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Fundamentals of Computer

Introduction

This chapter introduces the basic concepts of data processing. The difference between data and information is to be convinced to the learners in the context of computer applications. The need for computers and its use as a data processor are to be provided using diverse real life examples. The merits of electronic data processing and the role of computer are to be clarified. The functional units of a computer and a general idea about the internal storage of data are discussed. Maximum care should be given to identify the need of studying this subject and the possibilities of applying computers in their studies and life.

Values and Attitudes:

- ✓ Ability to identify the need of computers and use it for data processing in possible situations
- ✓ Sharing attitude through collaboration

Unit Frame

Period : 20

Concepts / Idea and Process skills	Process/Activities with Assessments	Learning outcomes
<ul style="list-style-type: none"> • Data and Information ✓ Classifying ✓ Identifying ✓ Communicating 	General discussion on data and information using real life examples Preparation of notes	<ul style="list-style-type: none"> • Distinguishes between data and information.
<ul style="list-style-type: none"> • Data processing ✓ Identifying ✓ sorting ✓ Communicating ✓ Sharing 	Group discussion on different stages of data processing. Preparation of notes <i>Assessment:</i> <ul style="list-style-type: none"> • Group discussion 	<ul style="list-style-type: none"> • Identifies various stages in data processing.
<ul style="list-style-type: none"> • Functional units of a computer ✓ Classifying ✓ Identifying 	General discussion on the functional units of a computer. Preparation of notes	<ul style="list-style-type: none"> • Recognises the functional units of a computer.
<ul style="list-style-type: none"> • Computer as a data processor ✓ Classifying ✓ Identifying 	General discussion on computer as a data processor. Preparation of notes <i>Assessment:</i> <ul style="list-style-type: none"> • Self check questions 	<ul style="list-style-type: none"> • Explains why the computer is the best electronic data processing machine.
<ul style="list-style-type: none"> • Number system ✓ Observing ✓ Identifying ✓ Communicating 	Group discussion on different number systems Preparation of notes	<ul style="list-style-type: none"> • Infers the concept of data representation inside computers.
<ul style="list-style-type: none"> • Data representation 	General discussion on the different types of data and the different ways to represent numbers and characters internally in computer. Preparation of notes	<ul style="list-style-type: none"> • Recognizes various coding system to represent numbers and characters.

Towards the Unit:

Data and Information

(1 Period)

Suggested activity: General discussion on data and information using real life examples

- The teacher initiates a discussion by writing some names and numbers on the board and asking the students what they are.
 - o Students come up with several answers and teacher introduces the concept of data.
- Teacher then draws columns and rows around the data and gives headings like name, CE, TE, PE, etc.
 - o Students now accept this as meaningful and teacher introduces the concept information
- Teacher uses the SSLC marksheet as another instance for introducing data and information and presents the differences between the two.
- The teacher concludes the discussion with the following points:
 - o Data
 - o Information
 - o Difference between the two

Data processing

(1 Period)

Suggested activity: Group discussion on the different stages of data processing

- Teacher initiates a discussion by asking the students to write the steps they have been through in the plus one admission process.
 - o Students write the procedures they had to perform right from preparing the application form.
 - o Teacher then groups the students and asks them to consolidate their steps and present them
- Teacher consolidates the steps in data processing.
- The teacher concludes the discussion with the following points
 - o Steps in data processing
 - o Stresses the use of information as data in other situations
- Instructs the students to prepare notes.

Functional units of a computer

(1 Period)

Suggested activity: General discussion on the functional units of a computer

- Teacher asks the students to recollect the different functional units of the computer that they have learnt in their lower classes.
 - Students draw the diagram of functional units and teacher adds the details to the CPU part.
- Teacher consolidates the functions of each unit in detail.
- The teacher concludes the discussion with the following points
 - Diagram of functional units
 - Function of each unit
- Instructs the students to prepare notes.

Computer as data processor

(1 Period)

Suggested activity: General discussion on computer as a data processor

- Teacher asks the students to write the features/advantages and limitations/disadvantages of computers.
 - Students individually write the features and limitations of computer.
- Teacher consolidates them after a random presentation by students.
- The teacher concludes the discussion with the following points
 - Features of computer
 - Limitations of computer
 - Instructs the students to prepare notes

Number System

(2 Periods)

Suggested activity: General discussion and illustration

- Teacher starts the session by asking some simple questions to test the previous knowledge about numbers and number system and to motivate them.

