Pemrograman Perangkat Keras

Konsep Pemrograman Perangkat Keras

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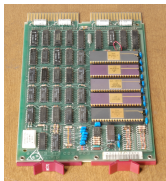Telkom University

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Overview

Introduction Hardware Programming

Steps to Start

References

What is computer hardware ?

(a) PDP-11 Board [1]

(b) Computer Motherboard [1]

Figure 1: Example computer hardware

Computer Hardware (cont.)

▶ Hardware refers to the physical elements of a computer

  • A computer's hardware is compromised of many different parts, such as main chip, RAM, EEPROM, GPIO, PCI, microcontroller

▶ Work together to perform specific or general tasks

▶ There are three requirements

  • Input

  • Processing Unit

  • Memory

  • Output

Microcontroller vs Microprocessor

Table 1: Differences between microprocessor and microcontroller

	Microprocessor	Microcontroller
Application	Used to perform intensive task	Used where the task is fixed and predefined
Structure	CPU only	CPU, memory, and I/O integrated in single chip
Clock	In GHz	In MHz
Programming	Re-programmable, and support many language	Re-programmable
Power consumption	High	Low

Why computer need software ?

The needs of software

- ▶ The computer hardware need software program to run properly
  - Scheduling the tasks
  - Managing the data flow
  - Managing the I/O
- ▶ The software program control the processes of the hardware
- ▶ Software program dedicated to perform an function

Programming

Hardware programming

- ▶ Create line of code to perform serial task to the hardware
- ▶ Control the I/O
  - • Input as data source
  - • Output as action
- ▶ Using C language [2]
  - • Small size
  - • It is processor-independent
  - • It is a very "low-level" high-level language

How to start hardware programming [2]

- ▶ Choosing the board
  - Used microcontroller ATmega328
- ▶ Describe the task
- ▶ Sketching and wiring
- ▶ Coding and upload
- ▶ Debugging
- ▶ Deploying

References

[1] Wikipedia contributors, *Computer hardware — Wikipedia, the free encyclopedia*, https://en.wikipedia.org/w/index.php?title=Computer_hardware&oldid=976306219, [Online; accessed 2-September-2020], 2020.

[2] J. Bayle, *C programming for Arduino*. Packt Publishing Ltd, 2013.

Thank You!