



# 程序代写代做 CS编程辅导

COMP2300/6300/ENGN2219 / Assessments / Assignment 2: Light Show

## Assignment 2: Light Show

Create a light and sound show on your micro:bit



Photo by Arno Senoner on Unsplash

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**QQ: 749389476**

**<https://tutorcs.com>**

Digital media festivals like Canberra's Enlighten Festival and Vivid Sydney use huge projectors and LED arrays to create a city-sized

light (and sound) show for people to enjoy. **Your task in this assignment is to create a *micro* light show on your micro:bit!**

You are going to write an ARM assembly program that uses the LED array on your micro:bit to create a changing light experience that engages a viewer. The application for your show is a demonstration of your knowledge of the micro:bit array and what **you** can achieve with it!



The assignment builds on what you have learned in labs 6-10:

- [Lab 7: Basic I/O](#)
- [Lab 8: Blinky](#)
- [Lab 9: Functions, Data Structures and Stack](#)
- [Lab 10 & 11: Interrupts and Wrapping Up](#)

If you have not completed the tasks in the above labs or do not understand the content, we *strongly* recommend that you first complete the labs and then start the assignment.

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## Outline

- **Deadline:** 26 May 2023, 11:59 pm
- **Assignment template:** [link](#)
- **Specification:** keep reading 📖
- **Weighting:** 25%
- **Marked out of:** \_ / 100

**Time Until Deadline (26 May 2023, 11:59 pm):**  
Deadline has passed!

## Rules and Policies

- this is an **individual** assessment task, ensure you fork your repo as **private**

comp2300 / 2024 / comp2300-2024-checkpoint-1 / Fork project

Project name  
comp2300-2024-checkpoint-1  
Must start with a lowercase or uppercase letter, digit, underscore, or hyphen. It can also contain dots, pluses, dashes, or spaces.

Project URL  
https://gitlab.cecs.anu.edu.au/ Select a namespace

Project slug  
comp2300-2024-checkpoint-1

Select your uid

Don't touch these

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Visibility level

☒ Private  
Project access must be granted explicitly to each user. If this project is part of a group, access will be granted to members of the group.

☐ Internal  
The project can be accessed by any logged in user.

☐ Public  
The project can be accessed without any authentication.

Select private

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Fork project

Cancel

- you may re-use designs / files from your labs
  - it is **your** responsibility to ensure any additional files are included in the repo and pushed to gitlab correctly
  - additional files should be left under the `src/` directory
  - additional files should not contain spaces in their name
    - eg: `src/example_file.S` is okay, `src/example file.S` is **not**
- you may use the included library files if you wish
  - if you want to make changes to the library files, then we suggest you instead create a new file under `src/` and copy what you need there and modify it; this way we won't miss extra work that you're doing
- your submission must be in ARM assembly, no C or other language is permitted
- late submission is not permitted without an extension

## Specification

Here's a technical specification for your assignment.

Your program:

- must be written in **ARMv7 assembly** using the assignment template (link).
- must use the LEDs to create a **light show** that **changes over time**
  - should* use scanning on the LEDs to enable displaying of any 5x5 image
- the light show must sufficiently demonstrate the technical capabilities of your implementation
- must **never stop** (it can repeat or loop)

- must work when the microbit is **powered over USB** but not connected to a computer (that is, it works after you upload it and plug into a USB charger)
- *should* use **memory** (data structures) to create a changing and easily modifiable light show
- must include the submission of a **<1000 words** design document describing:

- **what** your design is (and how it meets the assignment specification)
  - this is *not* what light show you're displaying
- **how** you achieve it
- **why** your design is appropriate for the task



Note that we say < 1000 words. If you feel you have addressed all of what has been asked of you in less words, please don't feel the need to hit 1000 words. You will end up writing a worse report by reducing the conciseness of it.