- o Which number system we are using in our daily life (like mark scored by a student, price of a note book, age of a student etc.)?
- o How many symbols / digits are allowed in that system?
- o How do you identify the biggest and smallest number from a group of numbers?
- Students respond by giving answers
 - o Expected answers may be counting number system, real number system, integer number system, decimal system etc.
 - o The digits allowed are 10 and the biggest and smallest numbers are identified by comparing them etc.
- Teacher initiates a general discussion by giving some discussion points
 - o Place value
 - o Most important and Least important digits of a number
 - o Base of number system
- Teacher writes a number say, 543 on the board and asks the students to split the number in terms of units, tens and hundreds
 - o Students responds with answers like 3 units, 4 tens and 5 hundreds
 - o Teacher consolidates the discussion by explaining the positional number system, weight (place value), Base of a number system, Most/Least Significant digit (MSD and LSD) etc.
- Students note down the points (notes preparation).
- Assessment can be done through class assignment.
- Similarly the other number systems are introduced with the active participation of students.

Representation of numbers

(2 Periods)

Suggested activity: General discussion on the different types of data and the different ways to represent numbers and characters internally in computer

- Teacher asks the students to list different types of data that can be stored in a computer.
 - o Students identify them as numbers (integers & floating point), characters, images, audio and video.

Process Assessment

- ✓ Group discussion on data processing
- ✓ Identification of data processing stages in real life situations.

Portfolio Assessment

- ✓ Activity log book
- ✓ Worksheets

Unit-wise Assessment

1. Written tests may be conducted with questions similar to those given in worksheets.
2. Group Quiz may be conducted by the learners themselves as follows:
 - i. The learners are divided into 4 groups (adjacent benches)
 - ii. Each group prepares questions. Group leader ensures that all the members in the group participate in preparing questions and their answers. The questions are consolidated within the group.
 - iii. The quiz is conducted by ensuring the participation all the learners. Teacher should interfere in time for ensuring the unit-wise assessment of all the learners.
3. Remediation may be planned, if needed, for the topics for which the learning outcome(s) are not attained.

TE Questions

1. Given below is some data. Convert this into information and compare the two
39, Sunil, 23/09/1999
2. Explain the different stages of data processing in relation with the higher secondary admission process.
3. The following are some stages in data processing that occur in a bank while a Demand Draft (DD) is prepared for a customer. Arrange them in proper order.

- a. The details of DD is used by bank for preparing annual reports
- b. The details in the application form is entered into the computer by clerk
- c. The DD is printed and given to the customer
- d. The manager approves the DD application
- e. The DD application form is filled by the customer
- f. The DD details is saved in the bank's computer

Scoring Indicators

1. Roll No 39, Sunil was born on 23/09/1999. Features of data and information
2. Explain 6 stages
3. e, b, f, d, c, a

Assessment Worksheet - 1.1

1. Unprocessed collection of facts is called _____
2. All number systems have ____ and ____ digits.
3. Calculations and comparisons are happening in the ____ unit of CPU.
4. The MSD of the binary number 1000.010 is_____.
5. The number system which uses the letter 'F' as one of its symbols is _____.

Components of the Computer System

Introduction

This unit at the beginning provides the learners with basic knowledge of data processing and the various functional units involved in the process of data processing. At this stage the learner should be able to describe the role of each functional unit and their importance in processing. In the next stage the hardware used for each functional units like processors, memory, input devices and output devices are to be discussed in detail. As a result the learner will be able to distinguish them based on their uses and features. The next section e-Waste provides the learners, knowledge of what is e-Waste, its hazards and its disposal methods. It also discusses the role of students in e-Waste disposal. This section should be handled with great importance as it could improve the morale and good attitudes in learners. This unit also discusses the concept of green computing with stress on how to make computers green. In the software section the learners are to be provided with knowledge of system software and application software in detail. Provision should be given for hands on experience on various software packages and utilities. The concept of free and open source software and proprietary software, freeware, shareware and human-ware are also discussed for analysis and interpretation by the learners.

Values and Attitudes

- ✓ Ability to solve problems of life with innovative ideas and utilize the experience for the benefit of the society.
- ✓ Judges the environmental and health hazards due to e-Waste and appraises the need of e-Waste disposal.
- ✓ Appraises the energy star concept and becomes a promoter of green computing.
- ✓ Ability to judge the pros and cons of free software and proprietary software.

