

Chapter-1

Lists, Tuples and Dictionary

Revision Notes

- **Sequence** is an object that contains multiple items of data.
- Items are stored in a sequence one after another.
- Sequence may have repeated items in a list.
- The number of elements is called length of the sequence.
- Various sequences available in Python are:
 - Lists
 - Strings
 - Dictionaries
 - Tuples
 - Sets

LISTS

- **List** is a collection of values or an ordered sequence of values.
- The items in a list can be of any type such as string, integer, float, object, etc.
- Elements of a list are written enclosed in square brackets [], separated by commas.
- Values in the list can be modified because it is mutable.
- The values that make up a list are called its **elements**.
- **Syntax** for creating a list:

```
<list_name> = [ ]
```
- A list with blank or no values is called an **empty list**.
- **Creating a list from an existing sequence:**
 - **Creating a list from a sequence**

```
<new_list_name> = list(sequence)
```
 - **Creating an empty list**

```
list_name = list()
```
 - List can also be created through user input
- List index can be a positive or negative integer value.
- An **IndexError** appears if the user tries and accesses elements that do not exist in the list.
- **Traversing a list** means accessing each element of a list.
 - Using 'in' operator

```
for i in list_name:
    print(i)
```
 - Using range() function

```
for i in range(len(list_name)):
    print(list_name[i])
```
- If we assign the elements of one list to another list, both shall refer to the same object.
- Changes made with one alias get reflected in the other alias.
- Aliasing should be avoided.
- In Python, while comparing two lists, each element is individually compared in lexicographical order.
- Two lists can be compared if they are of comparable type, otherwise Python flashes an error.

➤ **Operations on Lists:**

- **Concatenation** – A process in which multiple lists can be combined together using '+'.
Syntax:
`list3 = list1 + list2`

- **Replication** – A process in which a list gets replicated or repeated a specific number of times using '*'.
Syntax:
`list1 * 3`

- Two lists can't be multiplied using *

- **Membership Testing** – An operation carried out to check whether a particular element is a member of that list or not.

- Using 'in' operator – returns "True" if the element appears in the list, otherwise returns "False".
- Using 'not in' operator – returns "True" if the element does not appear in the list, otherwise returns "False".

Syntax:

```
print (<element> in/not in <list1>)
```

- **Indexing** – An index value is assigned for each item present in the sequence.
 - In Python, indexing starts from 0.
 - Negative indices identify positions from the end of the list and starts with -1.
- **Slicing** – It is an operation in which the user can slice a particular range from that sequence.
 - List slices are sub-part of a list extracted out.

Syntax:

```
list1 [start: stop: step]
```

➤ **Built-in Functions for lists:**

- **append()** – Adds a single item to the end of the list and does not create a new list.

Syntax:

```
list1.append(item)
```

- **extend()** – Adds one list at the end of the other list.

Syntax:

```
list1.extend(list2)
```

- **insert()** – Inserts an element at a specified index.

Syntax:

```
list1.insert(index_number, value)
```

- **reverse()** – Reverses the order of the elements in a list.

Syntax:

```
list.reverse()
```

- **index()** – Returns the index of first matched item from the list.

Syntax:

```
list.index(<item>)
```

- **update()** – Changes an item or a range of items using '='.

Syntax:

```
list[index] = <new value>
```

- **len()** – Returns the length of the list.

Syntax:

```
len(list)
```

- **sort()** – Sorts the items of the list.

- For ascending order

Syntax:

```
list.sort()
```

- For descending order
Syntax:
`list.sort(reverse = True)`
- **clear()** – Removes all items from the list.
Syntax:
`list.clear()`
- **count()** – Counts how many times an element has occurred in a list and returns it.
Syntax:
`list.count(element)`
- **Deletion operation** – For deleting an item from a list.
 - If index is known
 - **pop()** – Removes the element from specified index and returns the removed element.
Syntax:
`list.pop(index)`
 If no index value is provided, the last element in the list is removed.
 - **del statement** – Removes the specified element but does not return the removed element.
Syntax:
`del list(index)` - to delete single element
`OR del list(start index : stop index)` - to delete a range of elements
 - If element is known but its index is not known
 - **remove()**
Syntax:
`list.remove(element)`
- **Searching the list**
 - For a particular element / index – **index()**
Syntax:
`list.index(element)`
 - For the maximum value in the list – **max()**
Syntax:
`max(list)`
 - For the minimum value in the list – **min()**
Syntax:
`min(list)`

