# ID620 Embedded Systems

## Project 1 - LEDs

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| Assignment Issued | **Week 4** |
| Assignment is due | **Week 7** |
| Total Marks | **100 marks (20% of your total course mark)** |

## Learning Outcomes covered

1. Make decisions about appropriate architectures, components, performance metrics, and program design when faced with a specific application development task.
2. Analyse the problem parameters of an embedded computing situation.
3. Select the appropriate hardware for an embedded computing situation.
4. Implement a simple representative embedded system.

*No late submissions* will be accepted without prior arrangement with your lecturer, and will only be agreed after presentation of a set of extremely extenuating personal circumstances.

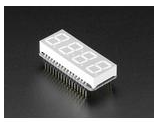
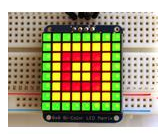
Submission must be in accordance with the instructions in the IN620 Course Directive. Marks will be deducted for failure to comply with these instructions.

A penalty of ***10 marks per day*** will apply to submissions received after the due date.

## Task – LED Project

This can be done as a **group project**. (up to three people.)

Using LEDs, material from your kits, or any other source, create hardware that **conveys useful information to the world, using LEDs**.



There are a wide range of choices here. You can use the LEDs in your kits. We have LEDs knocking around the place. You might want to have a look in Jaycar or nicegear.co.nz for an LED display, light strip, etc.

**We are able to purchase small hardware items for you provided that:**

* **The retailer is based in New Zealand.**
* **The item is in stock in New Zealand.**

**In order to manage this, we’ll only order hardware within the first week of the assignment. Any later and we run the risk of hardware not arriving until the due date of your project.**

### Requirements

* Your Arduino uses LEDs of any kind to **convey information** to users.
* Your project has a **specific purpose** it is trying to accomplish that is genuinely useful.
* Use cases or user stories are fulfilled.
* You should be able to:
  + Show you understand the scenario, and how an embedded system would **meet the requirements to solve the problem** (Meet any use cases you’ve identified.)
  + **Justify your choices** of hardware, how you implemented your code.
  + **Build a prototype** embedded system on a breadboard.
* As a group you will give a **live demonstration** of your project. We suggest you structure this way:
  + Define the problem you’re solving with your project
    - Problem scope
    - Simple use cases
  + Describe your solution. What assumptions did you make? Define the scope, limitations you discovered.
    - If your solution isn’t perfect? Show insight why, and how you would improve it.
  + We want to see a breadboard design/Schematic
  + What components did you use? Why these and not others?
  + Code Defence
  + Physical Demonstration – how did you test your device, evaluate its performance

### What kind of things could I do?

This is where you get to choose. Some ideas:

* Create an Arduino version of something like a clock or timer. Make the interface as appealing as you can. How accurate is this device?
* Can you link 2 or 3 arduinos together in some way?
* Use Arduinos and LEDs to create a model of something. Control the signal lights for a model train set, or lighting in a kitset model?
* Can you use an Arduino to control ambient lighting? Make something that responds to music?
* Can you make a game? You kit will contain buttons (You can’t do Simon sorry!)
* Can you make gadget that responds to your mood?

**There are no limits to the ideas but be aware that you’ve got 3 weeks to complete this project, so keep it in scope!**

## Project Breakdown

Initial discussion with your lecturer to approve your idea.

Evidence for marking will include:

* Code
* Physical proof of the project (Working demo)
* Live demonstration.

## Marking schedule

Marking schedule is available on Moodle.