**SS1 THIRD TERM DATA PROCESSING NOTE**

**TOPIC 1: SPREADSHEET**

A spreadsheet package (sometimes called Spreadsheet) is an application program consisting of grid of cells arranged in rows and columns that is used for modeling data for the purpose of budgeting, planning, data analysis etc.

The columns in a spreadsheet are represented by letters, ‘A’, ‘B’, ‘CA’ etc., while rows are represented by numbers, 1, 2, 3 etc. A single cell is referenced by addressing its column letter and row number e.g. ‘B5’. In spreadsheet, a contiguous group of cells is referred to as a Range. For example A1:A10 reference the contiguous group of cells A1 to A10. In MS Excel 2007 and above, a typical worksheet contains 16384 (XFD) columns and 1,048,576 rows. A spreadsheet is generally designed to hold numeric data, short text strings or results of formulas that is automatically calculated based on the contents of other cells. A file created by MS Excel is called a Workbook with default name Book1 or BookX, where X can be any number starting from 1. This workbook has three worksheets (sheets) by default and users can create as many as the computer memory allows. A workbook has the extension ‘.xlsx’. The total number of characters a cell can contain is 32,767.

**Examples of Spreadsheet packages**

1. Microsoft Excel           3. SuperCalc                    5. Lotus 1-2-3
2. Google Sheet               4. StatView Spreadsheet         6. Gnumeric

**Uses of Spreadsheet**

1. Used for simple lists
2. Used for analysis of numerical data
3. Used for sorting and filtering of information
4. Used for preparation of daily sales report
5. Spreadsheet turns information within table into detailed graphs and charts to show visual representation of the data.

**Components of Spreadsheet**

1. Name box: this is a space to the left of the formula bar that references the cell that is active. It shows the name (address) of a selected cell.
2. Formula bar: this bar displays information entered (being entered as you type) in the current or active cell. The content of this cell can be edited in the formula bar

Other components such as cell, column, row, sheet tab have been discussed earlier.

**Working with Excel worksheet**

Recall that a cell can take short text (label), number and formula. So when working with Excel, you are expected to type in any of the above in the cells. The Excel sheet below will be used for our practical example.



**Calculating in Excel**

To do any form of calculation, a user is required to put a formula together or by using the pre-defined functions available in Excel.

To use any of the available functions, the following information should be taken into consideration:

1. The cell that you want to store the result of your calculation must be made active
2. Any formula or function to be inserted must be preceded by an equality sign (=) followed by desired argument
3. Press Enter key when done to see the result of your formula

A formula using a function name is of the form

= funct\_name (arg1, arg2 , …, argN) ,

where N >= 1 and funct\_name is the name of the function e.g. SUM, AVERAGE, COUNT, MIN, MAX etc.

**Addition in Excel**

Consider the Excel sheet above, to calculate the **CA**score for the first student (**ESTHER**) on the table:

Type any of the following formulas in cell **D2**

1. =B2+ C2
2. =SUM(B2,C2)
3. =SUM(B2:C2)

To calculate the **Total** score for **TOBILOBA**, use the formula:

1. =D4 + E4
2. =SUM(D4,E4)
3. =SUM(D4:E4)

**Note:** Total = CA + Exam

**Average in Excel**

Assuming the **Total** score for all students have been calculated, how do you calculate the **Average** of all the **Total** scores?

Note that the Total score for each student is calculated in column**F**, cell **F2** for the first student up to cell **F9** for the last student. To get the average of the Total scores, use the formula below:

1. =(F2+F3+F4+F5+F6+F7+F8+F9)/8
2. =AVERAGE(F2,F3,F4,F5,F6,F7,F8,F9)
3. =AVERAGE(F2:F9)

**Minimum and Maximum in Excel**

To calculate the lowest Exam score, use the following formula:

1. =MIN(E2,E3,E4, E5,E6,E7,E8,E9)
2. =MIN(E2:E9)

To calculate the highest Exam score, use the following formula:

1. =MAX(E2,E3,E4, E5,E6,E7,E8,E9)
2. =MAX(E2:E9)

**Grading in Excel**

Consider the table above, If we are to grade according to a particular condition say, if a student’s **Total** score is 50 and above then his/her grade is “**PASS**” and if below 50, the grade is “**FAIL**”. How do you use Excel to achieve this?

