

Individual 3

by Chandra Kant

Submission date: 09-Jun-2018 07:17 AM (UTC-0500)

Submission ID: 974006275

File name: ChandraKant_CE242_IP3.doc.docx

Word count: 1141

Character count: 8281

Unit 3 Individual Project

Chandra Kant

CE242-1802B

Table of Contents

Business Organizational Background	3
Modern Computer Organizations and Design	4
Digital Logic Design.....	5
Computer Memory & Data Representation	6
Basic Data Types and Their Representation in Computer Memory	6
Bit	6
Bit String.....	6
Nibble	6
Byte	6
Character.....	6
Decimal Number Representation	6
Representation of ASCII Characters in Computer Memory	7
How Computer Memory and Storage Operates	7
RAM.....	8
ROM	8
Cache Memory	8
Secondary Storage	9
Assembly Language Programming.....	10
Input/ Output Organization	11
Summary & Final Recommendation.....	12

Business Organizational Background

TBD

Modern Computer Organizations and Design

TBD

Digital Logic Design

TBD

Computer Memory & Data Representation

Basic Data Types and Their Representation in Computer Memory

In digital computers, data is represented using binary digits, 1s and 0s.

Bit

Bit refers to a single binary digit, and it has only two states, either a 1 or a 0.

Bit String

A sequence of bits is called a bit string.

Nibble

A set of 4 bits is called a nibble.

Byte

A set of 8 bits is called a byte. A byte is a bit string of size 8.

Character

A character, commonly referred to as 'char' in programming, is another 8-bit data type.

Decimal Number Representation

The Integer

Integers are simply whole numbers, different to floating point numbers. In a computer, integers are represented using a fixed number of bits. They can be represented in 8 bits, 16 bits, 32 bits or 64 bits. Apart from the length, integers are also be represented as either signed or unsigned.

Unsigned integers represent negative, zero and positive integers while unsigned integers can represent only zero and positive values.

In signed integers, the sign of the integer is represented with a sign bit. A sign bit is either 1 for negative integers or 0 for positive integers. Representation schemes for signed integers are:

- i) Sign-Magnitude Representation, where the sign bit is the most significant bit, and the magnitude of the integer is represented by the remaining bits.
- ii) One's Complement Representation, where, the absolute value of positive integers is the magnitude of the remaining bits, and the absolute value of negative integers is the magnitude of the inverse of the remaining bits.

- iii) Two's Complement Representation, where, the absolute value of positive integers is the magnitude of the remaining bits, and the absolute value of negative integers is the magnitude of the inverse of the remaining bits plus one.

Computers normally represent signed integers using two's complement. This is because, in two's complement, there's only one representation for zero, unlike two in one's complement and sign-magnitude representations.

7 Floating Point Numbers

Floating point numbers are also referred to as real numbers. They have represented infraction (F) and exponential (E) notation with a radix of 2, i.e. $F \times 2^E$, where E and F can both be positive or negative.

There are two main disadvantages of using floating point representation:

- i) Loss of precision due to truncation of long numbers.
- ii) Calculations on floating point numbers are less efficient compared to integer arithmetic.

8 Representation of ASCII Characters in Computer Memory

ASCII stands for American Standard Code for Information Interchange. In this standard, alphanumeric characters are represented by numbers. There are two types:

- i) ASCII-7 – each character is represented using 7 bits, and 2^7 (128) characters can be represented.
- ii) ASCII-8 - each character is represented using 8 bits, and 2^8 (256) characters can be represented.

The conversion of characters to numbers is known as encoding. The ASCII code of a character is its decimal equivalent to base 2.

How Computer Memory and Storage Operates

The primary memory of a computer is of two types: random access memory (RAM) and read-only memory (ROM).

RAM

A RAM device allows direct access to required information by the processor. Random Access Memory is volatile. The information stored in it is lost when the computer is turned off. The two types of RAM are:

- i) Dynamic Random Access Memory (DRAM): Consists of a capacitor and transistor and is dynamic in that it needs to be frequently refreshed due to loss of charge from the capacitor.
- ii) Static Random Access Memory (SRAM): It stores data that is not frequently refreshed and is therefore effective and very fast compared to DRAM.

ROM

The Read Only Memory allows the processor to only read information but cannot write onto it. Read Only Memory is non-volatile. The information stored in it is not lost when the computer is turned off. ROM is used to store instructions called firmware, which can be randomly accessed by the CPU. There are several types of ROM:

- i) Mask ROM (MROM) – Static ROM which is programmed by the manufacturer. Mainly used by server and network operating systems.
- ii) Programmable Read Only Memory (PROM) – It is manufactured as a blank memory but is programmable only once and cannot be modified.
- iii) Erasable Programmable Read Only Memory (EPROM) – Unlike PROM, it can be modified or programmed again.
- iv) Electrically Erasable Programmable Read Only Memory (EEPROM) – Similar to EPROM but easily erasable with electric current. EEPROM is used to store the system BIOS.
- v) FLASH ROM – It is a better version of EEPROM in which many locations can be modified at the same time.

Cache Memory

The cache memory is a static random access memory which provides very fast data access to the processor. It is also known as CPU memory. The main role of the cache is speedy communication between processor and memory.

Secondary Storage

It is also known as auxiliary memory. Secondary memory offers larger storage capacity is not directly connected to the processor. There are several types of secondary memory devices classified according to:

- i) Storage technology
- ii) Storage capacity
- iii) Portability
- iv) Data access time

The most common types are:

- i) Floppy Disks – Data is stored on a metal-oxide film in the form of electromagnetic charges. They've however become outdated and have been replaced by other types with higher capacity.
- ii) Hard Disks – Hard disks are designed to have very high storage capacities. Most computers come with internal hard disks, and it's where the operating system is stored. A hard disk is made up of disk platters with concentric circles known as tracks where data is stored.
- iii) Optical Disks – They are plastic disks with a reflective surface. They have pits where data is stored and read optically. Optical disks are either writable or read-only. Examples are DVD, CD-RW, CD-R and CD-ROM.
- iv) Magnetic Tapes – Data is stored on magnetic film. They can store a large volume of data, but their disadvantage is that data is stored sequentially.
- v) Solid State Devices – These devices are made of silicon chips and do not have moving parts. They store data electronically. They include memory cards and flash drives.

1

Assembly Language Programming

TBD

Input/ Output Organization

TBD

Summary & Final Recommendation

TBD

Individual 3

ORIGINALITY REPORT

17%

SIMILARITY INDEX

9%

INTERNET SOURCES

4%

PUBLICATIONS

12%

STUDENT PAPERS

PRIMARY SOURCES

1

Submitted to Colorado Technical University
Online

Student Paper

7%

2

de.scribd.com

Internet Source

2%

3

Submitted to University of Bedfordshire

Student Paper

2%

4

Submitted to Kuala Lumpur Infrastructure
University College

Student Paper

2%

5

appscgroup.blogspot.in

Internet Source

1%

6

greenstonesupport.iimk.ac.in

Internet Source

1%

7

tuwana.com

Internet Source

1%

8

www.most.gov.mm

Internet Source

1%

Exclude quotes Off

Exclude matches Off

Exclude bibliography Off