



**Ahsanullah University of Science and Technology (AUST)**  
Department of Computer Science and Engineering

**LABORATORY MANUAL**

Course No. : CSE2146  
Course Title: Introduction to Computer Systems

For the students of 2<sup>nd</sup> Year, 1<sup>st</sup> Semester of  
B.Sc. in Textile Engineering program

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## **COURSE OBJECTIVES**

1. Basic introduction to computer systems.
2. Learning basic uses of Microsoft Office Suite.
3. Demonstrate public speaking ability along with PowerPoint presentations.
4. To learn the useful techniques for formal email writing and to use the google search engine efficiently.
5. Creating websites using google sites
6. To learn number system especially binary number system and its arithmetic.
7. Effective report writing techniques using LATEX.
8. Understanding the different types basic logic gates.
9. Gaining the knowledge of different problem solving skills such as Algorithm and Flowchart etc.

## **PREFERRED TOOL(S)**

Microsoft Office Suite

Google Sites

Share LATEX

## **TEXT/REFERENCE BOOK(S)**

This course doesn't follow any particular book exactly, but any of the following books are useful:

Peter Norton, *Introduction to Computers, 6th Edition*, McGraw-Hill Education.

P. K. Sinha, *Computer Fundamentals*, 25.70 edition, BPB Publications.

Gary B. Shelly, Steven M. Freund and Misty E. Vermaat, *Introduction to Computers*, 8<sup>th</sup> edition, Cengage Learning.

## **ADMINISTRATIVE POLICY OF THE LABORATORY**

- ✓ Students must perform class assessment tasks individually without help of others.
- ✓ Plagiarism is strictly prohibited and will be dealt strictly.

## Session 1: Computer Systems

### OBJECTIVES:

This session will help you to understand the basic parts of a computer. We will talk about how to setup a computer. The types of computers you can use and the things you need to consider in order to buy a computer.

### BASIC PARTS OF A COMPUTER:

#### ✓ Hardware

##### Input Devices

- ❖ Keyboard
- ❖ Mouse
- ❖ Webcam
- ❖ Microphone
- ❖ Scanner

##### Output Devices

- ❖ Monitor
- ❖ Printer
- ❖ Speaker

##### Central Processing Unit

- ❖ Processor
- ❖ Processor Cooler
- ❖ Motherboard
- ❖ BIOS
- ❖ RAM
- ❖ HDD
- ❖ GPU
- ❖ PSU
- ❖ Optical Drive

#### ✓ Software

Computer software, or simply software, is a part of a computer system that consists of data or computer instructions.

##### System Software

- ❖ Operating Systems: UNIX, Windows, Linux, Mac OS; BIOS; Device drivers.

##### Application Software

- ❖ MS Word, MS Excel, Calculator, Paint, games, Firefox, Chrome.

##### Malware Software

## ✓ Data system

Bits and bytes.

RAM, HDD, CD, DVD file capacity.

### **ASSIGNMENT:**

Suppose, you have to purchase a computer for your personal use. You are given a budget of 60,000 BDT in order to buy it. As desktop computers are highly customizable, so you have to visit a retailer shop or site in order to build a custom computer, instead of just looking at some specific model directly. You should classify the specification as Gaming PC, Educational PC or Entertainment PC and provide justification of your classification.

Sample retailer site: <https://ryanscomputers.com/desktop.html>

## Session 2: Microsoft Word

### **OBJECTIVES:**

Microsoft Word is one of the most popular word processing software. In this session we will learn some basic uses of it.

### **THE LIST OF TOPICS TO BE COVERED:**

Create new documents from scratch and template.

Save and open previous documents.

Creating PDF and HTML files from Word Doc.

Shortcuts: copy, cut, paste, bold, italic, underlined, save, save as, open, close, undo, redo.

Random text code [= lorem (numberOfParagraph, numberOfLines)]

View Recent changes [Shift+F5]

Font family, size and style.

Bold, italic, underlined, strikethrough.

All caps, all small, superscript, subscript.

Text alignment, indentation and line spacing.

Bullets and numbers.

Text color, highlight, and word art.

Find and replace.

Hyperlink.

Equation and symbols.

Table, charts, shapes, and text box.

Image insertion and position.

