Architetture dei Sistemi Di Elaborazione	Delivery date: <mark>24th January 2023</mark>
Extra point #2 **Max 2 points**	Expected delivery of extapoint2.zip must include: - zipped project folder - this document compiled in pdf - Application note in pdf

<u>Purpose of Part 2</u>: to enhance the Tamagotchi developed in the previous extra point with the KEIL **software debug** environment to emulate the behaviour of the LPC1768 and the LANDTIGER Board.

<u>This part is evaluated to assign a maximum of 2 extra-points for qualified students taking the exam with a mark >= 18</u>

Improve your Tamagotchi!

In Keil µVision, use the LANDTIGER **emulator** (or the actual board if you are able to have one) for implementing an improved version of your Tamagotchi.

Please deliver a zip folder with all the files of your project. <u>At the end of the Keil project folder, please add "EMULATOR" if you developed it using the emulator or "BOARD" if you had the opportunity of developing the project on the actual board.</u>

Example: extrapoint2_emulator.zip **or** extrapoint2_board.zip

Please attach any useful comments and your emulator configurations <mark>(substitute the image below).</mark> <mark>Your project will be evaluated according to your specification!!</mark>
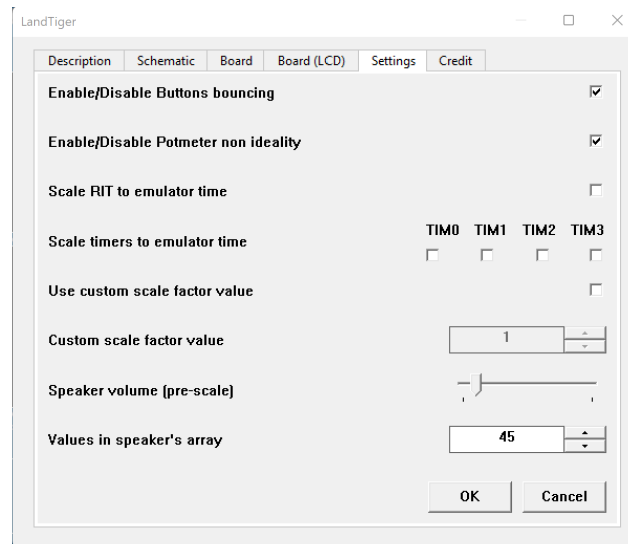
Additional Comments (C-variable/defines defined in your code, e.g., scaling factors) :
Contrariamente all'Extrapoint 1, per questa consegna ho utilizzato la scheda. Per riuscire ad implementare la specifica degli effetti sonori ho dovuto adattare il programma per liberare due timer (timer 2 e timer 3) da dedicare alla gestione del suono. Di conseguenza ho inserito diverse variabili per gestire tutte le casistiche senza l'ausilio dei timers. Ad esempio, ho utilizzato due variabili, happinessSeconds e satietySeconds, per gestire temporalmente il livello delle batterie. Per quanto riguarda le batterie e il loro livello ho scelto che happiness e satiety hanno una priorità maggiore rispetto alle coccole e quindi che se il livello di una delle due batterie sia 1 e il tempo per effettuare l'animazione sia insufficiente il personaggio morirà. Per la gestione del suono ho utilizzato diverse variabili che rappresentano lo stato del Tamagotchi - come ad esempio isDead, isEating, isSelected - che servono a scatenare il timer della riproduzione del suono. Inoltre, ho utilizzato la variabile sound e isButtonPressed rispettivamente per abilitare/disabilitare il suono e tenere traccia di esso e per disattivare temporaneamente delle funzioni all'interno del RIT. Quest'ultimo, in particolare, ha la funzione di non far scatenare altre azioni se il pulsante di selezione è premuto in modo da non creare conflitti con le altre specifiche.

Application Note)

You are required to produce an Application Note document **(MAXIMUM 1 PAGE)** regarding one (of your choice) of the new implemented features (aka Specifications).

An "Application Note" is a form of technical writing with the following purposes:

1. It has an instructional or tutorial style

2. It is targeted to a specific audience of users.

3. It is typically a focused description of how to do something, including an introduction to the topic as well as precise implementation details, results, and recommendations. It is more than just the repetition of information from part of a spec sheet.

   For example: the writer should have done something with the information from a spec sheet, and describe how it was done or how ONE should do it.

4. It often includes references to other manuals, documents, or books where the user may gain more or related information. You can avoid adding references.

