TSENGWA KUKHOKUHLE TSNKUK001

DANCAN ANGWENYI ANGDAN002

Practical 4: RPI-3B SPI and Interrupt

(RPI-Python Serial Com. and RPI-Python Interrupt)

1. a.

b.

c.

# function to convert data to voltage level, # places: number of decimal places needed

*def ConvertVolts(data, places):*

*volts = (data \* 3.3) / float(1023) #first convert the data to a value between 0 V and 3.3 V*

*volts = round(volts, places) #round the floating point number to places number of decimal places*

*return volts. #return the required value*

d. From the datasheet of the MCP9700A temperature sensor by Microchip technology, there is a linear relationship between the output voltage of the sensor and the temperature in degrees Celsius. This relationship is found from Figure 2-16 of the datasheet to be:

temperature\_in \_degrees\_Celsius = 100\*output\_voltage – 50

# function to convert a 10-bit temperature value to degrees Celsius, # places: number of decimal places needed

*def ConvertDegCel(data, places):*

*vout = ConvertVolts(data, 2) #first convert the 10 bit number to a voltage with two decimal places*

*temp = ( 100\*vout ) - 50 #convert the output voltage to a temperature using the information from the datasheeet*

*return temp #return the temperature*

e. When the flashlight from a smartphone is used to shine light on the LDR, the 10-bit value read from the corresponding channel is 1023. This is taken as the maximum value that can be read from the LDR.

# function to convert light to percentage, # places: number of decimal places needed

*def ConvertPercent(data, places):*

*percent = (data \* 100) / float(1023) #first convert the value/light to a percentage*

*percent = round(percent, places) #round the value to places number of decimal places*

*return percent #return the required value*