

BT 0068

Computer Organization and Architecture

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Prof. V. B. Nanda Gopal

Director & Dean

Directorate of Distance Education

Sikkim Manipal University of Health, Medical & Technological Sciences (SMU DDE)

Board of Studies**Dr. U. B. Pavanaja (Chairman)**

General Manager – Academics

Manipal Universal Learning Pvt. Ltd.

Bangalore.

Prof. Bhushan Patwardhan

Chief Academics

Manipal Education

Bangalore.

Dr. Harishchandra Hebbar

Director

Manipal Centre for Info. Sciences.

Manipal.

Dr. N. V. Subba Reddy

HOD-CSE

Manipal Institute of Technology

Manipal.

Dr. Ashok Hegde

Vice President

MindTree Consulting Ltd

Bangalore.

Dr. Ramprasad Varadachar

Director, Computer Studies

Dayanand Sagar College of Engg. Bangalore.

Nirmal Kumar Nigam

HOP- IT

Sikkim Manipal University – DDE

Manipal.

Dr. A. Kumaran

Research Manager (Multilingual)

Microsoft Research Labs India

Bangalore.

Ravindranath.P. S.

Director (Quality)

Yahoo India

Bangalore.

Dr. Ashok Kallarakkal

Vice President

IBM India

Bangalore.

H. Hiriyannaiah

Group Manager

EDS Mphasis

Bangalore.

Content Preparation Team**Content Writing****Mr. Balasubramani R**

Assistant Professor, Dept. of IT

Sikkim Manipal University – DDE

Manipal.

Language Editing**Ms. Chandrika P.S.**

HOD – English

Sharada P.U. College, Mangalore

Content Editing**Dr. E. R. Naganathan**

Professor & HOD – IT

Sikkim Manipal University – DDE

Manipal.

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SUBJECT INTRODUCTION

The goal of this book is to introduce the basic concepts of computer architecture and organization, in order to allow computer scientists to recognize when programs are not as efficient as they could be and to transform them so that they make better use of the underlying machine. Another, closely related, goal is to provide the necessary background in computer architecture to evaluate competing algorithms to decide which is likely to be the most efficient for a given machine, even before they are expressed in a programming language.

Unit 1: This unit discusses basic building blocks of a digital computer and different data representation in computers. This unit also briefly explains different codes.

Unit 2: This unit explains the Register Transfer Language. It also gives an overview of bus and memory transfers. It also explains different microoperations in detail.

Unit 3: This unit discusses Von-Neumann architecture of computer. It also provides input on early evolution of computers as well.

Unit 4: This unit provides a detailed coverage on register organization of a basic computer with special reference to register organization of Intel 8085 microprocessor and Motorola and Zilog machines.

Unit 5: This unit discusses the data transfers between the different modules of a system like I/O module, Memory module etc. It explains the structure, elements and functions of an interconnection entity which is called as Bus. Here we also study different structure of CPU with single bus or two bus systems.

Unit 6: This unit explains instruction characteristics, type and different data types that are supported by different machines like VAX, IBM etc. Then it covers different operations like data transfer, arithmetic and logical operations and transfer of control operations, with examples. It also covers different modes of addressing with the formats and lengths of the instruction. Finally it explains the stacks and subroutines that are necessary for execution of certain instructions like transfer of control etc.

Unit 7: This unit discusses the main entity of the CPU that is arithmetic logic unit. It also introduces different number representations.

Unit 8: This unit discusses different operations like addition, subtraction, multiplication and division of numbers.

Unit 9: This unit discusses the Memory Unit, dealing with internal and external memory. It also deals with the system memory considerations, structures and principle of the cache memory.

Unit 10: We touch upon, in brief, the virtual memory and memory management in operating system as well.

Unit 11: This unit discusses the Input Output that is responsible for interaction with the peripherals. This unit also discusses the external devices and different I/O functions. It explains in detail the programmed and interrupts driven I/O techniques.

Unit 12: This unit touches upon the basic understanding of direct memory access. Here we also give the detailed working of DMA controller and its synchronization requirements with interrupts.