

EECE416 :Microcomputer Fundamentals and Design

αβτσ

Microcontroller Application

www.MWFTR.com

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Arduino

UNO



MINI



Mini USB Arduino Nano V3.0
ATMEGA328P Module CH340G 5V16M
Micro-controller board

Basic Stamp 2

USB



Serial



Texas
Instruments
MSP430
LaunchPad



STM32F



How we learn and use them

⌘ Parallel Learning

- ☒ Class moves on with i386 Assembly
- ☒ uP Project goes on in parallel
- ☒ Team-learning

⌘ Team Learning Process

- ☒ **3-Week Cycles** for a type of uP
- ☒ Take turns to another type of uP (if everything works fine and as scheduled)

⌘ **3-Week Cycle Schedule**

- ☒ Starting Day is Thursday
- ☒ Ending Day is Tuesday
- ☒ 1 Week period is **R-F-S-D-M-T-W**

⌘ This means: **Every Tuesday** there must be something to deliver – **presentation, demo, etc**

1st Round (Oct)& 2nd Round (Nov)

Group	Controller/Oct	Controller/Nov
8	<u>Stamp2A</u>	<u>STM32F</u>
6	<u>Stamp2B</u>	<u>Arduino Mini</u>
2	<u>Arduino Uno</u>	<u>MSP430</u>
4	<u>Arduino Uno</u>	<u>Arduino Mini</u>
1	<u>STM32F</u>	<u>Stamp2A</u>
5	<u>Arduino Mini</u>	<u>Stamp2B</u>
7	<u>MSP430</u>	<u>Arduino Uno</u>
3	<u>MSP430</u>	<u>Arduino Uno</u>
9	<u>Arduino Uno</u>	<u>MSP430</u>

1st Round 3-Week Cycle

⌘ Week 1: Delivery Date is Oct 11 (T)

- ☑ Find out what items are needed to work with the controller
- ☑ Search and learn about programming environment
- ☑ Know the pins, connectors, cables of the controller
- ☑ Run a sample code
- ☑ **Make and submit a written or video report on the activities (Week 1 deliverables)**

⌘ Week 2: Delivery Date is Oct 18 (T)

- ☑ Write a code for a component and task given
- ☑ Make and submit a written or video report on the activities

⌘ Week 3: Delivery Date is Oct 25 (T)

- ☑ Write a code for a component and task given
- ☑ Make and submit a written or video report on the activities

1st Round - Week1 Issues

⌘ Week 1 (due Oct 11)

☒ ISSUES – Driver Program and/or OS incompatibility

☒ Mini Arduino

☒ MSP430

☒ SOLUTION1

☒ Try to solve by Wednesday

☒ If not solved, receive new type of controllers ASAP

☒ SOLUTION2

☒ Suggestion???

1st Round – Week2

⌘ Week 2 (due Oct 18)

☑ Connection of an RGB LED

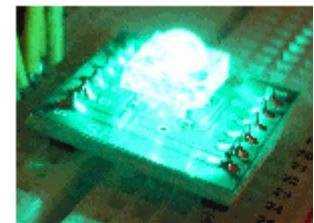
☑ **Written Report (electronic submission)**– must include

☑ Brief description of the project

☑ Code

☑ Connection Diagram

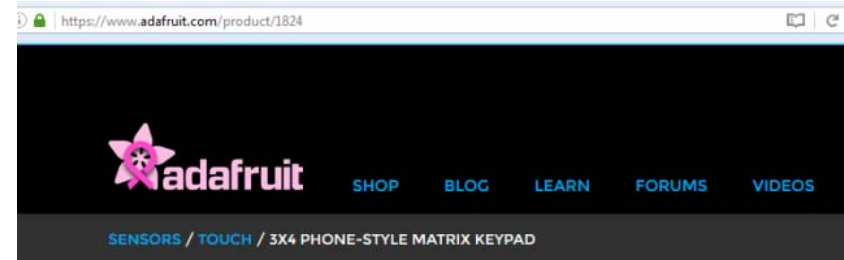
☑ Screen captures or photo-shots of working system



1st Round--- 3rd Week

⌘ Add a **keypad** or a **distance sensor** to control/change the color of the RGB LED

⌘ **3x4 Keypad (4)**



1st Round--- 3rd Week

⌘ a distance sensor: HC-SR04 (3)

The screenshot shows the DealExtreme website interface. At the top, there's a navigation bar with "Free shipping to US", "English", "Login or Join Free", "My Account", "Order Tracking", and "Contact us". A large banner for a "Huge Name Brand GIVEAWAY" is visible, along with icons for "\$100 Gift Card" and "High Discounts". The DealExtreme logo and a search bar with "Multi-language search available" are also present. Below the navigation, there's a category breadcrumb: "DX > Electrical & Tools > Arduino & SCM Supplies > Sensors". The main product image shows the HC-SR04 sensor module, a blue PCB with two ultrasonic sensors. The product title is "HC-SR04 Ultrasonic Sensor Distance Measuring Module - Blue". The price is listed as "US\$ 1.94" with a "51% OFF" badge. The list price was "US\$ 3.99". Shipping options include "CHINA" and "DXSOUL" with "Free Shipping in 24 Hrs To UNITED STATES". The quantity is set to 1, and there's an "ADD TO CART" button. At the bottom, there are links for "Product Details", "Reviews", and "Discussions".