Unit Frame

Period : 35

Concept / Idea and Process skills	Process/Activities with Assessments	Learning outcomes
<ul style="list-style-type: none"> • Hardware ✓ Observing ✓ Understanding ✓ Classifying ✓ Analysing 	<p>A discussion followed by a power point presentation of various components of computer system.</p> <p>Demonstration of actual motherboard with processor and memory.</p> <p>Assignment on input/output devices.</p> <p>Demonstration of available devices.</p> <p>Illustration, Table preparation,</p> <p><i>Assessment:</i> Worksheet Self check questions</p>	<p>Identifies microprocessor and list registers.</p> <p>Distinguishes various types of memory and list their importance.</p> <p>Distinguishes different types of input/output devices based on their uses and features.</p>
<ul style="list-style-type: none"> • e-Waste & Green Computing ✓ Understands ✓ Identifies ✓ Interprets ✓ Judges 	<p>General discussion on Green computing concepts.</p> <p>Discussion on steps that can be adopted to make computers green.</p> <p>Demonstration of various settings available in computer to make computer green.</p> <p>Illustration, Preparation of notes.</p>	<p>Recognises the importance of e-Waste disposal and the learner's role in its disposal.</p> <p>Explains the concept of green computing</p>
<ul style="list-style-type: none"> • Software ✓ Understanding ✓ Classifying ✓ Discussing ✓ Identifying ✓ Categorizing 	<p>General discussion on software and its classification.</p> <p>Discussion on operating system and its functions.</p> <p>Demonstration of different operating systems.</p> <p>Discussion on different application software.</p> <p>Demonstration of different application software.</p> <p>Discussion on Computer languages.</p> <p>Demonstration of compilation/ interpretation process.</p>	<p>Distinguishes between system software and application software</p> <p>Recognises the need and functions of an operating system.</p> <p>Classifies various language processors and recognise their need.</p> <p>Lists the uses of different types of utility software.</p>

Concepts/Process skills	Process/Activities with Assessments	Learning outcomes
	<p>Discussion on utility software.</p> <p>A group discussion on free and open source software is conducted.</p> <p>A group discussion is conducted to list the different free and open source software.</p> <p>Discussion on freeware and shareware.</p> <p>Comparison between freeware and shareware with suitable examples</p> <p>Conducts a debate on open source and free software with proprietary software.</p> <p>Table preparation</p> <p><i>Assessment:</i> Lab work Preparation of questions Preparation of notes</p>	<p>Distinguishes and lists the use of word processor, electronic spread sheets and presentation software.</p> <p>Explains the importance of open source concepts</p> <p>Distinguishes between freeware, shareware and proprietary software.</p> <p>Lists the advantages of freeware and shareware.</p>
<ul style="list-style-type: none"> • Humanware or Liveware. ✓ Identifying ✓ Interpreting ✓ Concluding 	<p>General discussion on humanware or liveware.</p> <p>Classification of humanware with job description.</p> <p>Illustration, Preparation of notes</p>	<p>Explains the term humanware or liveware.</p>

Towards the Unit:**Computer Memory****(1 Period)*****Suggested activity: Seminar***

- The teacher divides the students into 5 groups and each group is given task of presenting a seminar on different types of memory..
- Each group has to prepare a presentation on the type of memory assigned
- The seminar should
 - o list registers/primary memory/secondary memory and their uses.
 - o differentiate between functions of registers, primary and secondary memory.
 - o illustrate the need for registers and cache memory.
 - o compare the cost of different memories.
- The students in other group can clear their doubts after the seminar. The teacher is expected to support the presenter with additional information, if needed.
- This activity provides involvement of each student in the group for the activity and a facility for teachers to evaluate the involvement of each student in the group for process assessment.
- The teacher concludes the seminar pointing to the advantage and disadvantage of using different types of memory.
- Each student in a group has to submit the seminar report for the portfolio.

Inout Output Devices**(1 Period)*****Suggested activity: Assignment on input/output devices***

- The teacher after completing general discussion on input/output devices, learners are asked to write an assignment.
- Different problems are given for each student or groups of three or five students.
 - o Each group is given with name of an office/shop/institution. (For example bank, supermarket, school, studio etc.)