Cover page, blank page, page break.

Page header, footer and page numbers.

Watermark, page color, page border.

Page setup: margin, ruler, size, orientation, columns and line numbers.

Label create [after excel].

Review, checking, and word count.

Viewing modes and print options.

**LAB EXERCISE:**

Given an image file like the following replicate the image using MS Word.

## Title of the Document

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Maecenas porttitor congue massa. Fusce posuere, magna sed pulvinar ultricies, purus lectus malesuada libero, sit amet commodo magna eros quis urna. Nunc viverra imperdiet enim. Fusce est. Vivamus a tellus.

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### Pellentesque

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- tristique
- senectus
- et netus
- et malesuada

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## ASSIGNMENT:

Prepare a job openings advertisement for a company with some specifications.



## Session 3: Microsoft Excel

### **OBJECTIVES:**

Microsoft Excel is a spreadsheet application that is used for basic data organization, statistical analysis, graphing data and many other uses. In this session, we will take a look at the basic uses of it.

### **THE LIST OF TOPICS TO BE COVERED:**

Create new documents from scratch and template.

Save and open previous documents.

Creating PDF and HTML files from Word Doc.

Definitions: cell, row, column, address.

Shortcuts: copy, cut, paste, bold, italic, underlined, save, save as, open, close, undo, redo.

Selection: shift+space; ctrl+space

Range: collection of selected cells.

Insert/delete value/row/column.

Page layout, orientation, page size.

Viewing modes and print options.

Pivot Table.

Conditional formatting.

Formulas: Sum, average, minimum, maximum, count, concatenate, lcm.

Ceil and floor functions.

Fill series, user comment.

Sort and custom sort, filter.

Cell reference.

Pane freeze.

Wrap text and merge cells.

Shapes and charts, trend line, legends.

**LAB EXERCISE:**

Create the CGPA calculation system in excel.

Show result pie and bar chart from given data.

## Session 4: Microsoft PowerPoint

### **OBJECTIVES:**

Power point is a complete presentation package. It has the powerful features in order to produce a professional looking presentation. In this session we will learn the basic uses of it.

### **THE LIST OF TOPICS TO BE COVERED:**

Create new documents from scratch and template.

Save and open previous documents.

Creating PDF and HTML files from Word Doc.

Slide designs, transitions, animations, comments.

Slide show.

Header and footer.

Box, charts and tables.

### **LAB EXERCISE:**

Select a suitable topic for presentation and start making it using the techniques you have learned in this session. In the next week, we will have a formal individual presentation on your selected topic.

## **Session 5: Formal Presentation using Microsoft PowerPoint**

### **OBJECTIVES:**

The main objective of this session is to present formally any chosen topic by the students. The students should demonstrate public speaking ability along with PowerPoint presentations.

### **GUIDELINES OF THE PRESENTATION:**

Simplify and limit the number of words on each screen. Use key phrases and include only essential information.

Your presentation is limited to maximum of 5 minutes including question answering section.

Use contrasting colors for text and background. Light text on a dark background is best.

Use good quality images that reinforce and complement your message. Ensure that your image maintains its impact and resolution when projected on a larger screen.

Do not use any template while making your presentation.

Do not read from your slides. The content of your slides is for the audience, not for the presenter.

Use the same font for all your headlines.

Include slide number for every slides.

Include a reference slide for any source of information you used in your presentation.

## Session 6: Resume/CV/Biodata

### **OBJECTIVES:**

Creating your own Resume / CV / Biodata

### **Resume**

Summarises your professional profile

Focuses on your skills, achievements and professional roles

Ideal length: 1 - 3 pages

Easy on humans and ATS (Applicant Tracking System)

Best weapon to target industries across the globe

### **CV**

Descriptive document of your professional summary

Focuses on your academia, research publications, scientific papers, achievements to name a few

Ideal Length: No restrictions

You would have already inferred that it is suitable for research scholars, academicians, and fresher's (some job opportunities ask specifically for a CV)

### **Bio Data**

At best describes your personal information including contact details, father name, mother name, location, current position, salary and so on and so forth

Focuses on nothing but your personal information. Not a good idea to send to a recruiter

Ideal length: Not more than one page

Best place to use a Bio Data: Matrimony and in some rare cases: Government Jobs

### **ASSIGNMENT:**

Create your own CV/Resume/Biodata.