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DX > Electrical & Tools > Arduino & SCM Supplies > Sensors

MVPRODUCT

HC-SR04 Ultrasonic Sensor Distance Measuring Module - Blue
HC-SR04 Ultrasonic Sensor Distance Measuring Module

★★★★☆ (219 reviews) | SKU: 133696 (Added on 5/26/2012)

List Price: ~~US\$3.99~~ **51% OFF**

Price: **US\$ 1.94**

Direct: CHINA DXSOUL Shipping: MVProduct Free Shipping in 24 Hrs To UNITED STATES

Quantity: - 1 + **ADD TO CART**

100% Satisfaction guaranteed or Your money back Price Match Report Error

Product Details Reviews Discussions

Microcontroller Project --- 3rd Week

⌘ a distance sensor –Parallax Ping Ultrasound Sensor (2)



Browser address bar: <https://www.parallax.com/product/28015>

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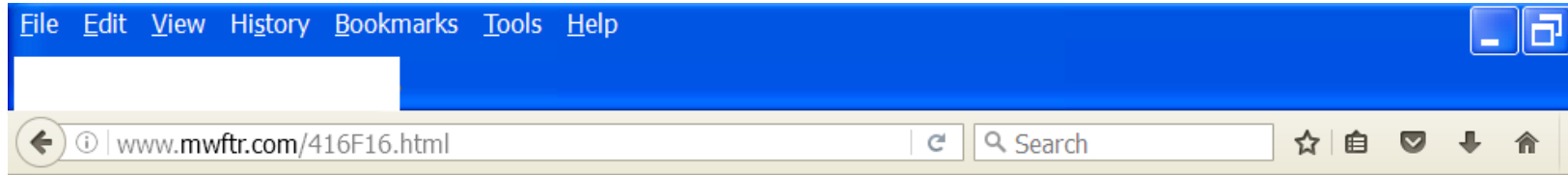
Altitude

Color/Light

Gas

...

1st Round --- 3rd Week



NOTE2

* Note3

* Microcontroller Project

----- If your board is a mini Arduino USB from China ("Arduino Nano CH340"): (1) Download and Save this driver file, (2) Read this driver installation instruction, and once all done, (3) See this figure to properly select this mini Arduino.

----- First component to connect: ShiftBrite V2.0 RGB LED from Macetech. Link to the Datasheet and Documents. Try to turn on (in different colors) and off.

----- Now connect either a 3x4 keypad or a range finder (Parallax Ping or HC-SRQ4) by which the color of the above RGB LED may controlled.

1st Round --- 3rd Week

⌘ Example Color Control

⊞ Green

⊞ (Far)

⊞ (0 – 3)



Yellow

(Middle)

(4 --6)



Red

(Close)

(7 – 9)



⊞ **FINAL REPORT**: WRITTEN REPORT by T Nov 1

⊞ Softcopy (File) – Description, Code, Display, Photos, etc

Demo



⌘ Round 1 --- Demonstration from
Volunteering groups

☑ Group 1

☑ Group 4

☑ Group 6

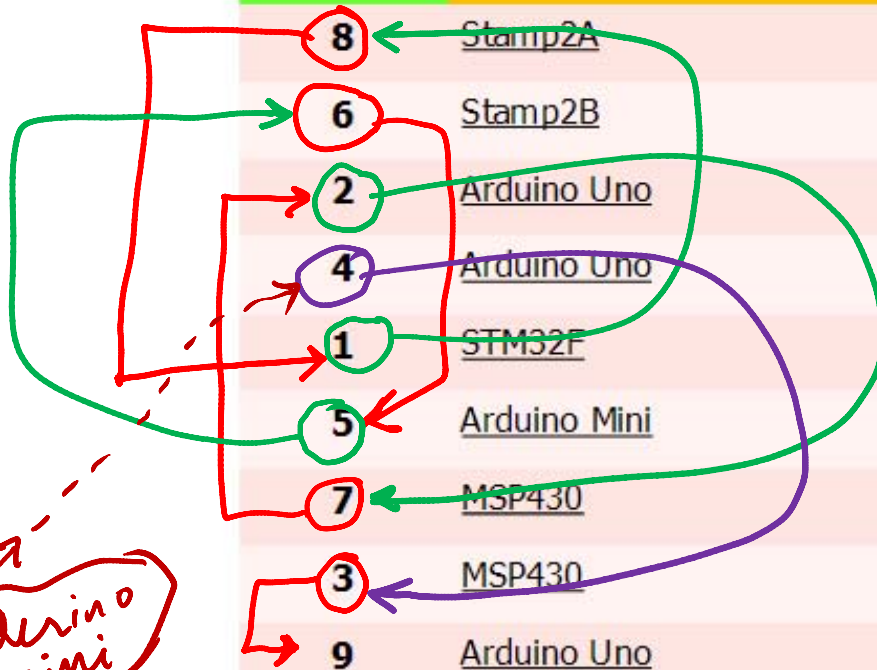
2nd round of microcontroller project

- ⌘ **Exchange** Device (Controller, USB Cable, Keypad/Distance Sensor)
- ⌘ **Keep** ShiftBrite RGB LED and wires.

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3	MSP430	Arduino Uno
9	Arduino Uno	MSP430

Arduino mini



2nd round of microcontroller project

⌘ Week 1 Assignment

- ☑ RGB LED connection
- ☑ Video Clip submission for the completed work (**Nov 8**)



⌘ Week 2: Delivery Date is **Nov 15 (T)**

- ☑ Connect RGB LED and Distance Sensor (or Keypad)
- ☑ Video Clips Submission of the Completed Work (Nov 15)

⌘ Week 3: Delivery Date is **Nov 22 (T)**

- ☑ Connect additional component (TBD) + RGB LED + Sensor (or Keypad)
- ☑ Written Report
- ☑ Demonstration