TUPLES

- A **tuple** consists of a number of values separated by commas.
- Tuples are enclosed within parentheses ().
- The values that make up a tuple are called its **elements**.
- Elements in a tuple need not be of the same type.
- The index value of tuple starts with 0.
- Tuples are faster and more efficient than lists.
- If a tuple comprises of a single element, the element should be followed by a comma. Such a tuple is called a singleton tuple.
- Creating tuple with a single element:
Syntax:
`tuple_name = ("January",)`
OR `tuple_name = tuple()`
- A tuple can be created by accepting input by user input using *while* loop.
- Tuples can be nested. This means that tuples can be placed inside other tuples.

- The individual elements of a tuple can be accessed through their indices given in square brackets [].
 - A tuple can be traversed using
 - **'in' operator with for loop.**
Syntax:
for i in tuple_name:
 print(i)
 - **range() function**
Syntax:
for i in range(len (tuple_name)):
 print(tuple_name [i])
 - **Slicing** is used to retrieve a subset of values.
Syntax:
tuple_name[start: stop: step]
 - Two tuples can be combine together using '+' operator.
 - The elements of a tuple can be repeated using '*' operator.
 - The users can check whether a particular element is a member of that tuple or not.
 - Using 'in' operator – returns "True" if the element appears in the tuple, otherwise returns "False".
 - Using 'not in' operator – returns "True" if the element does not appear in the tuple, otherwise returns "False".**Syntax:**
<element> in/not in <tuple_name>
 - **Tuple functions:**
 - **len() – Returns the length of a tuple.**
Syntax:
len(tuple_name)
 - **count() – Counts the occurrence of an item in the tuple.**
Syntax:
tuple_name.count(element)
 - **any() – Returns True if a tuple is having at least one item and returns False if the tuple is empty.**
Syntax:
any(tuple_name)
 - **max() – Returns the element with maximum ASCII value in the tuple.**
Syntax:
max(tuple_name)
 - **min() – Returns the element with minimum ASCII value in the tuple.**
Syntax:
min(tuple_name)
 - **sorted() – Sorts the elements of a tuple.**
Syntax:
sorted(tuple_name)
 - **index() – Finds the first index of a given item and returns the index.**
Syntax:
tuple_name.index(value, start, end)
 - Tuples can be compared using comparison operators like <, >, =, !=, etc.
 - In Python, comparison operators start by comparing the first element from each sequence. If they are equal, it goes on to the next element until it finds the elements that differ. The subsequent elements are not considered.
 - A tuple is deleted using del statement.

Syntax:

```
del tuple_name
```

DICTIONARIES

Python **Dictionary** is an unordered collection of items where each item is a key-value pair.

- A dictionary can be created by placing items inside curly braces { } separated by a comma.

Syntax:

```
<dictionary_name> = {'key1': 'value1', 'key2': 'value2', ..., 'keyn': 'valuen'}
```

- To access elements in a dictionary, square brackets [] alongwith the key are used.
- **Traversing a dictionary** means accessing each element of a dictionary.

Syntax:

```
for i in dictionary_name:
    print(i, ': ', dictionary_name[i])
```

- **To add new elements** to an existing dictionary

Syntax:

```
dictionary_name ['key'] = 'value'
```

- **To modify existing key-value pair** in a dictionary

Syntax:

```
dictionary_name ['key'] = 'value'
```

- **To merge two dictionaries**

Syntax:

```
dictionary_name.update(dictionary2)
```

- When two dictionaries are merged, the values of the same key are overwritten.

- **To remove an item from the dictionary**

- Using **del command**

Syntax:

```
del dictionary_name[key]
```

- Using **pop() method**

Syntax:

```
dictionary_name.pop(key)
```

- The users can check whether a particular key is present in a dictionary or not.

- Using 'in' operator – returns "True" if the key is present in the dictionary, otherwise returns "False".
- Using 'not in' operator – returns "True" if the key is not present in the dictionary, otherwise returns "False".

Syntax: <key> in/not in <dictionary_name>

- **Dictionary functions:**

- **len()** – Returns the number of key-value pairs in the dictionary.

