ Python 編程能力

- Data types, Basic operations, Control structure, Functions, Files, List, Tuple, Dictionary, Set, Object-oriented concepts. Classes design



## 參加這門課程對我有什麼好處？

- 參加 2020 年 11 月的全美 Bebras Computing Challenge 挑戰賽。
- 獲得兩門 EDX 線上 Python 課程的認證。
- 參加自 2020 年 12 月開始的 ACSL Intermediate Division Contests，成績優秀學生可參加 2021 年 5 月的 ACSL 全明星賽。
- 參加 Microsoft Technology Associate Python Programming 認證考試。
- 獲得 AP Computer Science Principle 和 AP Computer Science A 不錯的考試成績。
- 獲得技能進行個人在遊戲開發、大數據應用、網站應用程式開發、機器學習、人工智慧等不同領域應用項目的開發。

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# ACSL Junior Division

Summer: 24 hours (8 weeks), Mon. & Thur. 1:30-3:00 PM



## Bebras Computing Challenge

- Bebras® Computing Challenge 目的在啟發學生的電腦運算思維能力。
- 全世界總共有超過 30 個以上的國家參與，並設計考題來挑戰學生的電腦運算思維能力。
- 每位參加挑戰賽的學生有 45 分鐘完成 15 題選擇題，這些都是與電腦運算和邏輯思維能力相關的題目。
- 電腦思維挑戰賽分為以下組別：

◆ Kits	grades 1 and 2	Castors	grades 3 and 4
◆ Benjamin	grades 5 and 6	Cadet	grades 7 and 8
◆ Junior	grades 9 and 10	Senior	grades 11 and 12

American Computer Science League



## American Computer Science League Contest

- American Computer Science League (ACSL) 美國電腦科競賽已有 40 年以上的歷史，其競賽涵蓋小學組、初級組、中級組和高級組。
- 每年有將近 300 個隊伍來自美國、加拿大、歐洲、亞洲和非洲參加不同組別的比賽。
- 每年初賽包括 4 場比賽，**初賽成績優秀的個人**可獲邀參加每年五月的全美明星賽。

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# Game Development Using Python

Summer: 24 hours (8 weeks), Friday 1-4 PM

## Who can join the class:

*Any students interested in Game design with Python.  
(basic Python coding experiences).*



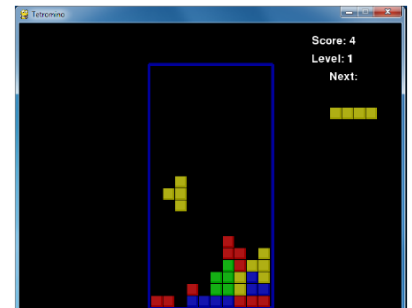
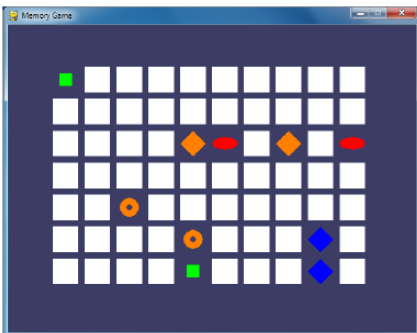
## What you will learn:

- Understanding the usage of Pygame module.
- Understanding the basic design of games.
- Understanding different ways to control the game.
- Develop different games from scratch.
- Develop games like: Memory game, Tetris, Shooting game, Flappy Birds and more.



## What you can get and do?

- **Build your personal projects on game development to enrich your personal profile.**
- **Build your own game to demonstrate your creativity, passion, and problem-solving capability.**
- **Attend next advanced game design courses to gain more abilities.**
- **Ability to acquire college research opportunities.**



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# Game Development Using Python

Summer: 24 hours (8 weeks), Friday 1-4 PM

## 誰可以參加這門課程？

任何對於使用 Python 編程來設計遊戲有興趣的學生。  
(具備 Python 編程基本能力)