Specification 1) Cuddles Animation

You shall create a new way to interact with your Tamagotchi using the TouchScreen.
Touching the Tamagotchi shall now trigger a new animation.
This new animation:
- It lasts for 2 seconds.
- It is triggered only on the actual Tamagotchi.
- At the end, the cuddles increases the happiness level of one bar (of your scale).

An example of cuddles animation:


Requirement 1:
Note that images are only for explanation purposes.
You are required to develop the cuddling feature.

Cuddling is activated by pressing on the TouchScrenn present on the Landtiger.

The animation:
- It lasts for 2 seconds.
- It is triggered only on the actual Tamagotchi.
  Touching the meal/snack menu, as well as the status levels or the Tamagotchi age on top of the screen should have no effect at all.
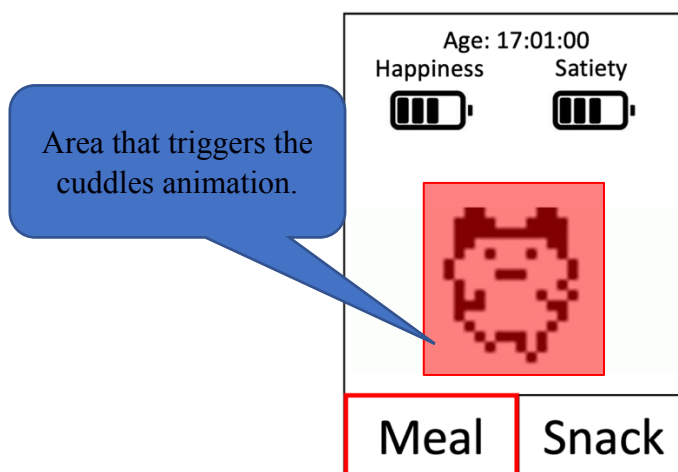
- At the end, the cuddles increases the happiness level of one bar (of your scale).

Specification 2) Sounds

Each animation on your Tamagotchi shall now include a <mark>sound effect</mark>.
You are not requested to make complex sounds/music, it is enough to play some notes.

You should include sound/music to the following part of your project:

- **Click** of the Meal/Snack option.
- **Eating** (Meal/Snack) animation.
- **Death / run** away animation.
- **Cuddles** animation.
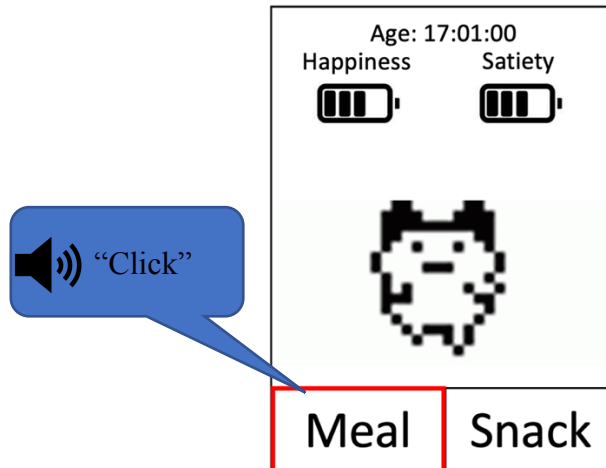
Requirement 2:
<mark>Note that images are only for explanation purposes.</mark>
You are required to develop a sound effect for all the major event/animation of your Tamagotchi.

Sound/music don't need to be excessively complex.
A single note is fine for the clicks and a couple of them is fine for the other animation (but you are free to experiment!).

For example:
- **Click** of the Meal/Snack option (a single note for representing the classical Windows "click" sound).
- **Eating** (Meal/Snack) animation (play 3 notes).
- **Death / run** away animation (play 5 notes).
- **Cuddles** animation (play 8 notes) .

Specification 3) Volume
With music/sound, it is common practice to develop the handling of the volume level.

As you can see for the following figure, a speaker icon with the following volume level can be added.

Age: 17:01:00

Happiness   Satiety
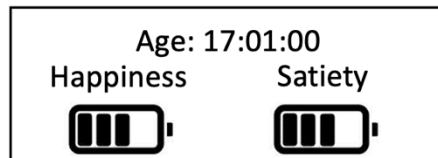
In this way, the volume level of the music can be controlled, from mute to the maximum level.

Requirement 3:
<mark>Note that images are only for explanation purposes.</mark>
You are required to develop the handling of volume level.

Volume level is sampled by reading the current <u>analog</u> value on the potentiometer every 50 ms.

When it is muted (lowest analog value), you are free to choose the image to show. For example:

 or