Syntax:

```
len(dictionary_name)
```

- **clear()** – Removes all items from the dictionary.

Syntax:

```
dictionary_name.clear( )
```

- **get()** – Returns the value of a given key in the dictionary.

Syntax:

```
dictionary_name.get(key)
```

- **items()** – Returns all the key-value pairs in the dictionary.

Syntax:

```
dictionary_name.items( )
```

- **keys()** – Returns the list of keys used in the dictionary.

Syntax:

dictionary_name.keys()

- **values()** – Returns the list of values defined in the dictionary.

Syntax:

dictionary_name.values()



Chapter-2

Introduction to Python Module



Revision Notes

- A module is a Python object with arbitrarily named attributes that you can bind and reference. A module allows you to logically organize your Python code.
- In Python modules, we can define different functions, classes and variables.
- All Python code for module are stored in a file named filename.py, where py is the extension of Python code file.
- A module can contain executable statements as well as function definitions. These statements are intended to initialize the module.
- Modules can import other modules. It is mandatory but not required to place all import statements at the beginning of a module.
- Import STATEMENT
 - import statement combines two operations : It searches for the named module, then it binds the results of that search to a name in the local namespace.
 - When a module is first imported, Python searches for the module python standard library and if found, it creates a module object, initializing it.
 - Syntax
 - `import module_name`
- **MATHEMATICAL FUNCTION**
- In Python, **math** module is used to perform mathematical functions. Definitions of all mathematical functions are stored in **math** module.
- To perform mathematical functions, we must import the math module.
- Various mathematical functions are as follows
 - **sqrt()** If you want to find the square root of any number, sqrt() function is used in Python.

Syntax

`math.sqrt(num)`

e.g. `>>> import math`

`>>> num = math. sqrt (49)`
`>>> print (num)`
`7.0`
`>>> print (math. sqrt (-9))`

Traceback (most recent call last) :

File "<pyshell# 27>", line 1, in <module> print (math. sqrt(-9))

ValueError : math domain Error
 - **ceil()** It is used to return ceiling value of any number. It gives smallest integer but not less than that number.

Syntax

`math. ceil (num)`

e.g. `>>> import math`

`>>> num = math. ceil (79.23)`

`>>> print (num)`

80

`>>> print (math. ceil (-25.46))`

- 25

- **floor ()** It returns the value which is equal or less than given number.

Syntax

`math. floor (number)`

e.g. `>>> import math`

`>>> num = math. floor (82.45)`

`>>> print (num)`

82

`>>> print (math. floor (-82.45))`

- 83

- **pow ()** It returns x raised to the power y. In Python, there are two ways to perform this.

Syntax

`pow (x, y) OR pow (x, y, mod)`

When third argument is given python calculate x to the power of y modules z i.e., `pow(x, y) % z`

e.g. `>>> import math`

`>>> a = 5`

`>>> b = 3`

`>>> num = pow (a, b)`

`>>> print (num)`

125

`>>> pow (5, 3, 20)`

5

`>>> pow (16, 2, 4)`

0

- **fabs ()** It returns the positive floating point value of the number. This positive value is called absolute value.

Syntax

`math. fabs (number)`

e.g. `>>> import math`

`>>> num = - 67`

`>>> math. fabs (num)`

67.0

`>>> print (math. fabs (49))`

49.0

➤ RANDOM MODULE/METHODS

This module is used to generate random number.

Various random methods are as follows

- **random ()** It returns a random floating point number between 0 and 1. Returned number will be in float.

Syntax

`random. random ()`

e.g. `>>> import random`


```
>>> random.random()
0.434539783417921
```

- **randint ()** It takes two arguments start and end and generates random integer number between these arguments.

Syntax

```
random.randint (start, end)
```

e.g. >>> import random

```
>>> random.randint (20, 80)
```

```
74
```

```
>>> random.randint (-10, -50)
```

```
- 25
```

- **randrange ()** It returns and generate pseudo random number between the given range of values. It takes three parameters start, stop and step, where start and step are optional.

Syntax

```
random.randrange (start, stop, step)
```

e.g. >>> import random

```
>>> random.randrange (20, 200, 20)
```

```
60
```

```
>>> random.randrange (-60, -10, 10)
```

```
- 40
```

➤ **STATISTICS MODULE**

- The statistics module provides functions for calculating mathematical statistics of numeric data. The following popular statistical functions are defined in this module.

