

# Meeting Minutes – Group 1

Location: o B 6

27 February 2023, 11:00–13:40

## Present

Gabriel Apap, Mark Mizzi, Damjan Filipovic

## Discussion

1. Decide on allocation of minuting and agendas for next meetings.
  - a) Decided that since we will not have many meetings a solution that splits this the most equally is ideal.
  - b) Mark proposes a solution. Gabriel does not understand. Mark draws diagram to aid explanation. Agreement on Mark's solution.
  - c) First week Mark - Chair, Gabriel - Minutes. Second week - Chair - Damjan, Mark - Minutes. Third week - Chair - Gabriel, Minutes- Damjan etc
2. Go over the project requirements as specified by "customer" (in the handbook).

### o.1 Client Requirements

- a) Clarification was made that the project requires to build a DTMF encoder only, decoding is not necessary
- b) It was confirmed that the experiment board contains a DAC. The board is equipped with a 10 Bit DAC.
- c) The meaning of "prioritised" was interpreted to mean the order of input as determined by the board. Although a human might think they were pressed at the same time however the board can determine exactly which key was pressed first.
- d) Clarification was made on how queued input and output is handled. Gabriel misunderstood that an enter key was needed and that all output is handled at once. This is not the case, (as Mark explained) input is processed immediately. An output queue is used due to output most likely taking longer than input processing.
- e) Clarification was made by Gabriel on what symbol length and inter symbol spacing means. Symbol length is how long the dualtone is outputted for for each symbol inter symbol spacing being the time between each symbol output. For example a symbol out put of 250ms with 50ms space between each symbol.

### o.2 Functional Requirements

- f) Gabriel noted that point F.2 and F.3 are somewhat unclear given that an LCD is itself a digital output. Is any other digital output required?  
**To clarify with Prof Briffa next week (given this is relatively low priority).**

- g) Clarification was made on point F.7 by Mark on what possible errors could arise. Possible errors included disconnection of peripherals or the application of invalid settings.  
**To further clarify with Prof Briffa next week.**

### 0.3 Technical Requirements

- h) Mark strongly suggests that the use of C++ should be avoided at all costs due to issues with dynamic linking and incomplete support of certain features. He further argues that we get no benefit from using C++. He notes that the use of libraries would not be available.  
The team decides to take Mark's suggestion. **The team will only be developing in C.**
- i) Clarification is needed on what is meant in T.6 by "multi-threaded" given that the CPU is a single core with no hardware threads. Mark posits that the meaning of multi-threaded in this context is the interleaving of interrupt code with regular code as well as the scheduling of regular code.  
**To clarify with Prof Briffa next week.**

### 0.4 Organisational Requirements

- j) Mark recommends the use of snake\_case for functions and variable names, and PascalCase for structs. It was decided that all curly brackets will be written on separate lines. For switch statements, any case code must be written underneath the case declaration. Same line multi variable declaration to be allowed but used with best judgement. Any further code style decisions will be made in future when necessary.
- k) Commit messages should have a singular line explaining briefly what was changed. Any further clarifications to be made after that.
- l) **The team to set up DoxyGen by next week and briefly go over documentation for it.**
3. Discuss architectural overview of the design (graphical representation).

### 0.5 Interrupts

- a) Keypad input interrupt handler. Mark clarifies a separate interrupt handler will be needed for each symbol/key. Interrupt handler will push to an output queue to be handled by regular code.
- b) Potentially the LCD, **research must be carried out on how the LCD functions.**

### 0.6 Regular code

- c) Task that processes one output from the output queue. This task will have to write to LCD and produce the tone.
- d) Access to the hardware will be abstracted using "driver code". Example `write_to_lcd("25")`  
`output_tone(8)`
- e) Conversion code from numbers to strings
4. Allocate research tasks for the team.
- a) Gabriel - Research how the LCD functions. Look into amplifier circuit. Look into how DAC functions.

- b) Mark - To look at optimal numbering of symbols to use bitwise tricks. To look into interrupt calling convention. To look at assembly instruction set and build up/find a quick reference (like a cheatsheet).
  - c) Damjan - To look into optimal conversion code for number to string. To look into thread safe and atomic data structures.
5. Other matters
- a) Next meeting to be held on the 2nd March

## Actions

1. Make necessary clarifications with Prof Briffa

Assigned to: **Team**  
Deadline: **6<sup>th</sup> March**

2. Research

Assigned to: **Mark**  
Deadline: **next meeting**

3. Research

Assigned to: **Damjan**  
Deadline: **next meeting**

4. Research

Assigned to: **Gabriel**  
Deadline: **next meeting**