

004:

HARDWARE RESOURCE CONFLICTS

INTERNAL AND EXTERNAL RESOURCE CONFLICTS

TuK



Bachelor Information Technology/Communications and Computing
Networks Year 4 Semester 1

MULTIMEDIA APPLICATIONS / SYSTEMS AND APPLICATIONS

SUBJECT CODE: ECCI/ECII 4102

OVERVIEW

- 1. Introduction & Attendance Registration**
- 2. Lecture Aims & Objectives**
- 3. Lecture Outline**
- 4. Chapter from Recommended Reading List**
- 5. Lecture 4 Topic**
- 6. Q&A**

LECTURE

AIMS & OBJECTIVES

- 1) To introduce students to resource conflicts theories.
- 2) To equip students with the knowledge to resolve resource conflicts
- 3) To develop students' expertise in the area of resource conflicts

LECTURE OUTLINE

4. Internal And External Resource Conflicts
 1. Computer Errors (s/w and h/w)
 2. Resource Conflicts (s/w and h/w)
 3. Multimedia Storage Calculations

CHAPTER FROM RECOMMENDED READING LIST

CHAPTER 4. “Internal & External Resource Conflicts”,
from “Fundamentals of Multimedia”

Li, Ze-Nian; Drew, Mark S

INTERNAL AND

EXTERNAL

RESOURCE
CONFLICTS

INTERNAL AND EXTERNAL RESOURCE CONFLICTS

DEFINING COMPUTER ERRORS

- Computers operate off series of commands which can
 - Conflict with one another
 - Request for unavailable processes
 - Call for unavailable information
- All the above resulting in the computer returning unusable results(errors)
- Errors differ from bugs (i.e. faults in the program or system).

INTERNAL AND EXTERNAL RESOURCE CONFLICTS

TYPES OF COMPUTER ERRORS

- 2 main types of errors:
 - S/w
 - H/w (internal and external)
- S/w are the most common; fixed with s/w updates or patches
- H/w are fixed with firmware updates or replacing defective h/w

INTERNAL AND EXTERNAL RESOURCE CONFLICTS

COMPUTER ERRORS

Common types: -

- POST (Power-On-Self-Test) Beeps* (research on this)
- BSoD (blue screen of death)
- Low virtual memory
- Missing DLL files
- Driver errors
- Fatal exception errors
- System error codes
- Browser errors

INTERNAL AND EXTERNAL RESOURCE CONFLICTS

COMPUTER ERRORS

POST (Power-On-Self-Test) Beeps*

No of beeps	Type of error
1 short beep	Okay, No error
1 long and 3 short beeps	Graphics card settings errors
1 short and 3 long beeps	Error in system memory
1 long and 9 short beeps	ROM issue
5 short beeps	Issue with CPU

If you listen to a beep immediately after OS is loaded, then you are facing over heat issue. Open the CPU and clean the dust.

INTERNAL AND EXTERNAL RESOURCE CONFLICTS

BEGINNING OF COMPUTER ERRORS

- Press power button,
- Computer sends a signal to the power supply,
- Power supply converts the AC (alternating current) to DC (direct current).
- Powers the computer and components with voltage and electricity.
- Once computer and components have ample power, power supply checks for, and reports no errors (if none)

INTERNAL AND EXTERNAL RESOURCE CONFLICTS

BEGINNING OF COMPUTER ERRORS

- A signal is sent using transistors to motherboard and computer processor (CPU).
- The processor clears any leftover data in the memory registers and gives the CPU program counter a **F000** hexadecimal number i.e. CPU is ready to process instructions in the BIOS
- It begins the power-on self-test (POST) sequence to ensure the necessary components are present and functioning properly.

INTERNAL AND EXTERNAL RESOURCE CONFLICTS

COMPUTER ERRORS

- If the computer does not pass any of these tests:- it encounters an irregular POST result and emits beep codes different from the standard beeps (one or two beeps).
- An irregular POST = no beeps or combination of different beeps indicating failure.
- If the computer passes the POST:- it looks at first 64-bytes of memory in CMOS chip containing information e.g. system time and date, all h/w installed

