

Advanced Robot Control

Driver implementation on MCU

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Presentation compiled for taking notes during lecture



Wrocław University
of Science and Technology



- 1 Drivers
 - Introduction
 - Architecture
- 2 Models
 - Models
 - Straightforward implementation
 - Logic with hardware abstraction layer
 - Multiple abstraction layers
 - Driver implemented through system calls
- 3 Software implementation
 - Hardware abstraction layer implementations
- 4 Quiz



Driver (1/1)

What is a driver?



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Each driver should contain following functions (depending on the type of a device some can be omitted):

- initialization
- deinitialization
- read/write operations
- control operations



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Types of driver implementation (1/1)

- Straightforward implementation
- Logic with hardware abstraction layer
- Multiple abstraction layers
- Driver implemented through system calls



Device representation

In order to allow for multiple presence of devices in the system the state of a single device should be separated from other devices. Therefore, the state of the device should be contained. This can be achieved through creation of a dedicated structure which holds all necessary elements including interfaces through which higher layer can communicate with the device.



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Straightforward implementation

This type of driver implementation characterizes with no separation of hardware dependant interfaces. Therefore, portability is very low and requires a lot of effort to move a driver to a different platform.



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Logic with hardware abstraction layer

Hardware interface is kept separately from logic of a driver. This kind of implementation characterizes with high portability since only the hardware layer is affected when the code is ported to a different device.



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Multiple abstraction layers

This type of driver implementation characterizes with more than two layers of abstraction. Usually, there are present two layers – logic layer and hardware layer.



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Driver implemented through system calls

The main idea is to assume Linux Device Driver model. Access to a device is realized through implementation of standard system calls [1].



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Techniques

One of the most important things when a driver is being implemented is a choice of the hardware decoupling method. It can be done using different techniques.



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Quiz for videoconference (1/1)

Prepare yourself for a short test. Select the host of the meeting as the chat receiver. Do not send answers to everyone. You will have 60 seconds for each question. When writing answer to the question. write down also the question number. Question 0. What is your favourite colour? Answer 0. My favourite colour is blue.



Quiz (1/1)

Calculate group number as the rest from dividing the Student ID number by 4.

Example

Student ID number is 123456, thus the group is 0.

Take last 2 digits from Student ID number (56) and calculate the rest from dividing by 4 ($56 \% 4 = 0$).

Write down your name, Student ID number and group.



Literature (1/1)



J. Corbet, A. Rubini, and G. Kroah-Hartman.
Linux Device Drivers, Third Edition.
O'Reilly Media, Inc., 2005.