- **mean ()** This method is used to calculate the arithmetic mean of numbers which are given in list and tuples.

Syntax

```
statistics.mean (list/tuple)
```

e.g. >>> import statistics

```
>>> list1 = [23, 65, 89, 78, 45]
```

```
>>> statistics.mean (list1)
```

```
60
```

```
>>> tuple1 = (56, 98, 78, -23, 44)
```

```
>>> statistics.mean (tuple1)
```

```
50.6
```

- **median ()** This function is used to find the median of numbers which are given in list or tuple.

Syntax

```
statistics.median (list/tuple)
```

e.g. >>> import statistics

```
>>> list1 = [23, 65, 89, 78, 45]
```

```
>>> statistics.median (list1)
```

```
65
```

```
>>> tuple1 = (56, 98, 78, -23, 44, -78)
```

```
>>> statistics.median (tuple1)
```

```
56
```

- **mode ()** This method is used to find the mode of numbers which are given in list or tuple. (it returns the most often repeated value of the set)

Syntax

```
statistics.mode (list/tuple)
```



```
e.g. >>> import statistics
>>> list1 = [23, 65, 89, 78, 45, 45]
>>> statistics.mode (list1)
45
>>> tuple1 = (56, 98, 78, -23, 44, -78)
>>> statistics.mode (tuple1)
statistics Error : no unique mode; found 6 equally common values
```

Chapter-3

Society, Law and Ethics

Revision Notes

➤ DIGITAL FOOTPRINTS

- Whatever a person does on internet creates his image or we can say leaves a shadow behind that creates his/her identity, this identity is called digital footprint.
- Digital footprint is nothing but the record of what a person does online.
- Digital footprint includes email you sent, information you shared, websites you visit and the activities you took part online.
- Digital footprint is used for several reasons for example- marketers use your digital footprint to find out in what kind of product user is interested and an interviewer what kind of activities the candidates perform online. It gives better idea about the candidate's personality.

➤ There are two kinds of digital footprints:

1. **Active digital footprint:** When a user knowingly shares the personal data in order to share information about the user by the means of social networking sites or other websites then it is known as active digital footprint.

For example: When user makes a comment or posts something on social media.

2. **Passive digital footprint:** When the personal data of the user is collected without letting him know or collection of personal data of user without the permission of him is known as passive digital footprint.

For example: when user visits any website then website traces his physical location using user's device IP address.

➤ DIGITAL SOCIETY AND NETIZEN

As our society is inclined towards using more and more digital technologies, we end up managing most of our tasks digitally. In this era of digital society, our daily activities like communication, social networking, banking, shopping, entertainment, education, transportation, etc., are increasingly being driven by online transactions.

Digital society thus reflects the growing trend of using digital technologies in all spheres of human activities. But while online, all of us need to be aware of how to conduct ourselves, how best to relate with others and what ethics, morals and values to maintain. Anyone who uses digital technology along with internet is a digital citizen or a netizen.

A responsible netizen must abide by net etiquettes, communication etiquettes and social media etiquettes.

1. Netiquettes

- As in real world, while communicating, socialising or interacting with others we need to follow certain conventions and rules, in virtual world also, while using social media, sending e-mails or simple web surfing, we need to follow certain rules and conventions called Netiquettes.

Importance of Netiquettes

- Netiquettes makes communications more effective.
- Following netiquettes makes our digital footprints positive.
- Following netiquettes will lower the cyber crime curve.
- Following netiquettes make web a better way to get information and convey our thoughts
- Netiquettes ensure careful word formation and also placing them at right place. Netiquettes also ensure the correct use of emoticons.

2. Communication Etiquettes

- Digital communication includes email, texting, instant messaging, talking on the cell phone, audio or video conferencing, posting on forums, social networking sites, etc. All these are great ways to connect with people in order to exchange ideas, share data and knowledge.
- Good communication over email, chat room and other such forums require a digital citizen to abide by the communication etiquettes.