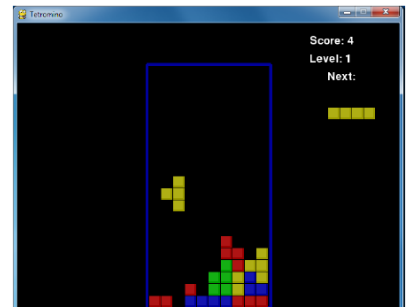
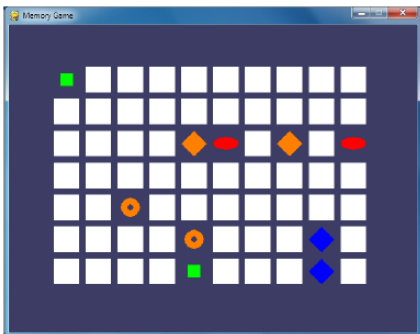
## 這門課程可以讓我學到甚麼？

- 了解如何使用 Pygame 模組來設計遊戲。
- 了解遊戲設計的基本方式。
- 了解不同種類遊戲的控制和設計方式。
- 從頭開始一步一步地學習一個完整遊戲的設計過程。
- 在課程中會開發以下的遊戲：Snake, Pong, Tetris, Density game, Flappy Birds 等不同遊戲。



## 我可以從這門課程獲得什麼？

- 建立個人遊戲開發項目，展示於不同網路平台，以充實個人技能和履歷。
- 開發自己設計的遊戲來展現個人的創造力、熱情和問題解決能力。
- 參加進階遊戲設計課程獲取更進階的能力。
- 有機會展示自己獲得參與大學研究的機會。



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# Machine Learning with Python

Summer: 16 hours (8 weeks) , Saturday 10:00-12:00

## Who can join the class?

*Any students interested in Machine Learning and Artificial Intelligence.  
(Basic coding skill required, Python preferred)*



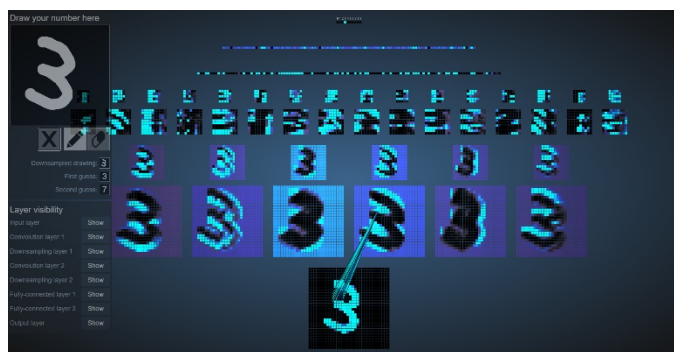
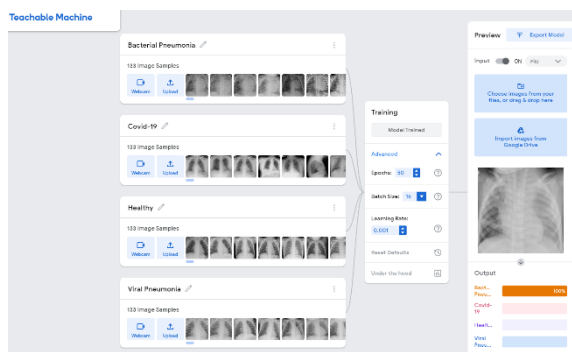
## What you will learn:

- Understanding the process of machine learning and model generation.
- The mathematical skills about probability, inferential statistics and linear algebra.
- Understanding different ML application on prediction, classification and clustering.
- Apply Python program to developing, implementing and deploying machine learning models through powerful frameworks such as scikit-learn, TensorFlow, etc.,



## What you can get and do?

- **Build up your knowledge on machine learning and artificial intelligence and their application on different fields.**
- **Gain practical hands-on experiences using real-world ML/AI datasets.**
- **Build up skills to apply MIT BWSI Program and join Modeling the Future Challenge competition.**
- **Ability to acquire college research opportunities.**



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# Introduction to Machine Learning and AI

Summer: 16 hours (8 weeks), Saturday 10:00-12:00

## 誰可以參加這門課程?

只要對機器學習(Machine Learning)和人工智能(Artificial Intelligence)有興趣的學生, 均可參加。  
(需要基本編程能力, 具備 Python 經驗為佳)