INTERNAL AND EXTERNAL RESOURCE CONFLICTS

SOLVING COMPUTER ERRORS

- Repairing an error requires identifying its error message & diagnosing the symptoms
- Error codes reveal the type of error and its meaning
- Errors can be solved:-
 - 'During error' (e.g. boot computer in safe mode)
 - 'Post' error

using troubleshooting tips and diagnostic programs

INTERNAL AND EXTERNAL RESOURCE CONFLICTS

SOLVING COMPUTER ERRORS

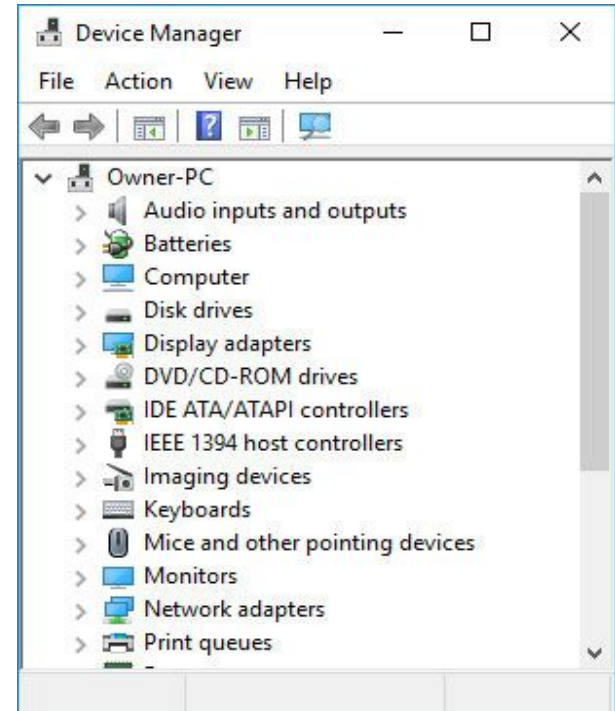
- Computer Programs and hardware share resources (e.g. memory) and make requests to share
- Many programs use Dynamic Link Library (DLL) shared files to run standard default methods for performing common repetitive tasks in a standardised way
- Insufficient amount of RAM or an application can eat up or leak memory
- To avoid this the PC can provide real actual memory or virtual memory (hard-drive memory used in place of physical memory)

INTERNAL AND EXTERNAL RESOURCE CONFLICTS

RESOURCE CONFLICTS

Type One (Traditional) R.C.

- Errors that occur whenever a resource (h/w, memory, storage space, resolution) attempted to access another resource (h/w, memory, storage space, resolution) but could not find it
- Example: a h/w device in a PC sharing the same I/O port as another h/w device resulted in a type 1 resource conflict
- Device manager was used to view type 1 h/w R.C.



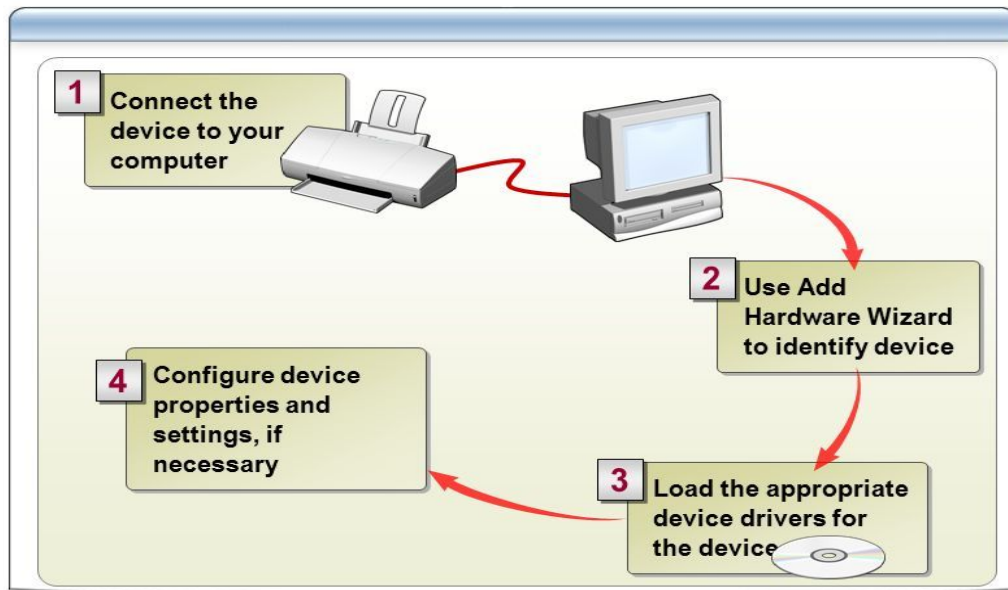
INTERNAL AND EXTERNAL RESOURCE CONFLICTS