## Session 7: Email Writing and Search Tokens

### OBJECTIVES:

The objective of this lab is to learn the useful techniques for formal email writing and to use the google search engine efficiently.

### FORMAL EMAIL WRITING:

**To:** recipient list.

**CC:** (Carbon Copy) recipient list.

**BCC:** (Blind Carbon Copy) recipient list.

**Subject:** write a proper subject.

### Body:

Greetings  
Main topic  
Closing

### Example:

**To:** [xyz@abc.com](mailto:xyz@abc.com)

**CC:** None

**BCC:** None

**Subject:** Mark of CSE1108 Lab Quiz.

### Body:

Dear Sir,

I am a student of AUST CSE 1.1. I would like inquire if the mark of our recent lab quiz is ready and whether we can have it.

Sincerely,

John

ID: 17.02.04.001

CSE, AUST.

## SEARCH TOKENS:

Keep It Simple

- ❖ Query: [who is the president of america]
- ❖ Better query: [president of america]

Use quotes to search for an exact phrase

Use an asterisk within quotes to specify unknown or variable words.

- ❖ e.g. “\* is thicker than water”

Use the minus sign to eliminate results containing certain words.

- ❖ e.g. jaguar -car

Compare using “vs”

Filter results

Image search

Define keyword

Basic calculator

Time zones

#hashtags for searching in social medias

Use tilde symbol (~) before a word tells Google to search for the words and its synonyms too

Search For Numbers In A Range

- ❖ android phone \$300..\$500
- ❖ television 20..50 inches

Search Using File Types

- ❖ e.g: [filetype:pdf free photoshop books]

Combine the above methods to make a complex search query

- ❖ site:gov filetype:pdf “death rate”
- ❖ site:hongkiat.com photoshop OR “adobe photoshop” tutorials

## Sources:

<http://time.com/4116259/google-search-2/>

<https://www.hongkiat.com/blog/better-google-searching/>



## Session 8: Making Your Own Website

### **OBJECTIVES:**

The objective of this lab is to create your own website using google sites.

### **THE LIST OF TOPICS TO BE COVERED:**

Google Sites is an application that makes building a website for your organization as easy as editing a document. With Google Sites, teams can quickly gather a variety of information in one place—including videos, calendars, presentations, attachments, and text—and easily share it for viewing or editing with a small group, an entire organization, or the world. As a business user, you can use Google Sites to set up internal project sites, intranets, or public-facing sites. You'll learn to:

- Create a new website
- Add and edit pages
- Insert maps, forms, video, and more
- Embed calendars, spreadsheets, and other Google documents
- Customize site layout and appearance
- Share your site for internal or external use

### **ASSIGNMENT:**

Create your own website using google sites.

## Session 9: Number System

### OBJECTIVES:

The objective of this lab is to learn number system especially binary number system and its arithmetic.

### THE LIST OF TOPICS TO BE COVERED:

- Conversion between different number system.
- Converting fractional numbers.
- Introduction to Binary Arithmetic
- Representing Negative Numbers
- Binary Subtraction Using Complements
- Concepts of Carry and Overflow

### LAB EXERCISE:

1. Fill the question marks of the following table.

Decimal	Binary	Octal	Hexadecimal
33	?	?	?
?	1110101	?	?
?	?	703	?
?	?	?	1AF

2. Let  $X = 2D16$  and  $Y = 5816$ .

Perform the following operations in 8-Bit 2's Complement (Signed) form. Write down the Carry (C) and Overflow (V) flags after performing these operations.

- i.  $B = X - Y$
- ii.  $C = -X - Y$

## Session 10: Report Writing and LATEX

### OBJECTIVES:

The objective of this session is to learn techniques to write effective reports. We will use LATEX as a tool for writing reports.

### THE LIST OF TOPICS TO BE COVERED:

- Purpose of an Effective Report.
- Topic Selection of a Report.
- Typical Structure of a Report.
- Project Report Writing with Principles and Examples.
- Writing Your Reports in LATEX
  - Paragraphs and new lines
  - Bold, italics and underlining
  - Lists
  - Mathematics
  - Bibliographies and references
  - Images
  - Tables

### LAB EXERCISE:

Replicate the research report provided as a PDF file in the lab using Share LATEX.