## Deliverables

To successfully complete this assignment, the following files must be submitted:

1. `src/main.S` containing your implementation
2. `src/____.S` any additional files you wish to include or split your implementation across (*optional*)
3. `src/____-lib.S` any files that contain alternative or modified versions of the functions found in `src/____.S` (*optional*)
4. `statement-of-originality.md` containing your name, uid and a list of references for **any** work that is not your own
5. `report.md` containing your **<1000 word** design document
  - *optional* `assets/*` containing any images you want to add in your document

## Marking Criteria

Your assignment will be evaluated on the following criteria:

1. Sophistication of your implementation in ARM-v7 assembly language (50/100)
2. Sophistication of your design and how it meets the assignment specification (25/100)
3. Sophistication of analysis and evaluation of why your implementation is correct and appropriate for your design and what limitations it might have (25/100)

Item 1 will be evaluated primarily through your program code. Items 2 and 3 will be evaluated through your `report.md` and the quality of the writing within.

For more information on items 2 and 3, read the [design document guide](#).

For item 1, you can consider the following to be a *part* of assessing the sophistication of your program:

- your use of memory for encoding your light show
- how easy it is to change what is displaying (a high quality submission should require little / no changes to the code to change what is being displayed)
- your level of extensive scanning display
- your style and adherence to programming standards
  - includes the calling convention and good commenting
  - for more info see the assembly style guide



## Ideas For Implementation

This list is non-exhaustive and is only provided as a *guide* to give you an idea of what we're expecting the difficulty of the grade ranges to look like.

Each point is an example of a submission, meaning that you only have to do one point from that grade range (unless otherwise specified). However, the more featured your submission is, the higher the mark. In saying that though, a single high quality feature is probably better than a few low-quality ones.

“Good use of memory”

This means that the program is easily changeable and controllable by modifying data structures in memory, without, or with very little, modification of the code and then uploading it to the board again to view those changes.

These are just provided as a **guide** and as mentioned, other aspects such as the quality of the report, quality of the programming, etc. also factor in to the grade. This means that just because you have successfully implemented something in grade range X, does **not** mean that you are **guaranteed** a grade in range X.

### Pass (50 - 59%)

- Moving Display, Non-scanned, Good use of memory
- Moving Display, Scanned, Poor use of memory

### Credit (60 - 69%)

- Moving Display, Scanned, Good use of memory

## Distinction (70 - 79%)

Everything from Credit level and *at least one* of:

- Basic PWM (Pulse Width Modulation)
  - eg: screen level brightness (all LEDs)
- Generative or chaotic display using the hardware Random Number Generator
- Using the timer in an integral part of your display

## High Distinction



An HD is a mark of 80+, not 100. Just because you do something in this range, doesn't mean that you can expect full marks.

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Everything from Credit level and *at least one* of:

- Complex PWM (Pulse Width Modulation)
  - eg: per-LED brightness control that can be programmed with memory and change with the display
- Using multiple hardware interrupts (buttons) to control and change what is being displayed
- External peripherals such as gyroscope, compass, etc, (warning: **VERY DIFFICULT**, consult with your tutor first)

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## Submission

Submission is through GitLab, the most recently pushed commit of your fork of the [assessment template](#) before the deadline is taken to be your assignment submission.

## Getting Started

1. read this assessment page **completely**
2. fork and clone the [assessment template](#)
  - ensure you fork your project as private
  - do **NOT** change the name or path of the repo, or it may get missed by our software

Don't touch these

Project name  
comp2300-2024-checkpoint-1

Must start with a lowercase or uppercase letter, digit, emoji, or underscore. Can also contain dots, pluses, dashes, or spaces.

Fork project

A fork is a copy of a project.  
Forking a repository allows you to make changes without affecting the original project.

Project URL  
https://gitlab.ces.anu.edu.au/

Select a namespace  
comp2300-2024-checkpoint-1

Want to organize several dependent projects under the same namespace? [Create a group](#)

Project description (optional)

Select your visibility

Project access must be granted explicitly to each user. If this project is part of a group, access will be granted to members of the group.

☐ Internal  
The project can be accessed by any logged in user.

☒ Public  
The project can be accessed without any authentication.