RESOURCE CONFLICTS

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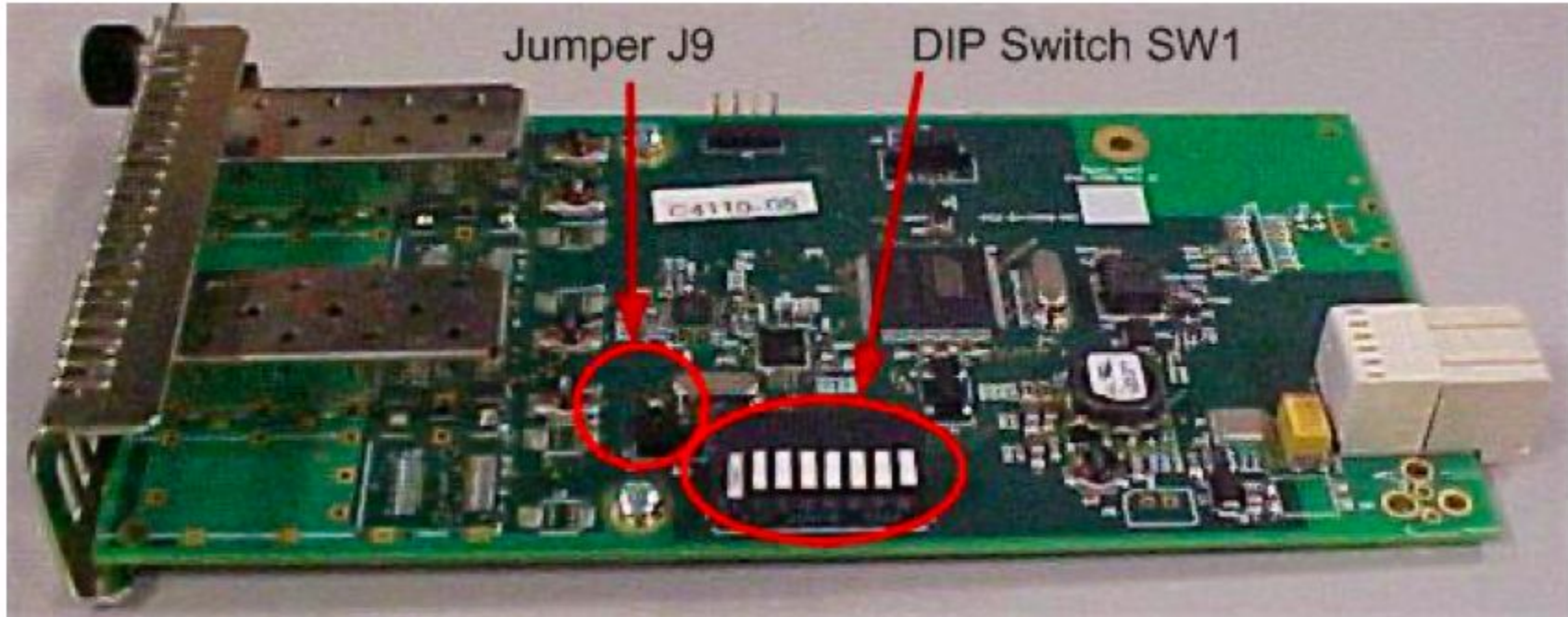
- Were more common in the past when each h/w device required users to configure h/w resource using jumpers or dip switches* (small metal connectors that act as on/off switches. Multiple jumpers together configure settings for a h/w device. Some jumpers are encased in a plastic switch, that can be toggled on/off)

Installing Non-Plug and Play Devices



INTERNAL AND EXTERNAL RESOURCE CONFLICTS

RESOURCE CONFLICTS

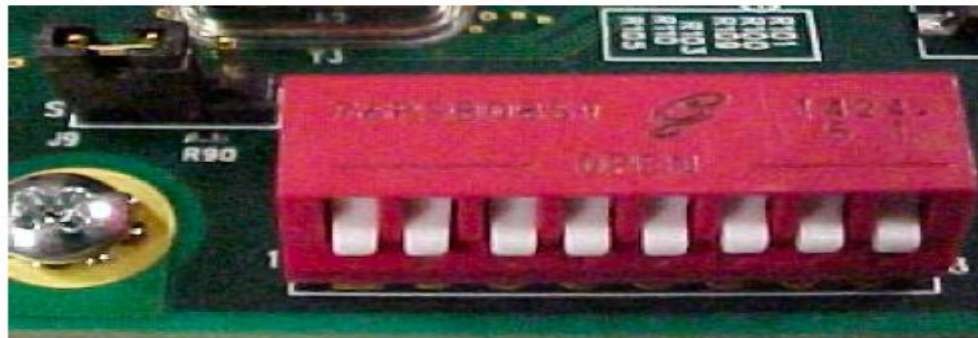


INTERNAL AND EXTERNAL RESOURCE CONFLICTS

RESOURCE CONFLICTS

Type One (Traditional) R.C.