3. Social Media Etiquettes

- Social media are websites or applications that enable their users to participate in social networking by creating and sharing content with others in the community. In the current digital era, we are familiar with different kinds of social media and we may have an account on Facebook, Google, Twitter, Instagram, Pinterest, or YouTube channel.
- Social media are websites or applications that enable their users to participate in social networking by creating and sharing content with others in the community. These platforms encourage users to share their thoughts and experiences through posts or pictures. In this way users can interact with other online users of those social media apps or channels.
- This is why the impact and outreach of social media has grown exponentially. It has begun to shape the outcome of politics, business, culture, education and more. In social media too, there are certain etiquettes we need to follow.
- Do not post personal comments.
- Courteously post and tag photos.
- Don't be reactive. You do not have to react to every post you see on social media.
- Don't misrepresent yourself.

➤ DATA PROTECTION

In this digital era, data or information protection is mainly about the privacy of data stored digitally. Elements of data that can cause substantial harm, embarrassment, inconvenience and unfairness to an individual, if breached or compromised, is called sensitive data.

All over the world, each country has its own data protection policies (laws). These policies are legal documents that provide guidelines to the user on processing, storage and transmission of sensitive information. The motive behind implementation of these policies is to ensure that sensitive information is appropriately protected from modification or disclosure.

- 1. Intellectual Property Right (IPR):** Intellectual Property refers to the inventions, literary and artistic expressions, designs and symbols, names and logos. The ownership of such concepts lies with the creator, or the holder of the intellectual property. This enables the creator or copyright owner to earn recognition or financial benefit by using their creation or invention.

Intellectual Property is legally protected through copyrights, patents, trademarks, etc.

- (A) Copyright:** Copyright grants legal rights to creators for their original works like writing, photograph, audio recordings, video, sculptures, architectural works, computer software, and other creative works like literary and artistic work. Copyright law gives the copyright holder a set of rights that they alone can avail legally. The rights include right to copy (reproduce) a work, right to create derivative works based upon it, right to distribute copies of the work to the public, and right to publicly display or perform the work. It prevents others from copying, using or selling the work.
- (B) Patent:** A patent is usually granted for inventions. When a patent is granted, the owner gets an exclusive right to prevent others from using, selling, or distributing the protected invention. Patent gives full control to the patentee to decide whether or how the invention can be used by others. Thus it encourages inventors to share their scientific or technological findings with others. A patent protects an invention for 20 years, after which it can be freely used.
- (C) Trademark:** Trademark includes any visual symbol, word, name, design, slogan, label, etc., that distinguishes the brand or commercial enterprise, from other brands or commercial enterprises.

Violation of IPR

Violation of intellectual property right may happen in one of the following ways:

- (A) Plagiarism:** Presenting someone else's idea or work as one's own idea or work is called plagiarism. If we copy some contents from Internet, but do not mention the source or the original creator, then it is considered as an act of plagiarism. It is a serious ethical offense and sometimes considered as an act of fraud.
- (B) Copyright Infringement:** Copyright infringement is when we use other person's work without obtaining their permission to use or we have not paid for it, if it is being sold.
- (C) Trademark Infringement:** Trademark Infringement means unauthorized use of other's trademark on products and services. An owner of a trademark may commence legal proceedings against someone who infringes its registered trademark.

2. Licensing

A license is a type of contract or a permission agreement between the creators of an original work permitting someone to use their work, generally for some price; whereas copyright is the legal rights of the creator for the protection of original work of different types.

Licensing is the legal term used to describe the terms under which people are allowed to use the copyrighted material.

3. Open Source Software

Copyright sometimes puts restriction on the usage of the copyrighted works by anyone else. If others are allowed to use and built upon the existing work, it will encourage collaboration and would result in new innovations in the same direction. Licenses provide rules and guidelines for others to use the existing work.

When authors share their copyrighted works with others under public license, it allows others to use and even modify the content. Open source licenses help others to contribute to existing work or project without seeking special individual permission to do so.

Free and Open Source Software (FOSS) has a large community of users and developers who are contributing continuously towards adding new features or improving the existing features.

Two popular categories of public licenses are

- (i) **GNU General Public License (GPL):** GPL is primarily designed for providing public license to software. GNU GPL is another free software license, which provides end users the freedom to run, study, share and modify the software, besides getting regular updates. Users or companies who distribute GPL licensed works may charge a fee for copies or give them free of charge.
- (ii) **Creative Commons (CC):** CC is used for all kind of creative works like websites, music, film, literature, etc. CC enables the free distribution of an otherwise copyrighted work. It is used when an author wants to give people the right to share, use and build upon a work that they have created.