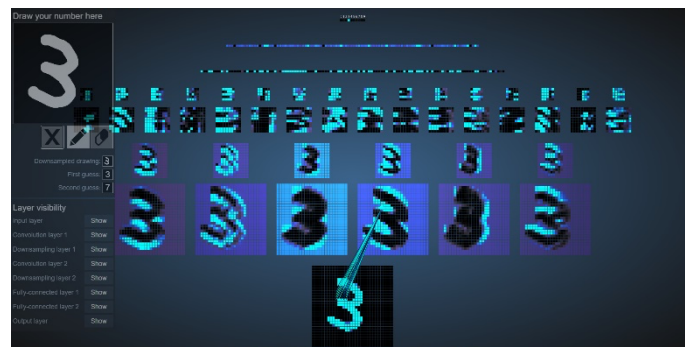
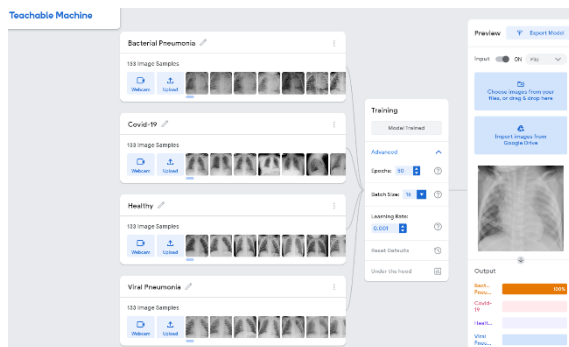
## 這門課程可以讓我學到甚麼?

- 了解機器學習的運作過程以及如何產出模型。
- 學習機器學習所需的數學基礎: 機率, 統計和線性代數。
- 了解機器學習的主要應用領域: 預測, 分類和集群。
- 學習通過 Python 程序使用強大的 scikit-learn, TensorFlow 等架構來開發, 實現和部署機器學習的模型。



## 我可以從這門課程獲得什麼?

- 建立個人對於機器學習和人工智能應用於不同領域的知識。
- 獲得實際運用真實世界的資料, 動手實作建立機器學習模型的經驗。
- 具備能力申請 MIT BWSI 暑期項目以及 Modeling The Future Challenge 競賽。
- 能展示自己機器學習和人工智能的知識和能力, 獲得參與大學研究或實習的機會。



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# Programming Drone with Python

Summer: 16 hours (8 weeks), Saturday 1-3 PM

## Who can join the class?

*Any students interested in controlling Drone through the Python program.  
(Basic Python coding skill required)*



## What you will learn:

- Understanding the principle of drone flight and drone control.
- Using Python program to control the drone.
- The OpenCV module to process the images captured by the drone camera.
- Apply OpenCV and Python program to fly drone with face tracking, follow the line and control the drone through hand gesture.



## What you can get and do?

- **Build up your fundamental knowledge on drone flying and the way to control drone through computer program.**
- **The techniques and algorithms associated with autonomous Unmanned Aerial Vehicle (UAVs).**
- **Build up skills about image processing and the ability to work with drone hardware.**
- **Ability to apply MIT BWSI UAV program and UCB ROAR academy.**



*The Tello Drone fee is **not** included in the course fee.*

*All students need to purchase the Drone by himself **before** the class.*



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# Programming Drone with Python

Summer: 16 hours (8 weeks), Saturday 1-3 PM

## 誰可以參加這門課程？

只要對無人機(Drone)和運用 Python 程序控制無人機飛行有興趣的學生，均可參加。  
(需要基本 Python 編程能力)



## 這門課程可以讓我學到甚麼？

- 了解無人機的飛行與控制原理。
- 學習如何使用 Python 程序來控制無人機。
- 使用 OpenCV 模組結合 Python 程序，進行無人機獲取影像的處理和應用。
- 運用 OpenCV 和 Python 進行無人機追蹤人臉的應用，無人循線飛行以及使用手勢來控制無人機。



## 我可以從這門課程獲得什麼？

- 建立個人對於無人機飛行的基本知識，以及通過編程控制無人機的能力。
- 學到無人機的相關技術和控制無人機的法則。
- 具備運用程序處理影像的能力，以及控制無人機硬體的能力。
- 具備能力申請 MIT BWSI 暑期無人機項目以及 UCB ROAR 無人車的暑期項目。



Tello Drone 費用不包  
含在課程費用中。

所有學生須在上課  
前，自行購買 Tello 無  
人機。



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