

Specification 1) Cuddles animation

Functions from the TouchPanel library were used to implement the touch screen.

main (sample.c)

As a first step, it is necessary to **initialize the touch screen** in the main (sample.c) using the *TP_Init()* function. In addition, in order to be able to use it correctly, a **calibration** process must be carried out. In fact, there are various possible errors that can affect the accuracy and reliability of the measured x and y coordinates, e.g. distortion of the coordinates of a circle into those of an ellipse. This calibration is performed using the *TouchPanel_Calibrate()* function, which uses a three-point calibration algorithm. Three points are drawn on the display, each with its own coordinates (x,y). The user touches the three points respectively, and the coordinates detected by the touch sensor will be the unknowns needed to solve the equations of the algorithm.

IRQ_RIT.c

The use of the touch screen was managed by **polling**. At each interruption of the RIT, which occurs every 50 ms, the *getDisplayPoint()* function is used.

It is required by the specification that the cuddle functionality is only activated when the Tamagotchi is actually touched, and not the rest of the screen. It was therefore calculated that the point to be touched must have the x-coordinate between 61 and 179, the y-coordinate between 125 and 249. If *getDisplayPoint()* returns a point with these coordinates, then timer 1 is initialized with a *TimerInterval* of 0x2FAF080 (i.e. two seconds) and is then activated. RIT is disabled so that the joystick cannot be used while the cuddle functionality is active. The variables *action* and *manage_happiness* are set to 1, the first of which is used so that the animation is not replaced when timer 0 is interrupted, the second is used to enter the if relating to the management of happiness when timer 1 is interrupted. The *totoro_cuddles()* function is used to display the version of the Tamagotchi with hearts around it due to the cuddles. For the correct handling of the sounds, required by the second design specification, the variables *sound* and *cuddles_flag* are also set to 1.

If, on the other hand, the point touched on the touch screen has coordinates that do not respect the identified range, then no instruction is executed.

IRQ_timer.c

The timer 1 thus initialized causes the cuddle animation to remain for two seconds. When the relevant interruption occurs, having set the *manage_happiness* variable to 1, happiness is incremented by 1.