➤ CYBER CRIME

- Cybercrime is a criminal act facilitated by use of electronic gadgets and information systems through internet.
- Cybercrimes are carried out against either an individual, or a group, or an organization or even against a country, with the intent to directly or indirectly cause physical harm, financial loss or mental harassment.

1. Hacking

Hacking is the act of unauthorized access to a computer, computer network or any digital system. Hackers usually have technical expertise of the hardware and software. Hacking is of two types. Ethical hacking and Non-ethical hacking

- Hacking, when done with a positive intent, is called ethical hacking. Such ethical hackers are known as white hat hackers. They are specialists in exploring any vulnerability or loophole during testing of the software. Thus, they help in improving the security of software. Ethical hacking is actually preparing the owner against any cyber-attack.
- A non-ethical hacker is the one who tries to gain unauthorized access to computers or networks in order to steal sensitive data with the intent to damage or bring down systems. They are called black hat hackers or crackers. Their primary focus is on security cracking and data stealing.

2. Eavesdropping

Eavesdropping is as an electronic attack where digital communications are intercepted by an individual for whom they are not intended. An eavesdropping attack occurs when a hacker intercepts, deletes, or modifies data that is transmitted between two devices. Eavesdropping, also known as sniffing or snooping, relies on unsecured network communications to access data in transit between devices.

3. Phishing and Fraud Emails

Phishing is an unlawful activity where fake websites or emails that look original or authentic are presented to the user to fraudulently collect sensitive and personal details, particularly usernames, passwords, banking and credit card details.

The most common phishing method is through email spoofing where a fake or forged email address is used and the user presumes it to be from an authentic source.

4. Ransomware

This is another kind of cybercrime where the attacker gains access to the computer and blocks the user from accessing, usually by encrypting the data. Ransomware can get downloaded when the users visit any malicious or unsecure websites or download software from doubtful repositories. Some ransomware are sent as email attachments in spam mails. It can also reach our system when we click on a malicious advertisement on the Internet.

Preventing Cyber Crime

- Take regular backup of important data.

- Use antivirus software and keep it updated always.
- Avoid installing pirated software. Always download software from known and secure (HTTPS) sites.
- Always update the system software which include the Internet browser and other application software
- Do not visit or download anything from untrusted websites.
- Usually the browser alerts users about doubtful websites whose security certificate could not be verified; avoid visiting such sites.
- Use strong password for web login, and change it periodically. Do not use same password for all the web-sites. Use different combinations of alphanumeric characters including special characters. Ignore common words or names in password.
- While using someone else's computer, don't allow browser to save password or auto fill data, and try to browse in your private browser window.
- For an unknown site, do not agree to use cookies when asked for through a Yes/No option.
- Perform online transaction like shopping, ticketing, and other such services only through well-known and secure sites.
- Always secure wireless network at home with strong password and regularly change it.

➤ **CYBER SAFETY**

Cyber safety is all about the responsible and safe use of Internet services by dealing with the risk which is associated with using the Internet. This behavior helps us to protect our personal information and minimize the danger online.

• **Safely browsing the web**

If you believe that the fake websites are the only places where you can come in touch with spyware then you are wrong. Spyware which is program designed to steal your sensitive information without letting you know is spread all over the internet. Even at the places where you do not expect it. You will open the wrong page or click on wrong link and you will compromise your internet browser safety. As soon as you come in contact with spyware it starts stealing your personal information like your name, address, Password, credit card info etc. and starts changing our files and makes inappropriate changes in your files.

- **Identity Protection:** Identity Protection is a method which provides you protection from identity theft. Identity theft is an activity which makes unauthorized use of your personal information. Identity theft could take place either online or by stealing your documents in real world or by the combination of above.
- **Confidentiality:** Confidentiality can be termed as the security of data or information. When a sender sends data or information to receiver and only receiver can receive and read it, then we say that data confidentiality is maintained. Confidentiality ensures the data privacy. Confidentiality is designed to stop the sensitive data or information to reach the wrong person. Only the authorized persons or sources can send and receive data.
- **Cyber trolls and bullying:** When process of harassing and bullying someone takes place using electronic means then it is called cyber bullying and the one who harasses someone by trolling is considered as troll. Trolls make nasty comment or post bad content about someone and harass them. All this trolling causes serious effects. Sometimes victims can not handle it and takes wrong decisions. Cyber bullying and trolling affect the victim mentally a lot that they always feel depressed, angry, worried and frustrated.

