Exercise for GPIO Testing

Source:

Handson Embedded Systems

Harry Li, Ph.D.
San Jose State University

Book manuscript in preparation

Contents

Reference:
(1) lecture notes and github: https://github.com/hualili/CMPE242-Embedded-Systems-;
(2) CPU datasheets, document number: Samsung Electronics, USER'S MANUAL, S3C6410X, RISC Microprocessor, pdf;
(3) board schematics, Tiny6410SDK-1111-PCB.pdf for ARM11;

Exercise for GPIO Testing (Part 1)

Exercises for 1.1 Prototyping Embedded System

P1.1 Design a power unit for the embedded prototype system?

P1.2 Design a GPP input testing circuit? why do you want to use resistor in your design?

P1.3 Design a GPP output testingg circuit? why do you want to use resistor in the design?

P1.4 Given a special purpose register GPxCON, based on the naming convention, identify its root, prefix, and explain this special purpose register's function?

P1.5 What is the function of GPxDAT?

P1.6 For 32 bit ARM CPU, we denote GPxDAT[31:0], explain what is GPxDAT[2]? how do you set this it as input? can you set it as output? explain how?

P1.7 Draw 32 bit memory, divide it into 8 equal banks, and find the starting address of each bank?

Exercise for GPIO Testing (Part 2)

P1.8 Read ARM 11 CPU data sheet, find the memory bank holding the GPP peripherial controller?

P1.9 What is a byte addressable machine?

P1.10 Use ARM 11 CPU data sheet, find GPxCON address? (hint: you can use any of the GPP port as GPx, where "x" stands for general purpose port x)

P1.11 What is compiler?

P1.12 What is cross compiler?

P1.13 How do you use *.h file to map the CPU architecture?

P1.14 Given a single line C code example to realize the mapping of GPxCON, suppose the address for GPxCON is 0x4000C000?

P1.15 Read ARM 11 CPU data sheet, find binary pattern to perform init and config to make GPEDAT[2] as input, and GPEDAT[3] as an output?

P1.16 What is the power-up address? what is the content placed at the power up address?

Exercise for GPIO Testing (Part 3)

P1.17 What is boot loader?

P1.18 How is the power up address related to the boot loader?

P1.19 Explain the booting process?

P1.20 Locate flash memory which holds the boot loader?

L1.21 Build a prototype system with either Pie-3 B or ARM 11 CPU module.