

LAB N°04 Part 02

Arduino Communications

Interrupts-PWM-Sensors-Actuators (Introduction to raspberry)

A. THEORY: (max 01 pages)

1. PWM

1.1. Definition

1.2. Comparing Arduino vs Raspberry GPIO, PWM, and Int. Pins

1.2.1. Theoretical study of Analog, PWM and interrupt of an Arduino pins

1.2.2. Theoretical study of Analog, PWM and interrupt of a Raspberry pins

2. Raspberry

2.1. Introduce Raspberry and its Pins

2.2. Comparison with Arduino Mkr1010.

2.3. Necessary steps to install Raspberry

B. ACTIVITY: (max 04 pages)

1. PWM usage:

Based on Arduino mkr1010, we want to control the brightness of an LED using a program that uses PWM output. Use the appropriate function `analogWrite(...)`, (Provide necessary explanations).

2. PWM-LDR-LED usage:

a. Compare PWM Pin with Analog GPIO?

b. Show (display graphically and values) the relation between the input value (0 to 255) and the duty cycle

c. Now, use the light sensor LDR and/or force sensor to modulate the intensity of the LED. To modulate the intensity of an LED using an LDR, we can read the analog input of the LDR using the `analogRead()` function and map the value to a range of 0 to 255 using the `map()` function. We can then use this value as the output to the `analogWrite()` function to control the brightness of the LED.

3. Applications of PWM:

Imagine and propose other applications of PWM.

C. CONCLUSION