Select private

Fork project

Cancel

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3. plan your assignment and what you are going to implement
4. think of how the data structures are going to look and work
5. think of how the program is going to fit together
6. read [the microbit tips and tricks page](#)
7. work on each part, debugging, testing, committing and pushing as you go
8. make a mistake or get stuck, then ask your tutor in your lab or a good question on the [course forum](#).

## Completion Checklist

- you have submitted the files [listed above](#)
- you have [wrote all of your code using good practice](#)
- you have saved, committed and pushed your assembly files to gitlab
- you have filled out, committed, and pushed your `statement-of-originality.md`
- you have filled out, committed, and pushed your `report.md`
- you have checked the [report pdf artifact on gitlab](#) to ensure it is correct
- you have checked the gitlab ci tests and they are passing

## Report pdf Artifact

Your repo will be packaged into a report pdf for marking purposes. As such it is important that you see what the result of the pdf job is and make sure the output makes sense.

It will:

- take your name and uid from the `statement-of-originality.md`
- take your report from `report.md`
- take references from the `statement-of-originality.md`

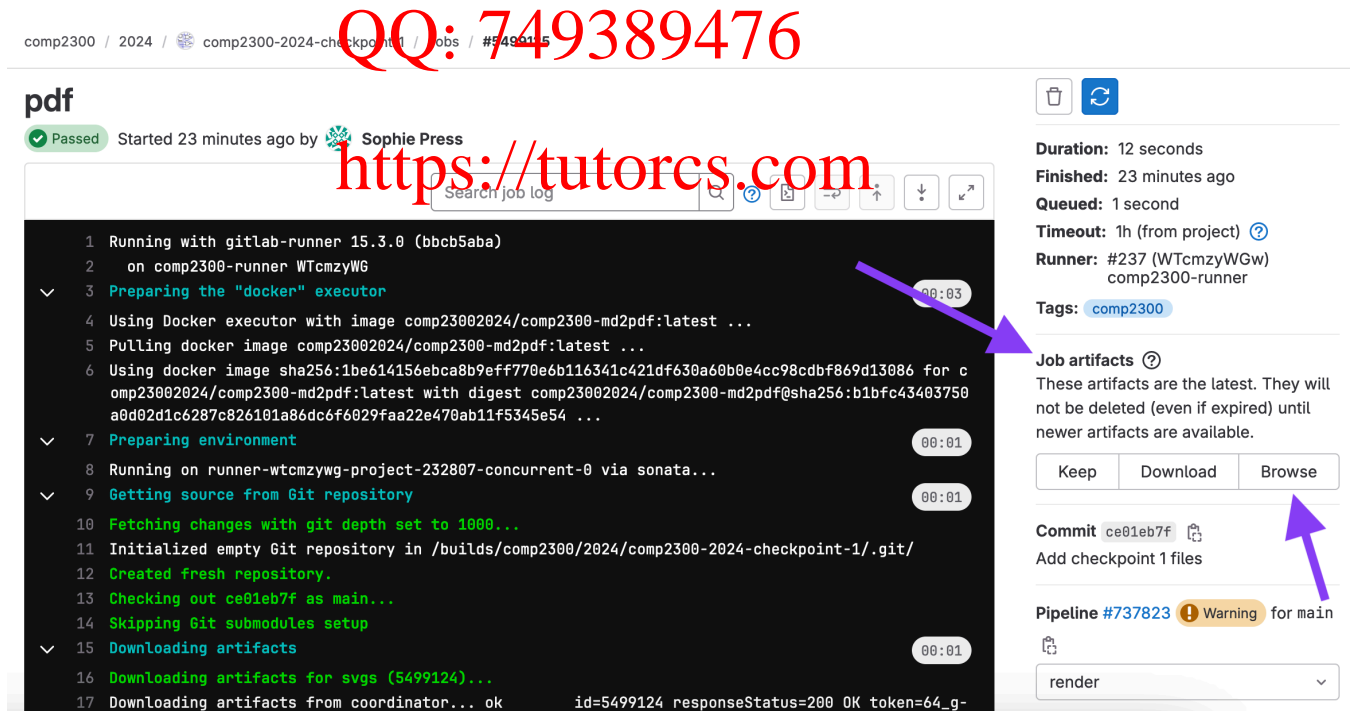


- take the code from all of your `src/____.S` files
- combine all of them into a single pdf

To view the pdf, first click the **render** icon on your most recent commit as above, then click on the pdf job.