➤ **SAFELY ACCESSING WEBSITES**

Malware is unwanted software that infects our computer and makes it behave in a way that's not acceptable to us.

Common threats to a computer are:

(i) **VIRUS**

- Virus is a malicious program that damages data and files, thereby causing the system to malfunction.
- A virus can attack any part of the software such as boot block, operating system, files, etc.
 - (a) Worms are programs that keep on replicating thereby unnecessarily eating up the disk space.
 - (b) Trojan Horses is a malicious program that is disguised as harmless. It may delete or damage files.
- (ii) **Spyware** is software that spies on the activities of a computer and reports it to the people who can pay for it. These get installed on a computer without the user's consent by 'Piggybacking' a file or from internet. These remain active unless someone switches them off or removes them properly.
- (iii) **Adware** is the software that delivers unwanted ads to your computer. Though this happens with the user's consent most of the times.
 - An adware just like spyware tracks your computing habits and data to reduce targeted ads that pop-up on your screen.
 - An adware infected PC displays a lot of frequent pop-up ads.

- As the adware is active in the background and there is a frequent display of ads the speed of system is inhibited.

➤ **E-WASTE MANAGEMENT**

E-waste or Electronic waste includes electric or electronic gadgets and devices that are no longer in use. Hence, discarded computers, laptops, mobile phones, televisions, tablets, music systems, speakers, printers, scanners etc. constitute e-waste when they are near or end of their useful life.

Globally, e-waste constitutes more than 5 per cent of the municipal solid waste. Therefore, it is very important that e-waste is disposed off in such a manner that it causes minimum damage to the environment and society.

Proper disposal of used electronic gadgets: E-waste management is the efficient disposal of e-waste. Although we cannot completely destroy e-waste, still certain steps and measures have to be taken to reduce harm to the humans and environment. Some of the feasible methods of e-waste management are reduce, reuse and recycle.

- **Reduce:** We should try to reduce the generation of e-waste by purchasing the electronic or electrical devices only according to our need. Also, they should be used to their maximum capacity and discarded only after their useful life has ended. Good maintenance of electronic devices also increases the life of the devices.
- **Reuse:** It is the process of re-using the electronic or electric waste after slight modification. The electronic equipment that is still functioning should be donated or sold to someone who is still willing to use it. The process of re-selling old electronic goods at lower prices after some repair and maintenance is called refurbishing.
- **Recycle:** Recycling is the process of conversion of electronic devices into something that can be used again and again in some or the other manner. Only those products should be recycled that cannot be repaired, refurbished or re-used. To promote recycling of e-waste many companies and NGOs are providing door-to-door pick up facilities for collecting the e-waste from homes and offices.

INDIAN INFORMATION TECHNOLOGY ACT (IT Act)

- The Government of India's The Information Technology Act, 2000 (also known as IT Act), amended in 2008, and provides guidelines to the user on the processing, storage and transmission of sensitive information. In many Indian states, there are cyber cells in police stations where one can report any cybercrime. The act provides legal framework for electronic governance by giving recognition to electronic records and digital signatures. The act outlines cyber crimes and penalties for them.
- The act is needed so that people can perform transactions over the Internet through credit cards without fear of misuse. Not only people, the act empowers government departments also to accept filing, creation and storage of official documents in the digital format.

TECHNOLOGY & SOCIETY

Technology has improved the general living standards of many people in the last few decades. Without technology, people would still be living within the geographical confines of their societies.

GENDER AND DISABILITY ISSUES WHILE TEACHING AND USING COMPUTERS

Gender issues

It has been observed that girls are comparatively less interested to study Computer Science subject than boys

The reasons behind this are:

- Preconceived notions
- Lack of interest
- Lack of motivation
- Lack of role models
- Lack of encouragement in class

Disability Issues

Various disability issues faced in the teaching/learning computers with regard to the disability are:

- Unavailability of teaching material / aids
- Lack of special needs teachers
- Lack of supporting curriculum