- o Each group has to
 - list the input/output devices needed by the office/shop/institution.
 - justify the purpose of selecting the devices.
 - illustrate their functioning.
- o Assignment is prepared in the Activity log book. The same may be collected in digital form prepared using word processing software. The product may be submitted through e-mail or print-out. This ensures the ICT skills of the learners.

e-Waste

(1 Period)

Suggested activity: General discussion and preparation of notes on green computing

- The teacher writes the following statement on blackboard or a chart.
 - o “Many of the technologies we use every day consume more power and resources than they really need”.
 - o Learners are asked to analyse the statement and a discussion is done.
- The teacher writes the following statement on blackboard or a chart.
 - o Should we use recyclable materials for manufacturing computer key board or cabinet? Why?
 - o Learners are asked to analyse the statement and a discussion is done.
- Then the teacher discusses the concept of green computing and the learners recognise the importance of green computing and prepare notes on it.

Freeware and Shareware

(1 Period)

Suggested activity: Debate and preparation of notes.

- The teacher after discussing what is freeware and shareware/proprietary software, initiates a debate whether freeware and shareware / proprietary software is better.

- o The two sides of the class lists out the advantages and disadvantages.
- This activity consists of the involvement of all students in the class.
- The teacher concludes the discussion with the following points
 - o Lists out the advantages and disadvantages
 - o Instructs the students to prepare notes.

Process Assessment

- Group discussion on various components of computer.
- Seminar on memory.
- Assignment on input/output devices
- Group discussion on various types of software
- Debate on free and proprietary software.

Portfolio Assessment

- Activity log book
- Assignment
- Seminar report
- Assessment worksheets

Unit-wise Assessment

- Class test
- Quiz
- Question preparation

TE Questions

1. Pick the odd one out
a) Hard Disk b) DVD c) RAM d) Floppy disk
2. What will happen if RAM is not present in the computer?
3. What will happen if ROM is not present in the computer?
4. Raju is planning to set up DTP centre. Suggest a suitable printer for him with justification.

4. Match the following:

A	B
RAM	Interface between user and hardware
OMR	Heat sensitive paper
Operating System	Objective type Exam
Thermal printer	BIOS
ROM	Volatile

6. Suggest suitable devices for the following situations:
- To use in super markets for identifying products which make billing easier?
 - To capture information, like pictures or text, and convert into a digital format that can be edited using computer.
7. What is the need for a compiler / interpreter?
8. What is e-Waste? Explain its disposal methods.
9. Explain student's role in e-Waste management.
10. Can the computer go green? How?
11. A computer after continuous use for two to three years became slightly slow? Point out a reason that can be associated with hard disk and give a suitable remedy?
12. How can we protect a computer from virus?
13. Classify the following softwares into groups and name the groups?
MS word, Windows XP, Open office, Pascal, MS Excel, Winrar, Linux, C++, MySQL, Adobe Flash, Winzip
14. Can a computer function without an operating system? Why?
15. Out of free software, open source software and proprietary, which is better? Why?
16. Distinguish freeware and shareware.
17. List any three humanware with job description?

Scoring Indicators

1. RAM
2. Computer becomes slower.
3. Problem with loading OS.
4. Laser Printer, 2 Justification points
5. RAM- Volatile, OMR- Objective type Exam, Operating System- Interface between user and hardware, Thermal printer- Heat sensitive paper, ROM- BIOS
6. a. Barcode reader, b. scanner and OCR.
7. Conversion from HLL to Machine language.
8. Definition, 3 disposal methods
9. Recycle, Reuse, stop buying unnecessary equipments, visit manufacturers website before buying
10. Yes; two supporting points.
11. Defragmentation and its definition
12. Antivirus software; Two Software names
13. Classify under System software and Application software
14. No, Process, device, memory and file management is done by OS.
15. Selection with justification.
16. Any two points
17. Any three humanware.

Assessment Worksheet 2.1

1. EEPROM stands for _____.
2. _____ is an example of optical storage device
3. Compare RAM and ROM.
4. List any three input devices
5. _____ holds the address of the next instruction to be executed by the processor

Assessment Worksheet 2.2

1. What is e-Waste?
2. List the toxic materials present in e-Waste.
3. The study and practice of environmentally sustainable computing is called _____.
4. One of the earliest initiatives towards green computing was the voluntary labeling program known as _____.
5. What is incineration? What do you mean by 'Green design'?

Assessment Worksheet 2.3

1. _____ is an interface between user and computer hardware.
2. List any two functions of operating system.
3. Match the following:

A	B
Language processor	Disk defragmenter
Utility software	Linux
High level language	Compiler
Operating system	Humanware
Database Administrator	C

4. _____ is an example of free and open source software.
5. _____ is an example of proprietary software.
6. What is Humanware? Give an example.