The University of Western Australia
School of Engineering
Associate Lecturer Kieran Quirke-Brown

Embedded Systems
ELEC3020

Semester Group Project **Retro Arcade Gaming System** **weeks 6-12**

GROUPS: Teams of 4 students

EQUIPMENT: Purchase your own equipment,
up to $50 will be reimbursed (receipts required)

GET STARTED
- Form a group of **4** students
- Register your group members with the project coordinator, who will give you a **group number**.
- Display this number prominently on your **gaming system** and on the cover page of your **report**.

IMPLEMENTATION
- Design and build a retro arcade gaming console using an ESP32. The gaming system should implement a number of games to show off its ability (more complex games will be awarded more marks).
- Use the TTGO microcontroller you already have to interface with a VGA monitor, as well as a second TTGO controller that has been designed as a controller for your system.
- To achieve a good mark your system should include a sound system (this can range from simple tones to full music files), a robust interior design (we will shake it), a stylish exterior and easy to setup (ideally a single power supply and quick access VGA port).

TASK
(1) Create a simple controller from a TTGO that can interact with your gaming console wirelessly.
(2) Setup a second TTGO to act as the console. This TTGO will be wired to some form of audio output with volume control, a VGA output that can be connected to a monitor and a memory device that can save information.
(3) Implement a simple game like brick breaker or pong or come up with your own (it is a good engineering practice to not reinvent the wheel).
(4) Save high scores of your game and display them on a leaderboard.
(5) Allow for two player mode either as split screen or single screen.
(6) Game selection (if multiple games are available) and display system state information (selected game/number of players etc.) from main system TTGO display.

PRESENTATION
Videos will be viewed and marked on Mon. of week 12

DEMONSTRATION

All groups will show the practical performance of their system on Fri. of week 12. This includes answering questions from the assessors.

SUBMISSION

1. One-minute video of your project journey including design decisions, setbacks and achievements along the way. You can have some fun with the videos but don't go overboard.
To be submitted no later than **Sunday evening before week 12.**

2. Submit the following documentation **before your project demonstration** as a single PDF document via LMS incl. signed cover sheet by all team members, **plus a printed and stapled copy**:

a. Project design report (*pdf*, max 10 pages), which includes
   - Report on which person did what
   - Hardware circuit diagram with explanations
   - Software design description and diagram
   - Do not include: code, table of contents, half-empty pages
   - This document should be written such that another team can pick up your report and rebuild your design, understanding the design decisions made.

b. Project budget (*Excel)* with "bill of material":
   - Part number
   - Part name
   - Part quantity
   - Price per part
   - Source (link where purchased)

c. User Manual as if it was sold to a customer (max 2 pages, no title page). This should not be a technical summary of your design but a step by step guide on how to use your product and what to do if there are issues (think about guides on how to use a kitchen appliance, these don't talk about the technical details of how the product achieves heating to a set value but just shows how you can do it).

d. Marketing and sales document (1 page slide or web-format) Incl. photo and brief system description as if selling it on *eBay*

Make sure to attach your group number as a sticker onto your project build!

MARKING

55%	Functional Performance
10%	Week 10 Prototype demonstration
5%	Video
10%	Project Design Report
10%	User Manual
5%	Budget
5%	Marketing Document

GROUP NO: _____

Name1 _____ Name2 _____

Name3 _____ Name4 _____

LAB DEMONSTRATOR **SIGN OFF** Design (wk10): _____