## Session 11: Basic Logic Gates

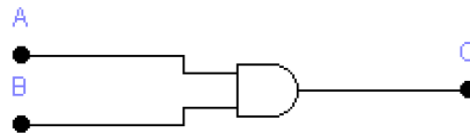
### OBJECTIVES:

The objective of this lab is to understand the different types basic logic gates.

### THE LIST OF TOPICS TO BE COVERED:

#### AND Gate

- This gate gives high output (1) if all the inputs are 1's. Otherwise the output will be low (0).
- Its Boolean algebra representation is:  $C=A.B$
- And its truth table and schema as following:



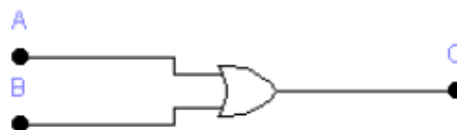
A	B	C
0	0	0
0	1	0
1	0	0
1	1	1

#### OR Gate

This circuit will give high output (1) if any input is high (1).

Its Boolean algebra representation is:  $C=A+B$

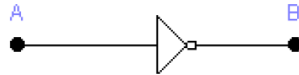
And its truth table and schema as following:



A	B	C
0	0	0
0	1	1
1	0	1
1	1	1

## NOT Gate

This is the simplest gate it just inverts the input, if the input is high the output will be low and conversely. So  $B=A'$



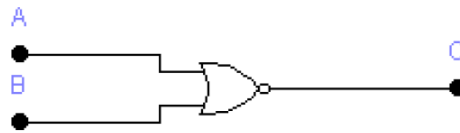
A	B
0	1
1	0

## NOR Gate

The NOR gate works opposite to the OR gate. Its Boolean algebra representation is:

$$C=(A+B)'$$

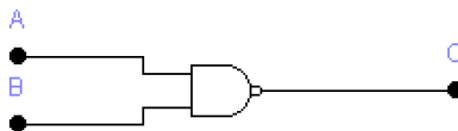
And its truth table and schema as following:



A	B	C
0	0	1
0	1	0
1	0	0
1	1	0

## NAND Gate

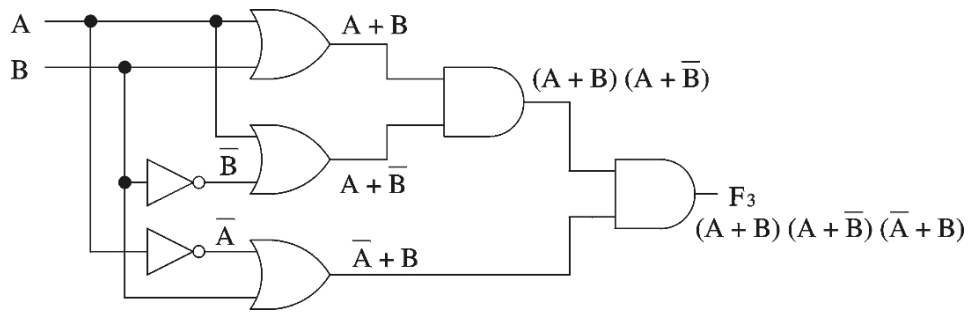
- The NAND gate works opposite to the AND gate. Its Boolean algebra representation is:  $C = (A.B)'$
- And its truth table and schema as following:



A	B	C
0	0	1
0	1	1
1	0	1
1	1	0

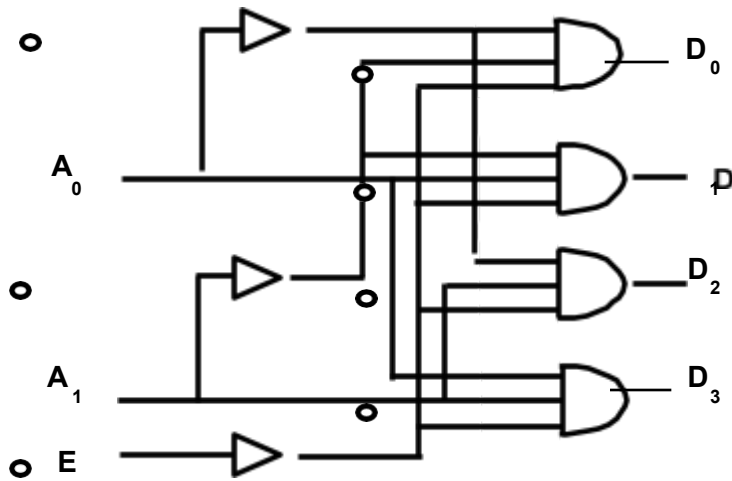
**LAB DEMONSTRATION:**

Write down intermediate logical expressions along the path with truth table.



