Software Detailed Design Requirements

# Résultat de recherche d'images pour "sambot esigelec"Introduction

A small bot on wheels needs to be designed. It should be able to move itself in an environment containing obstacles.

The obstacles can be detected and avoided thanks to an ultrasound sensor placed on a servomotor (sweeping).

Holes must be detected too with an infrared sensor (to prevent falls).

This document lists all the **system requirements**, for the **software only.**

Every requirement is composed of:

* One unique ID following this pattern: SYS\_XXXXX (Five digits),
* A name, which is always a small introduction of the requirement,
* A text, describing what is this requirement for.

# Software Detailed Design Requirements

DDR\_00100

Name: Moving forward

Text: if the user press the “move forward” key or if the robot is in autopilot mode and there is no obstacle and no hole, then the MSP430G2553 should use a timer to provide a PWM signal in order to drive both the wheels clockwise.

Function: R\_avancer.

DDR\_00110

Name: Turn right

Text: if the user press the “move right” key, then the MSP430G2553 should use a timer to provide a PWM signal in order to drive the right wheel counterclockwise and the left wheel clockwise.

Covers: SYS\_00100

Function: R\_tourner\_droite

DDR\_00120

Name: Turn left

Text: if the user press the “move left” key or if the robot is in autopilot mode and there is an obstacle or a hole, then the MSP430G2553 should use a timer to provide a PWM signal in order to drive the left wheel counterclockwise and the right wheel clockwise.

Covers: SYS\_00100

Function: R\_tourner\_gauche

DDR\_00130

Name: move backward

if the user press the “move backward” key, then the MSP430G2553 should use a timer to provide a PWM signal in order to drive both the wheels counterclockwise

Covers: SYS\_00100

Function: R\_reculer

DDR\_00200

Name: Get the distance with obstacle in front of the ultrasound sensor

Text: The MSP430G2231 should acquire data from the ultrasound sensor continuously.

Function: get\_distance\_ultrason

DDR\_00205

Name: Detect obstacle

Text: If the MSP430G2231 receive the command ‘x’ from the MSP430G2553 through the SPI communication, then it should answer back the value of the ultrasound sensor

Function: universal\_serial\_interface(USI interruption)

DDR\_00210

Name: Sweep obstacle sensor

Text:

**If the servomotor rotates clockwise:**

If it hasn't reach 45° then it shall keep rotating clockwise else it should rotate counterclockwise.

**If the servomotor rotates counterclockwise :**

If it hasn't reach -45° then it shall keep rotating counterclockwise else it should rotate clockwise

Function: balayage

DDR\_00300

Name: Measure infrared sensor

Text: The MSP430G2231 should acquire data from the infrared sensor continuously.

Function: get\_distance\_infra

DDR\_00305

Name: Detect hole

Text: If the MSP430G2231 receive the command ‘y’ from the MSP430G2553 through the SPI communication, then it should answer back the value of the infrared sensor

Function: universal\_serial\_interface(USI interruption)

DDR\_00600

Name: Bot start autopilot mode

Text: If the user send a command ‘1’ through UART communication to the MSP430G2553, the variable on should be set to 1

Function: USCIABORX\_ISR (USCI interruption)

DDR\_00610

Name: Bot stop autopilot mode

Text: If the user send a command ‘0’ to the MSP430G2553, the variable on should be set to 0

Function: USCIABORX\_ISR (USCI interruption)

DDR\_00700

Name: Data stop display

Text: If the user send a command ‘2’ to the MSP430G2553, the variable log should be set to 0

Function: USCIABORX\_ISR (USCI interruption)

DDR\_00710

Name: Data start display

Text: If the user send a command ‘3’ to the MSP430G2553, the variable log should be set to 1

Function: USCIABORX\_ISR (USCI interruption)

DDR\_00800

Name: servomotor on

Text: If the user send a command ‘l’ to the MSP430G2553, the variable servo should be set to 1

Function: USCIABORX\_ISR (USCI interruption)

DDR\_00810

Name: Make a 180 degree turn

Text: If the MSP430G2231 send to the MSP430G2553 that a hole has been detected then the motor drives the right wheel and drive the left wheel in an opposite direction.

Function: R\_demi\_tour

DDR\_00

Name: Make a 90 degree turn

Text: If the MSP430G2231 send to the MSP430G2553 that an obstacle has been detected then the motor drives the right wheels only.

Function: R\_tourner\_droite