Then, you'll be taken to the job page, where you should see a "Job Artifacts" section, click on the Download button.



This will download a zip file containing your pdf. Which should look something like this.



The image is a collage of various elements related to a C programming assignment and a tutoring service. At the top, there are two side-by-side screenshots of a document titled "Assignment 2" with a deadline of "5/12/23, 2:28 AM". The left screenshot shows the "Student Details" section with fields for "uid:" and "name:", and a "Report" section with the text "Your report text will be here". The right screenshot shows the "References" section with a single entry: "[1] Example Author. 2023. example code video. Retrieved from [https://example.com/video](\"https://example.com/video\")". Below the right screenshot is a QR code with a small logo in the center that says "Tutor CS". In the center of the image, there is large red text that reads "程序代写代做 CS编程辅导" (C programming tutoring). Below this, there is more red text: "WeChat: cstutorcs", "Assignment Project Exam Help", "Email: tutorcs@163.com", "QQ: 749389476", and "https://tutorcs.com". At the bottom, there is a small inset image showing a code editor with C code: 

```
1 // C program to find the sum of first n natural numbers
2
3 #include <stdio.h>
4
5 int main()
6 {
7     int n, sum = 0;
8     printf("Enter a number: ");
9     scanf("%d", &n);
10    for (int i = 1; i <= n; i++)
11        sum += i;
12    printf("Sum of first %d natural numbers is: %d", n, sum);
13    return 0;
14 }
```

There is more general info about gitlab ci [here](#).

## FAQ

## Can I make a game? Like snake?

Yes! As long as the display is still based off the game state which is stored in memory. And you will still need to use scanning on the display. But otherwise this is a good example of what you can do by combining buttons and things like the Random Number Generator.

## What does scanning mean?

There is a lab exercise for this.

## What does sufficiently demonstrate the technical capabilities of your implementation mean?

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the beating heart loop to change  
 QQ: 749389476  
 ats based on the result from the

<https://tutorms.com>

## Do I have to write a design document?

## How do I write a design document?

Make sure you are answering the questions in the specification and stay within the word limit.

<https://comp.anu.edu.au/courses/comp2300/assessments/assignment-2/>

## My program doesn't work, can I email you for help?

Sorry, you won't get help over email or Teams. We provide a course forum which is the **only** way we are able to help.

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Forum posts related to your assignment submission **must** be "private to instructors" (as for any individual assessment).

It's [5 minutes, 6 hours] before the deadline and my CI Jobs aren't finish.



Unfortunately on the day the assessment is due, when many students are pushing updates at once, the CI servers can't keep up. You may not see your CI jobs finish before the deadline. You will just have to manually check that your files have been submitted correctly.

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The best way to avoid this issue is to start early and finish early 😊

If there's any issues with your git repository *after the deadline*. Please let us know (after the deadline) through a private forum post and there may be something we can do.

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How do I know my assessment has been submitted?

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If:

QQ: 749389476

1. the files in *your fork* of the assessment are correct (i.e., the files you intend to submit) when checking on the **gitlab website**
2. the time is before the deadline

<https://tutorcs.com>

then your assessment has been submitted (well done!).

Please don't ask us to "check", we would be just doing exactly the same thing as the above steps which you can do yourself.



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## Acknowledgement of Country

The Australian National University acknowledges, celebrates and pays our respects to the Ngunnawal and Ngambri people of the Canberra region and to all First Nations Australians on whose traditional lands we meet and work, and whose cultures are among the oldest continuing cultures in human history.

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