To calculate the grade, MS Excel provides the **IF** function which has the syntax:

**=IF(logical\_test, value\_if\_true, value\_if\_false)**  , where:

* **Logical\_test** is what you want to test for i.e. is Total score is greater than or equal to 50?
* **Value\_if\_true** is what should happen if the ‘logical\_test’ is true i.e. “PASS”.
* **Value\_if\_false** is what should happen if the ‘logical\_test’ is false i.e. “FAIL”.

So how do you calculate the grade for the last student on the list? i.e. **JOSHUA**

It is assumed that the total score has been calculated for JOSHUA, so in cell **G9**, type the following formula:

**=IF(F9>=50, “PASS”,”FAIL”)**

F9 is the cell where the **Total** score for **JOSHUA** is located, the ‘>=’ is the conditional operator to test if the value in cell F9 is greater than or equal to 50. If the test is carried out and it amount to true, then “PASS” will be inserted into cell G9 else ‘FAIL’.

DO IT YOURSELF!

What if the conditions are:

Total score is 75 and above, then grade is “ABOVE AVERAGE”, 50 to 74, the grade is “AVERAGE” and below 50 , the grade is “BELOW AVERAGE”. Write the IF functions to achieve this. **Try this on your own!**

**Formula errors in Excel**

1. **##### error:** when your cell contains this error, the column isn’t wide enough to display the value. The solution is to increase the width of the cell by double-clicking the right border of the cell (at the top of the cell column) or clicking and dragging to the right.
2. **#NAME? error:** occurs when Excel does not recognize the text in a formula. For example typing the formula =SU(A1:A3), Excel can’t recognise the function name ‘SU’. So the solution is to change the ‘SU’ to ‘SUM’ which is a correct function name for addition.
3. **#VALUE! Error:** occurs when a formula has the wrong type of argument. For example cell A1 has 4, cell A2 has 5 and cell A3 has ‘Hi’. If you try to add the three using the formula**=SUM(A1:A3)**, Excel displays #VALUE! Error because the value in cell A3 is a text and not a number. The solution is to change the value in cell A3 to a number.
4. **#DIV/0! Error:** occurs when a formula tries to divide a number by zero (0) or an empty cell. The solution is to change the dividing value to a value not equal to zero (0)

**Assignment: Explain** the #REF! error, with typical example.

Sorting, Creating Chart, Setting print area, changing page orientation, inserting gridline/border, merging cells etc. will be explained in the course of the practical class.

**TOPIC 2: DATABASE MANAGEMENT SYSTEM**

A database is a structured collection of interrelated data. It is a collection of data ordered and structured in a way that data can be easily accessed and managed.

A database management system (DBMS) is application software that is used to create, maintain and manage a database. MS Access database has the extension “.accdb’.

The smallest unit of data representation is called a bit. A character is made up of 1 byte i.e. 8 bits. A field consists of a group of characters. A record is a collection of related fields. File is a collection of related records and database is a collection of related files.



**Benefits (functions) of a DBMS**

1. Creation of database
2. Efficient data access
3. Data administration
4. Data integrity and security
5. Concurrent access and crash recovery
6. Data manipulation
7. Data transformation/modification/editing
8. Report generation/presentation

**Examples of DBMSs**

1. Microsoft Access            4. Oracle                 7. IBM Dbase (III & IV)
2. Informix                           5. Ingress                8. MS SQL Server
3. MySQL                            6. FoxBase             9. Paradox

**Database Object**

A database object is a data structure used to either store or reference the data. The following are some of the objects in MS Access

1. Table: this is the most important database object. It consists of rows and columns. It stores records about a particular entity.
2. Form: this object provides a convenient way to enter and view records in a table
3. Query: this object enables the user to locate records that match specified criteria.
4. Report: this object allows you to format, organize and summarize all or a portion of the data in a database

Other database objects are Macro and Module.

 **Database elements**

The elements of a typical database are Tables, fields, records, primary key,  and characters.

