

# DEVICE DRIVERS AND INTERRUPTS

## SERVICE MECHANISM

### Lesson-5: Device Driver

## Device driver definition

- A device driver has a set of routines (functions) used by a high-level language programmer, which does the interaction with the device hardware, sends control commands to the device, communicates data to the device and runs the codes for reading device data.

## Device driver routine

- Each device in a system needs device-driver routine with number of device functions.
- An ISR relates to a device driver command (device-function). The device driver uses SWI to call the related ISR (device-function routine)
- The device driver also responds to device hardware interrupts.

## Device driver generic commands

- A programmer uses generic commands for device driver for using a device. The operating system provides these generic commands.
- Each command relates to an ISR. The device driver command uses an SWI to call the related ISR device-function routine)

# Generic functions

- Generic functions used for the commands to the device are *device create ( )*, *open ( )*, *connect ( )*, *bind ( )*, *read ( )*, *write ( )*, *ioctl ( )* [for IO control], *delete ( )* and *close ( )*.

# Device driver code

- Different in different operating system.
- Same device may have different code for the driver when system is using different operating system

# Device driver

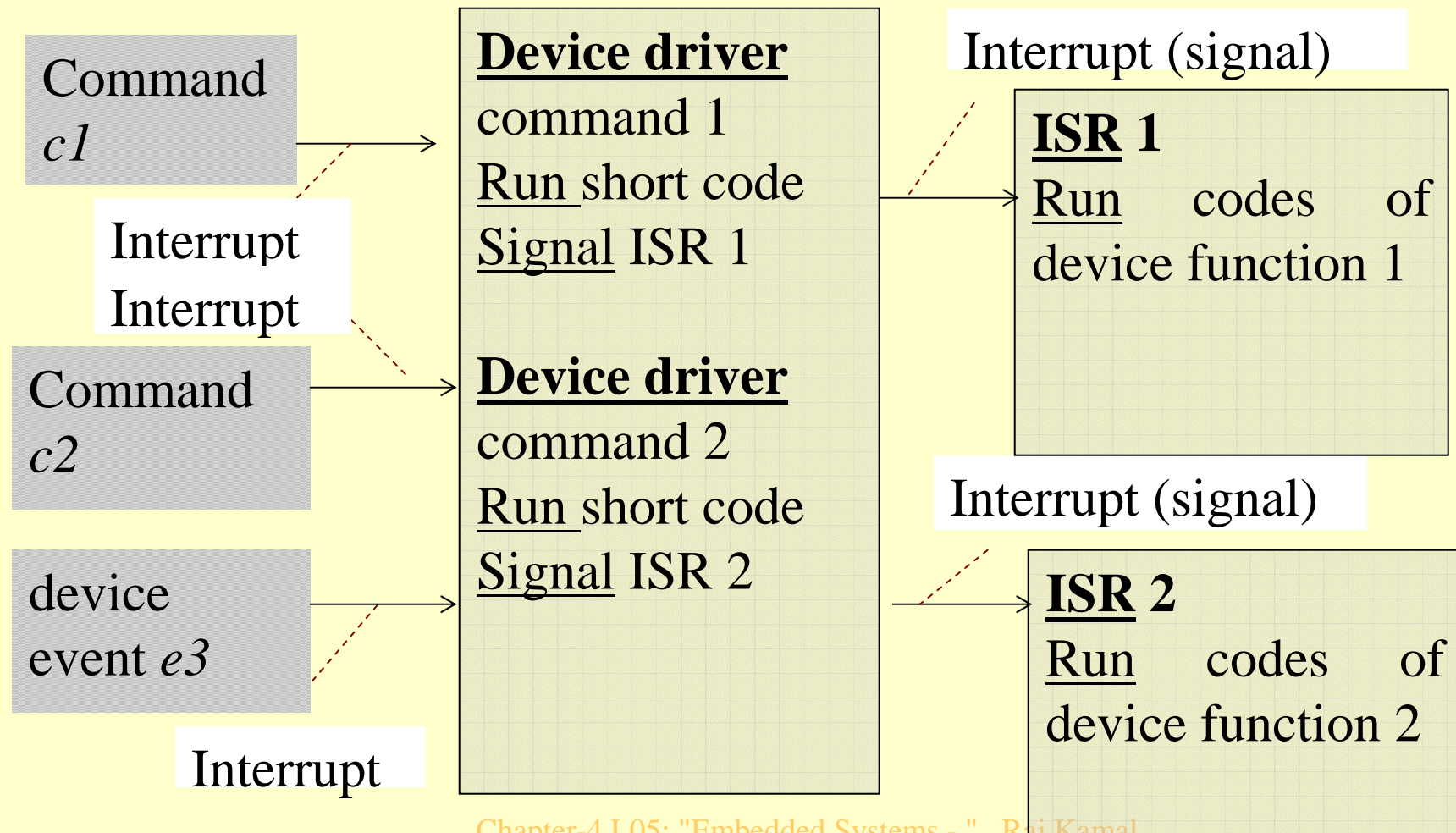
- Does the interrupt service for any event related to the device and use the system and IO buses required for the device service.
- Device driver can be considered software layer between an application program and the device

## Interrupt service routines

- An Interrupt service routine (ISR) accesses a device for service (configuring, initializing, activating, opening, attaching, reading, writing, resetting, deactivating or closing).
- Interrupt service routines thus implements the device functions of the device driver



# First level ISR and second level IST approach to handle the device hardware interrupts followed by software interrupt



## Example (Contd.)

- Application program commands to write on the display screen of a mobile the *contact names* from the contact database. It sends an SWI to call LCD display device-driver
- The driver run short code and executes another SWI to call the ISR related to write function at the LCD

# Example

- The device-driver does that without the application programmer knowing how does LCD device interface in the system, what are the addresses by which it is used, what and where and how used are the control (command) registers and status registers in that

# Summary

## We learnt

- A device driver has a set of routines (functions) used by a high-level language programmer, which using the software interrupt instructions, does the interaction with the device hardware, sends control commands to the device, communicates data to the device and runs the codes for reading device data and also provide ISRs for the device hardware interrupts.

# End of Lesson 5 of Chapter 4