PC/CP 320
Exploration Project

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Outline

There are 2 projects this term. Integration project brings together several things you’ve done in lab. Exploration project allows you to investigate something that has been mentioned, but you haven’t used in the lab.
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- *Exploration* project
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- **Integration** project
  Brings together several things you’ve done in lab

- **Exploration** project
  Allows you to investigate something that has been mentioned, but you haven’t used in the lab
Exploration Project Information

Exploration Goal Options

Outline

Schedule

Project Substitution Option

Outline

Why two projects?

The integration project only involves previously-seen material.
The challenge is adapting the code to incorporate all of them.
The exploration project introduces something you've never used.
The challenge is learning how to use it.

Trying to combine both would make it too easy to get overwhelmed.
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Why two projects?
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Exploration project
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Diagram:

- Operator interface
- Raspberry Pi
- Unfamiliar device
There are 4 weeks, (8 lab periods), exclusively for the projects.
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Schedule

There are 2 weeks, (i.e. 4 lab periods), mostly for the exploration project.

Lab 3A; Choose device to explore and learn about it.

There are lots of resources online.

Lab 4A; Demonstrate basic functionality of the device.

Show it doing something.

Lab 4B; Demonstrate the completed exploration project.

Show it doing something that wasn't in any of the resources you found.

Be sure to highlight what you came up with on your own.
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  Show it doing *something*. 
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Be sure to highlight what you came up with on your own.
Project Substitution Option

You have the option of combining the projects as follows:

- An unfamiliar input device can replace one input device for the integration project.
- An unfamiliar output device can replace one output device for the integration project.

If you make this your 4th device, you can determine feasibility during the first 3 lab periods. This means that you are basically doing the projects in parallel.

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  (In fact, it may be similar to what you use for early testing of the device.)
  It may use functionality you created for the integration project.
- *If you can show it working on time as the 4th device, the integration demonstration can be delayed.*
Exploration Goal Options

Preliminary
- for devices with few or no examples with Raspberry Pi
  Exhibit sample operation with Raspberry Pi

Previous Examples
- for devices with several examples with Raspberry Pi
  Exhibit different operation with Raspberry Pi than examples
  OR
  Change code format from examples
  e.g. create library if examples bit-bash
  e.g. add functionality absent from examples
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Project Components

Software
- simple example for others to use

Documentation
- includes list of sources you used

You are part of an ongoing community of creators and developers. Your work will be part of what future members of the community use.

Video or screencast
- specifically exhibiting what you developed
Project Components

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Multivalued Input Options

Analog sensor — such as resistive or capacitive soil moisture sensor, heart rate monitor (combination project possibilities). An analog output must feed into ADC to interface with the Pi. Some will need voltage dividers or need analog voltage amplification or attenuation. Devices like this require calibration to be useful to future users.
Multivalued Input Options

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Devices like this require *calibration* to be useful to future users.
Multivalued Input Options (continued)

- DS18B20 1-wire temperature sensor (combination project possibility)
- DHT11 temperature/humidity sensor (combination project possibility)
- Keypad (combination project possibility)
- Capacitive Hex Keypad (combination project possibility)
- RFID reader (combination project possibility)
- TM1638 Keypad/display (combination project possibility)

Some of these have existing libraries; others may have simpler bit-bashing examples.
Multivalued Input Options (continued)

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Exploration Project Information

Exploration Goal Options

Project Components

Multivalued Input Options

User Output Options

Operator Interface Options

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Some of these have existing libraries; others may have simpler bit-bashing examples.
User Output Options (complex)

- MAX7219 displays including 8x8 dot matrix, 8 digit 7 segment display
- 128x32 OLED display
- TM1637 display
- TM1638 Keypad/display

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Operator Interface Options

If the device is for input, then the operator interface should be to display the output.

If the device is for output, then the operator interface should be to control the input.

The simpler the interaction, the easier it is for others to understand and adapt.
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