- Type 1 R.C's are avoided today using plug & play which manages for the user each of the h/w devices installed in a P.C.



INTERNAL AND EXTERNAL RESOURCE CONFLICTS

RESOURCE CONFLICTS

Type Two R.C.

- Occurs as a result of multimedia system placing limits on the:-
 - Quality
 - Sizeof a multimedia application that can be produced or displayed
- Two types of type II R.C.:-
 - Internal
 - External

INTERNAL AND EXTERNAL RESOURCE CONFLICTS

RESOURCE CONFLICTS

Type II R.C.

- IERC h/w problems are resolved using special equipment
- Diagnostic programs are run on PCs to discover IRC hardware problems

INTERNAL AND EXTERNAL RESOURCE CONFLICTS

RESOURCE CONFLICTS

- Effects of type 2 IRC include:
 - Wearing out of hardware components e.g. storage, memory,
- Effects of type 2 ERC include: hardware fires, external damage, etc
- Type 2 ERCs are resolved using special equipment e.g. for hardware fires class C extinguisher should be used, etc.
- The steps to diagnosing errors in a computer include
 - 1) Check the A/C outlet
 - 2) Test the power supply
 - 3) Test the CMOS battery

INTERNAL AND EXTERNAL RESOURCE CONFLICTS

MULTIMEDIA STORAGE CALCULATIONS

Image Storage

Bit depth: the number of bits per pixel

Bit depth (bits per pixel)	Number of colours or tones	Relationship
1	2	$2^1 = 2$
2	4	$2^2 = 4$
3	8	$2^3 = 8$
4	16	$2^4 = 16$
6	64	$2^6 = 64$
8	256	$2^8 = 256$
16	65,536	$2^{16} = 65,536$
24	16,777,216	$2^{24} = 16,777,216$
32	4,294,967,296	$2^{32} = 4,294,967,296$

$$\text{File size} = \frac{\text{Horizontal} \times \text{Vertical} \times \text{Bit Depth}}{8 \times 1024 \text{ bits (= 1 Kb)}}$$

INTERNAL AND EXTERNAL RESOURCE CONFLICTS

MULTIMEDIA STORAGE CALCULATIONS

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Example:

What is the file size in kilobytes of a 256-colour image with a resolution of 1024 by 768 pixels?

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$$\text{File size} = \frac{1024 \times 768 \times 8}{8 \times 1024 \text{ bits}}$$

$$\text{File size} = \frac{6,291,456}{8,192}$$

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MULTIMEDIA STORAGE CALCULATIONS

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INTERNAL AND EXTERNAL RESOURCE CONFLICTS

MULTIMEDIA STORAGE CALCULATIONS

Video Processing

SAMPLING (method used to digitise sound) has 3 characteristics:

- **Frame rate:** the number of frames per second

To calculate the file size for video:

1. calculate the number of frames
2. calculate the file size for each frame

File size for video = Number of frames x file size for each frame

Number of frames = frame rate x time in seconds

File size for each frame = $\frac{\text{Horizontal} \times \text{Vertical} \times \text{Bit Depth}}{8 \times 1024 \text{ bits } (= 1 \text{ Kb})}$

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MULTIMEDIA STORAGE CALCULATIONS

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INTERNAL AND EXTERNAL RESOURCE CONFLICTS

MULTIMEDIA STORAGE CALCULATIONS

Example:

Calculate the file size in Kb of a 90 minute movie at 24 frames per second. Each frame is 2048 by 872 pixels with 32 bits for each pixel.

Number of frames = frame rate x time in seconds

Number of frames = 24 x 90 x 60

Number of frames = 129,600 frames

File size for each frame = $\frac{2048 \times 872 \times 32}{8 \times 1024}$

File size for each frame = 6976 Kb

File size for video = Number of frames x file size for each frame

File size for video = 129,600 x 6976

File size for video = 904,089,600 Kb

File size for video = 862.207 Gb (1Gb = 1,048,576 Kb)