**Creating a database**

To create a database:

1. Click **Blank** **Database** button on the **Backstage** **View** window
2. On the **File** **name** box, type in an appropriate name for the database, then click **Create**

Note that in giving a name to your database, the name cannot be longer than 255 characters in length and must not contain the following characters:

Forward slash (/), Asterisk (\*), Back slash (\), Colon (:), Question mark (?), Quotation mark (“), Pipe symbol (|), Greater than (>) and less than (<) symbols.

**Creating Table**

After clicking the Create button, a new window shows up with a table already created with a default name **Table1**. This very window is called the **Datasheet** **View**.

If the Database is storing information about a school, then the entities in a school include Student, Teacher, and Subject etc. So if we are going to create a table that stores student information, then we list the attributes of a typical student such as *StudentID*, *Firstname*, *Lastname*, *Gender*, *DOB*, *Address*, *Nationality* etc. The above listed attributes are what make the fields (column name). To define the structure of the Student table, do the following:

1. On the **Home** tab, click the **View** button on the top left corner (directly below the **File** tab)
2. Then click Design view

The window that shows up is called the **Design** **View**, and has a part called **Field** **Name** and on the left the **Data** **Type** column. The Field name is the attribute of the student i.e. *Lastname*, *StudentID* etc. while the Data Type has to do with the type of data value each field takes. For example, if the field name is *Lastname*, then the appropriate data type is **Text** (since your name is a combination of alphabets). The following are the data types available in MS Access 2010.

|  |  |
| --- | --- |
| **Data type** | **Description** |
| Text | Accepts either alphabet or numbers including special characters with a maximum of 255 characters in length. It is called short text in version 2013 above |
| Memo | Similar to Text data type but can allow a maximum of 63,999 characters in length. It is called long text in version 2013 and above |
| Number | Only numeric value is allowed and can be used to perform calculations |
| Date/Time | Date and time values can be stored in this field |
| Currency | You can enter only currency values in this field |
| AutoNumber | You cannot enter or change the data in this field at any time. MS Access increments the value in this field whenever you add a new record to a table. |
| Yes/No | The field is depicted with a Check box that by default result to FALSE (No)and when checked becomes TRUE (Yes) |

Other data types are OLE Object, Hyperlink, Attachment and Lookup Wizard.

Now enter the following field names and select the appropriate data type as indicated in the table below:

|  |  |
| --- | --- |
| **Field Name** | **Data Type** |
| StudentID | Number |
| Last Name | Text |
| First Name | Text |
| Gender | Text |
| DOB | Date/Time |
| Address | Memo |
| Phone | Text |

Note that the field name can be up to 64 characters long. They can include combination of letters of the English alphabet, numbers, blank space and special characters except a period (.), an exclamation mark (!), and brackets ([]).

You must make sure that you set the primary key (PK) field. A **primary** **key** is any field that contains values that are unique for each record in the table. In the case of this, the PK field is ***StudentID***, since no two students can have the same StudentID.

After typing as indicated in the table above, Save it, then click View to return to Datasheet View. You can start filling the table with data values that form records.

**Querying the Database**

Querying the database means asking the database to extract a subset of the information saved in it based on the criteria you are giving it.

**Note:** The process of querying the DB would be explained during the course of the practical.

**TOPIC 3: COMPUTER ETHICS**

**Computer ethics** is a term used to describe the principles of right and wrong that are acceptable when using computer system and related technologies.

**Computer room management** ethics can be defined as the appropriate way of handling and taking good care of computer and associated resources within the computer room.

**Computer ethic issues**

1.       **Plagiarism** – presenting someone’s work (hard copy, softcopy) as your own.

2.      **Copyright violation**: violation of the legal rights to an original work (e.g. software, ebook etc.) is a common ethical dilemma in our society.

3.  **Privacy infringement**: having unauthorized access to data of an individual is a privacy infringement which is liable to jail term.