**LAB EXERCISE:**

1. Consider the following logic diagram.
  - a. Find the expression for D0, D1, D2, and D3.
  - b. Let E = 0, A0 = 1, A1 = 1. What will be the value of D0, D1, D2, and D3?



## Session 12: Problem Solving Techniques

### OBJECTIVES:

The objective of this lab is to gain the knowledge of different problem solving skills such as Algorithm and Flowchart etc.

### THE LIST OF TOPICS TO BE COVERED:

#### Algorithm

- The algorithm is part of the blueprint or plan for the computer program, an algorithm is: An effective procedure for solving a class of problems in a finite number of steps. Every algorithm should have the following 5 characteristic feature:
  - Input
  - Output
  - Definiteness
  - Effectiveness
  - Termination

**Example:** One of the simplest algorithms is to find the largest number in an (unsorted) list of numbers.

#### **Algorithm LargestNumber**

**Input:** A non-empty list of numbers  $L$ .

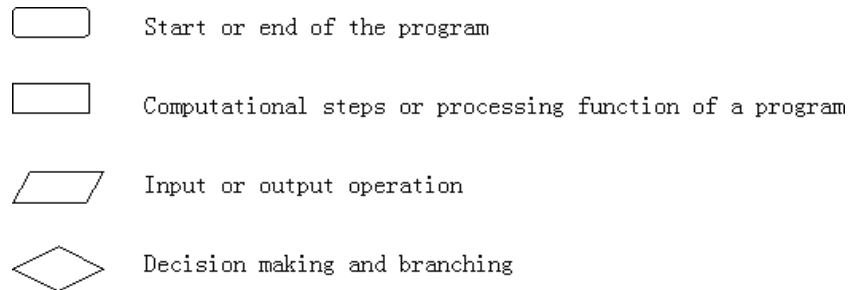
**Output:** The *largest* number in the list  $L$ .

```
• largest ← L0
• for each item in the list L, do
• if item > largest, then
  largest ← item
5) return largest
```

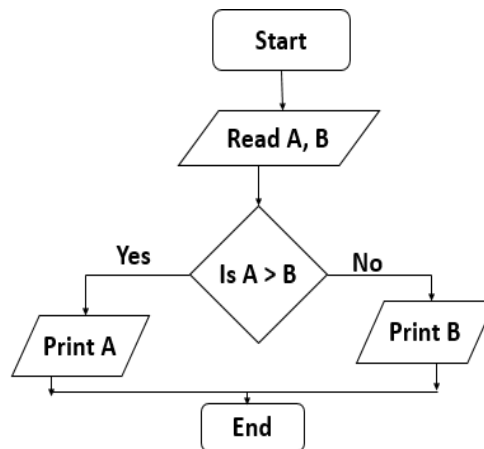
## Flowchart

- The **flowchart** is a means of visually presenting the flow of control through an information processing systems, the operations performed within the system and the sequence in which they are performed.

Flowcharts are usually drawn using some symbols; some standard symbols, which are frequently required for flowcharting many computer programs are shown below,



**Example:** Flow Chart to find largest of two numbers.



### **LAB EXERCISE:**

Write an algorithm in the form of a flowchart which takes temperatures input over a 100 day period (once per day) and outputs the number of days when the temperature was below 20C and the number of days when the temperature was 20C and above.



## **MID TERM EXAMINATION**

There will be a 40-minutes mid-term examination after the first half of the semester. Different types of questions will be included in the exam.

## **TERM FINAL EXAMINATION**

There will be a one-hour written examination after last half of the semester. Different types of questions will be included in the exam.

**END**