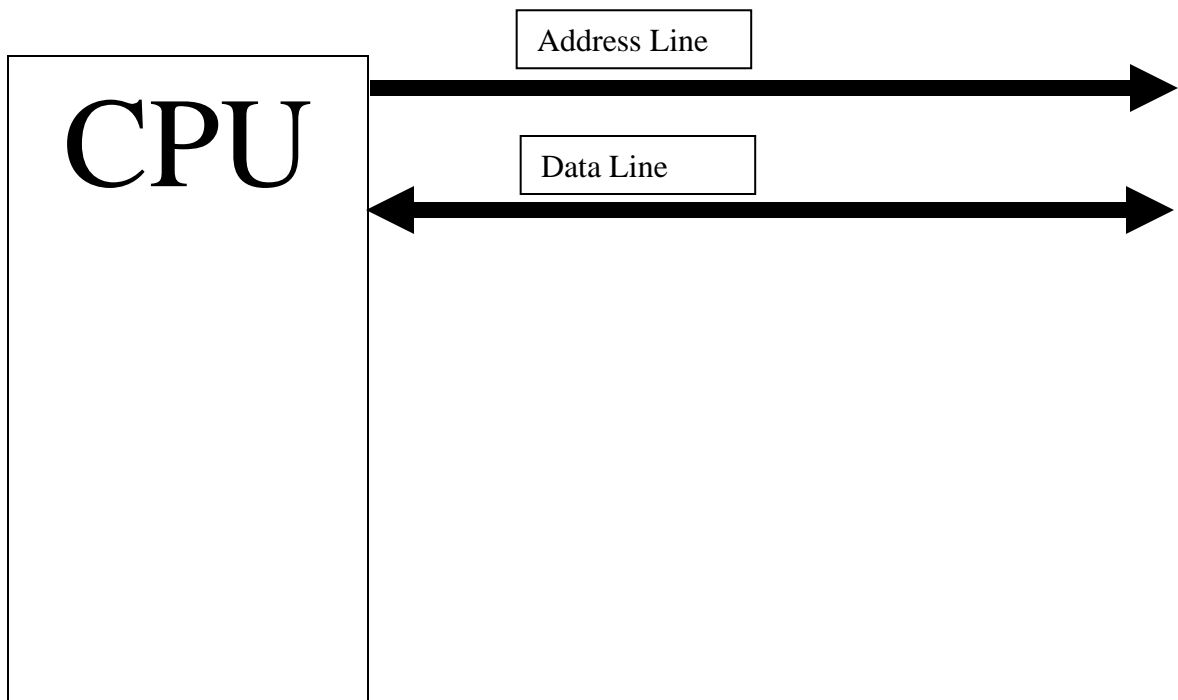


Embedded Systems
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Tutorial 4 – Architecture and ESP32

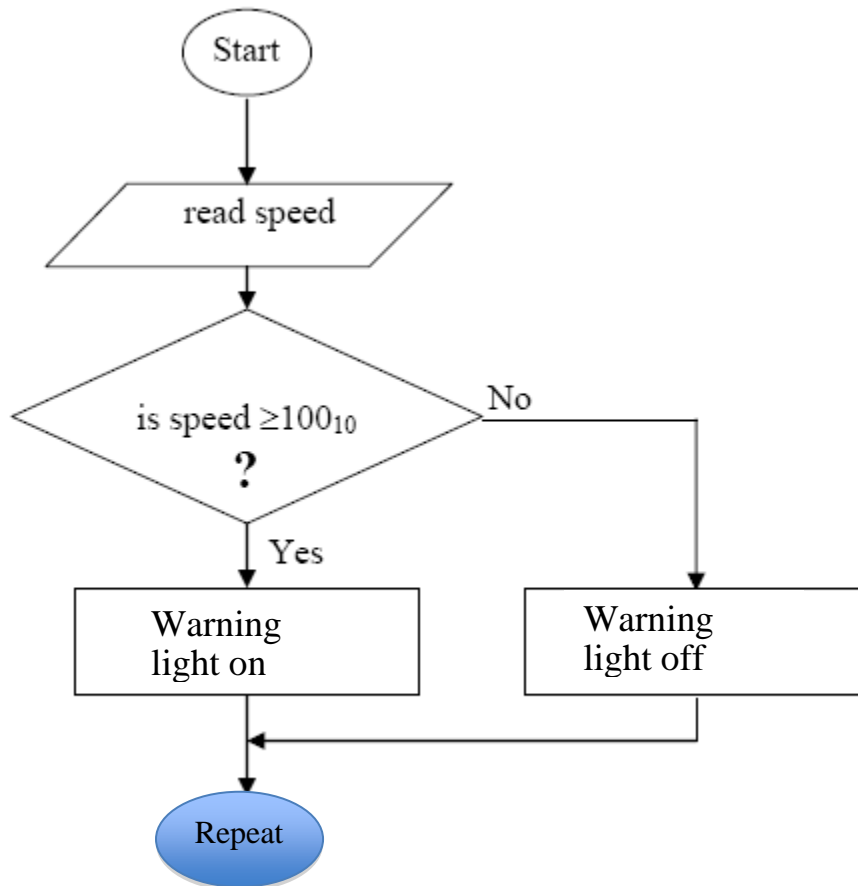
1. Architecture

Create a memory map of the following memory modules and then connect it back to the CPU.



2. Data Monitoring

Write a C subroutine "checkspeed" for the ESP32 controller to perform the following function:



Speed is read as an analogue value from GPIO03.

If speed is greater or equal to 100 (decimal) it switches on a warning light; otherwise, the light is turned off. The warning light is controlled by GPIO02 otherwise the warning should be turned off and a fan should be ran at the corresponding speed.

This program should loop forever.

Write a C program to solve this task.

3. Temperature Control

A ESP32 microcontroller is used to control the temperature in this room. The current temperature of the room has been stored in flash memory address 0 and is stored as an integer in degrees Celsius. Also, a switch that controls the heater for this room is connected to GPIO01, and a switch that controls the air conditioner for this room is connected to GPIO02.

Using the airconditioner and heater the controller needs to maintain the temperature between 21 and 25 degrees. The system should use hysteresis to limit the amount of switching. The system should also remember the current state of the airconditioner and heater in case power is lost.

Write a **C program** on the microcontroller.