4.    **Netiquette**:  Netiquette is the short for “internet etiquette”. It is the set of social rules about the proper and polite way to communicate when using the internet. Some of the common guidelines here are:

          a.       Email – when using email, if you don’t know the source of the email, make sure you:

* + Don’t reply to the email
	+ Don’t click the (malicious) attachment
	+ Don’t click the dangerous links in the email that could download malware to your system.

        b.      Don’t click on any link or online ad (advertisement) that you are not sure of the source

        c.       Do not reveal your sensitive information online

        d.      Don’t just download any free software if you are not sure of the security of the website

        e.      Keep your username and password to yourself; don’t be deceived to sharing this vital                           information (not even to your friend)

        f.        Think twice before posting that message because whatever you post online stays online and                 can affect your personal or professional life in the future

         g.       Install antivirus protection before going online, it’s important for your online safety.

**Responsible ways of using the computer**

* Installing antivirus on the computer and regularly update it
* Checking and respond to emails promptly and politely
* Avoid using the computer to send anonymous emails/messages
* Take regular backups of files/data

**Ways of misusing the computer**

1. **Hacking** – using computer knowledge to have unauthorized access to files and information
2. **Pornography**- using computer or internet to watch or distribute pictures and videos that are sexually explicit.
3. **Fraud** – using the internet to fraudulently swindle unsuspecting victims of money or valuables e.g. yahoo yahoo
4. Spreading malicious software into networked computer
5. Using the computer to send discriminatory, harassing and threatening messages

**Assignment:** List 10 Computer room rules and regulations.

**TOPIC 4: SAFETY MEASURES**

Safety measures are the precautions or actions taken to ensure protection from or not being exposed to, the risk of illness, or injury from the use of computer and related equipment within a computer environment.

The following are some of the safety measures/guidelines:

1. There should be appropriate ventilation in the computer room
2. Use surge protector to protect your computer against power surge and spikes
3. Unauthorized access to computer should be restricted by putting passwords on computer or by encrypting the files
4. Using anti-glare screen protector to cover the monitor in order to reduce strain to the eyes
5. Ensure good working posture when using the computer
6. Ensure you install and regularly update antivirus software to guard against malware
7. Make sure you regularly backup your files on external storage media
8. Avoid repairing computer components or devices esp. CRT monitor to avoid electrocution.

**Computer related health problems and solutions**

1.       Eye strain and vision problem – continuous staring at the monitor without taking breaks can cause eyestrain which weakens the sight.

Precautions/solution

* Use anti-glare glasses to cover the monitor
* Take regular short breaks from sitting in front of the computer

2. Low back pain – this is as a result of wrong sitting posture adopted when you use the computer. The risk increases when this happens regularly over a long period.

Precaution/solution

1. Use a proper chair that support your back and lower back
2. Sit up straight. Do not slouch
3. Regular exercises at least five times a week to strengthen your back muscle
4. Using a lumbosacral belt as a precautionary  and preventive measure will help prevent this problem

3. Carpal tunnel syndrome – regular typing and use of mouse over prolonged periods is a major risk factor of the risk called Carpal tunnel syndrome. Tingling and numbness, pain and loss of strength of the affect wrist, fingers and hands are symptoms.

Precautions/solution

1. Exercises for the wrist will help and take regular breaks
2. Do not hold the mouse tightly.

4. Cervical spondylosis (neck and shoulder problem)  - reading from the monitor screen or typing over a prolonged periods regularly is a risk factor that can over time cause cervical spondylosis

Precaution/solution

1. Wear a cervical collar during your computing hours, this will keep the neck and shoulder muscles strong
2. Neck and shoulder exercise two to three times a day will keep the neck and shoulder muscles strong

**TOPIC 5: APPLICATION OF ICT**

ICT is a short form that stands for Information Communication Technology. A good way to think about ICT is all the equipment and methods used by people to handle information.

ICT includes any product that will store, retrieve, manipulate, transmit, or receive information electronically in a digital form. For example, Computers, digital T.V, E-mails, and many more.

Abacus and the printing press are examples of ICT, the term usually refers to modern technology based on electronics.

ICT combines the technology of computing and telecommunications so that a large amount of data can be stored and transmitted.

Televisions, computers, satellites, and telephones are just some of the types of equipment used in ICT.

