Week	Content
1	Brightness, Adaptation and Discrimination, Light and Electromagnetic Spectrum, Image Sampling and Quantization.
2-5	Some Basic Relationships Between Pixels ,Spatial Domain Filtering, Intensity Transformation Functions, Histogram Equalization, Spatial Correlation and Convolution , Low pass filters, Order Statistics filters, Sharpening Spatial Filters: Laplacian filterFiltering in Frequency Domain The Discrete Fourier Transformation(DFT)
6-7	Frequency Domain Filtering:Ideal and Butterworth Low pass and High pass filters, Image Degradation/Restoration Process
8-10	Noise models, Noise Restoration Filters, Image Compression, Huffman Coding,Run Length Coding, Bit Plane Coding
11-12	Morphological Image Processing, Erosion, Dilation, Opening, Closing , Hit-or-Miss Transformation, Basic Morphological Algorithms
13-15	Image Segmentation: Point, Line and Edge Detection ,Thresholding, Region Based Segmentation

Assessment Methods

Written tests, assignments, quizzes, presentations as announced by the instructor in the class.

Keywords

image transform, image restoration, image processing, image segmentation.

Microprocessors (BHCS16B) Discipline Specific Elective - (DSE)

Credit: 06

Course Objective

This course introduces internal architecture, programming model of Intel Microprocessors (8086 -Pentium) and assembly language programming using an assembler. Students will also learn interfacing of memory and I/O devices with microprocessor.

Course Learning Outcomes

On successful completion of the course, students will be able to:

1. Describe the internal architecture of Intel microprocessors
2. Define and implement interfaces between the microprocessor and the devices.
3. Write assembly language programs

Detailed Syllabus

Unit 1

Microprocessor architecture: Internal architecture, Programming Model, Addressing modes, Data movement instructions

Unit 2

Microprocessor programming: Register Organization, instruction formats, Program control instructions, assembly language

Unit 3

Interfacing: Bus timings, Memory address decoding, cache memory and cache controllers, I/O interface, keyboard, timer, Interrupt controller, DMA controller, video controllers, communication interfaces.

Unit 4

Data transfer schemes: Synchronous data transfer, asynchronous data transfer, interrupt driven data transfer, DMA mode data transfer.

Unit 5

Microprocessor controllers: I/O controllers, interrupt controller, DMA controller, USART controller.

Unit 6

Advance microprocessor architecture: CISC architecture, RISC architecture, superscalar architecture, multicore architecture

Practical

ASSEMBLY LANGUAGE PROGRAMMING

1. Write a program for 32-bit binary division and multiplication
2. Write a program for 32-bit BCD addition and subtraction
3. Write a program for Linear search and binary search.

4. Write a program to add and subtract two arrays

5. Write a program for binary to ascii conversion

6. Write a program for ascii to binary conversion

References

1. Brey, B.B.(2009). *The Intel Microprocessors: Architecture, Programming and Interfacing*. 8th edition. Pearson Education.

2. Triebel, W.A., & Singh, A. (2002). *The 8088 and 8086 Microprocessors Programming, Interfacing, Software, Hardware and Applications.* 4th edition. Pearson Education.

Course Teaching Learning Process

- Use of ICT tools in conjunction with traditional class room teaching methods
- Interactive sessions
- Class discussions

Tentative weekly teaching plan is as follows:

Week	Content
1-2	Microprocessor Architecture: Internal Architecture of microprocessor, Register Organization and flags, Programming models, Real mode memory addressing and protected mode memory addressing.
3-4	Addressing modes: Data memory addressing modes, program memory addressing modes, stack memory addressing mode.
5-6	Microprocessor Programming: Machine language, Instruction formats, Data movement instructions, assembly language syntax, Stack manipulation instructions, string transfer instructions, Arithmetic and logical instructions.
7-8	Program control instructions: The Jump group, different types of loops, defining function in assembly language, function call and return, introduction to interrupts.
9	Hardware Specification of 8086/8088: Pin-out diagrams of 8086/8088 microprocessors, function of pins, role of clock generator.
10	Memory Interfacing: Address decoding, interfacing of memory with 8088 and 8086.
11-12	I/O Interfacing: I/O port address decoding, isolated and memory mapped I/O, interfacing of keyboard and timer, communication interface

13-14	Interrupts : Purpose of interrupts, Interrupt instructions, interrupt vectors and interrupt descriptors, functioning of interrupt controller
15	Direct Memory Access (DMA): Basic DMA operation, functioning of DMA controller

Assessment Methods

Written tests, assignments, quizzes, presentations as announced by the instructor in the class.

Keywords

Microprocessor architecture, microprocessor programming, interfacing,

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Information Security (BHCS17A) Discipline Specific Course - (DSE)

Credit: 06

Course Objective

The course offers a broad overview of the fundamentals of information security covering topics such as error correction/detection, cryptography, steganography, malwares, This course also touches on the implications of security in Internet of Things (IoT).

Course Learning Outcomes

On successful completion of this course, a student will be able to,

1. Identify the major types of threats to information security
2. Describe the role of cryptography in security
3. Select appropriate error-detection and error-correction methods for an application
4. Discuss the strengths and weaknesses of private and public key crypto systems
5. Describe malwares and memory exploits
6. Discuss the need for security in IoT

Detailed Syllabus

Unit 1