

OSes ASSIGNMENT ON RTOS

Morse-based Twitter

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Dip. Automatica e Informatica



Goal

- The goal of this lab is implementing a Morse-based Twitter
- The system sends Tweets composed of maximum 140 characters
 - For the sake of simplicity we assume only uppercase characters
 - Numbers and punctuation characters are not allowed
- The systems sends a pre-defined set of messages, one after the other
 - Each message is sent (possibly multiple times) for a duration of 180 seconds
 - After 180 seconds since starting displaying a message, the display is interrupted for 0.5 seconds, and then the display of the next message is started
- The pre-defined messages are (from Fortune Cookie):
 - A FEATHER IN THE HAND IS BETTER THAN A BIRD IN THE AIR
 - A SHORT PENCIL IS USUALLY BETTER THAN A LONG MEMORY ANY DAY
 - ACCEPT SOMETHING THAT YOU CANNOT CHANGE AND YOU WILL FEEL BETTER
 - ADVENTURE CAN BE REAL HAPPINESS
 - ALL THE EFFORT YOU ARE MAKING WILL ULTIMATELY PAY OFF

Goal

- Remember that
 - The dot is coded as symbol “1”
 - The dash is coded as symbol “111”
 - A pause “0” shall be inserted after each symbol
 - After each codeword an inter-codeword pause shall be inserted, corresponding to “000”
 - After each word, an inter-word pause shall be inserted, corresponding to “0000”
 - Each bit (“0”/“1”) shall be displayed on a LED (or using printf)
 - The bit timing is 100msec
- Propose a suitable architecture for generating the needed bit timing, the message timing, and implement the embedded system using either OSEK (EE VM, or EE Arduino, or Trampoline) or Micrium μ C/OS-III

■ Morse coding

A ● -	J ● - - -	S ● ● ●
B - ● ● ●	K - ● -	T -
C - ● - ●	L ● - ● ●	U ● ● -
D - ● ●	M - -	V ● ● ● -
E ●	N - ●	W ● - -
F ● ● - ●	O - - -	X - ● ● -
G - - ●	P ● - - ●	Y - ● - -
H ● ● ● ●	Q - - ● -	Z - - ● ●
I ● ●	R ● - ●	

Evaluation criteria

- The evaluation is based on the following criteria
 - Max 15 points: the solution shall provide the requested behavior
 - Max 9 points: code complexity (the simpler, the better)
 - Max 6 points: memory occupation (the least, the better)
 - Extra bonus, max 3 points: hardware implementation
 - As making the code running on hardware is more complex, 3 extra points will be granted to the solutions running correctly on Arduino or FRDM K64

Deliverable

- The code you developed:
 - If based on Micrium you shall deliver app.c
 - If based on OSEK you shall deliver OIL file and C file
- 2-page report describing your work in PDF format
- The files shall be delivered using “portale della didattica/elaborati” as a single ZIP file
- Deadline 18/12/2020 24:00
- The assignment shall be delivered by both Mechatronics and Computer Engineering students
 - CE students will have to deliver a second work covering the 2-extra credits (more details next)