Computer Generations – Related post:

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Benefits of ICT

ICT is so important in the world today that it makes it necessary for every person to be competent in the use of ICT for the tasks they have to accomplish. Some advantages of ICT include:

Education

In any society, the potential for increasing access to and improving the relevance and quality of education through ICT.

Educators have the ability and courage to make a positive contribution. making such a contribution is a challenge and teachers must happily exploit new techniques and learning opportunities.

Today, most schools and higher educational institutions have computers in the classrooms for teachers and students. Technology can support learning in many ways, for example-

A motivational teacher has found that using modern computer technologies can capture and hold student’s attention.

A computer can also provide many, effective, and powerful opportunities for teaching and learning skills. These are skill-building practice and linking learners to institutional resources.

Benefits of ICT

Communication

With the help of ICT, Communication has become cheaper, quicker, and more efficient. earlier, only large computers had communication capabilities. Today, even the smallest computers and devices can able communicate with each other.

Today computers are capable of exchanging information with the help of the internet. You can send messages through the computer to your friend easily.

Students easily submit their homework or assignment easily through using the technologies of ICT.

Cost-effectiveness: ICT has helped to make computerize the business process thus streamlining businesses to make them cost-effective money-making machines.

Healthcare

The ICT revolution is having huge effects on the pharmaceutical industry and on the delivery of health services.

ICT benefits to the patient: A complete medical history of patients. and updated easily through online access, patients freed from taking prescriptions for hospitals for further treatment. Also, online medical advice can be taken easily means you don’t have to go to the hospital.

ICT benefits to the doctor: To improve the efficiency and effectiveness of the antiquated healthcare system. doctors would be able to access complete patient records through they did not create them. The system will save doctors time overall, the use of health care has clear benefits.

Business

ICT has replaced the traditional modes of businesses with innovative technologies. This has boosted the performance of business enormously and saw the emergence of new business innovation in many areas.

The use of ICT applications like a spreadsheet, database software, word processor, accounting software, statistical analysis software, and CAD enable businesses to carry out their functions more effectively in the place of work.

The use of email messaging service and instant messaging (IM) and electronic conferencing has enhanced uninterrupted business interaction and communications for businesses with multiple offices.

A major advantage of information technology to business is E-commerce. This helps in boosting the economy. It makes buying and selling activities easier, more efficient, and fast.

Benefits of ICT

Governance

ICT also affects government by improving responsiveness, increasing efficiency, and enhancing governance practices. government can encourage the diffusion of ICT through their supply of online services and their own use of technologies.

The internet gives governments the opportunity to offer public services plans and to give information and policies related information more efficiently.

The more public services can be delivered through electronic media such as the internet, the larger the potential savings. Processing documents, such as licenses, or collecting taxes electronically are examples of such possibilities.

Banking

The computer is called the nerve center of all the banking systems all over the world. Computers can control the entire banking system that also includes “Electronic banking services”. Electronic banking provides 24 hours services, the services are:

Automated teller machine(ATM)

Electronic fund transfer

Pay by phone system

Cheque deposit

Direct deposit

Internet banking

Benefits of ICT

Impact And Benefits of ICT On Society

The impact of ICT on society seems to have been a global change which has an impact as large as that since the birth of the telephones by alexander graham bell the (inventor of the telephone).

Faster communication speed: In the past, it took long time to get any information or news to be send or to be known. Now with the internet all this became possible to share with everyone with no more time.

Low communication cost: Using the internet is cost-effective than other modes of communication such as telephone, or courier services. It allows peoples to have access to a large amount of data at a very low cost.

Sharing of information: with the technological advancement of ICT, information can be easily shared by people all over the world. people can share or exchange opinions, news, and information through discussion groups, mailing lists, and forums on the internet.

Career opportunities in IT

Nowadays, the computer industry is one of the larger worldwide industries. the industry has created thousands of high tech jobs, even in companies whose primary business is not computer related.

Job availability in the computer industry generally are available in one or more of these sectors:

1. General business and their IT departments
2. Common equipment field
3. Computer software field
4. Computer service and repair field
5. IT consulting
6. Computer sales
7. Computer education and training field