

Kendriya Vidyalaya Sangathan

Ernakulam Region



**Student Support Material
2021-22**

TERM -II

Computer Science

CLASS XI



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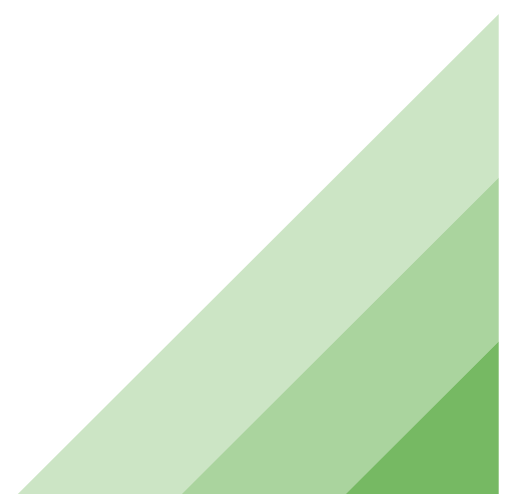
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TABLE OF CONTENTS

1	LIST	PAGE:1
2	TUPLES & DICTIONARY	PAGE:13
3	PYTHON MODULES	PAGE:37
4	SOCIETY LAWS & ETHICS	PAGE:48



Computer Science
CLASS - XI
Code No. 083
2021-22

1. Learning Outcomes

Student should be able to

- a) develop basic computational thinking
- b) explain and use data types
- c) appreciate the notion of algorithm
- d) develop a basic understanding of computer systems - architecture, operating system and cloud computing
- e) explain cyber ethics, cyber safety and cybercrime
- f) Understand the value of technology in societies along with consideration of gender and disability issues

2. Distribution of Marks

Unit No.	Unit Name	Marks	Periods	
			Theory	Practical
I	Computer Systems and Organisation	10	10	5
II	Computational Thinking and Programming - 1	45	50	35
III	Society, Law and Ethics	15	20	----
	Total	70	80	40

		Term-1	Term-2
		Marks	Marks
I	Computer Systems and Organisation	10	---
II	Computational Thinking and Programming - 1	25	20
III	Society, Law and Ethics	---	15
		35	35

3. Unit wise Syllabus

TERM 1:

Unit I: Computer Systems and Organisation

- Basic Computer Organisation: Introduction to computer system, hardware, software, input device, output device, CPU, memory (primary, cache and secondary), units of memory (Bit, Byte, KB, MB, GB, TB, PB)
- Types of software: system software (operating systems, system utilities, device drivers), programming tools and language translators (assembler, compiler & interpreter), application software
- Operating system (OS): functions of operating system, OS user interface
- Boolean logic: NOT, AND, OR, NAND, NOR, XOR, truth table, De Morgan's laws and logic circuits
- Number system: Binary, Octal, Decimal and Hexadecimal number system; conversion between number systems.
- Encoding schemes: ASCII, ISCII and UNICODE (UTF8, UTF32)

Unit II: Computational Thinking and Programming – 1

- Introduction to problem solving: Steps for problem solving (analysing the problem, developing an algorithm, coding, testing and debugging). representation of algorithms using flow chart and pseudo code, decomposition
- Familiarization with the basics of Python programming: Introduction to Python, features of Python, executing a simple "hello world" program, execution modes: interactive mode and script mode, Python character set, Python tokens (keyword, identifier, literal, operator, punctuator), variables, concept of l-value and r-value, use of comments
- Knowledge of data types: number (integer, floating point, complex), boolean, sequence (string, list, tuple), none, mapping (dictionary), mutable and immutable data types
- Operators: arithmetic operators, relational operators, logical operators, assignment operator, augmented assignment operators, identity operators (is, is not), membership operators (in, not in)
- Expressions, statement, type conversion & input/output: precedence of operators, expression, evaluation of expression, python statement, type conversion (explicit & implicit conversion), accepting data as input from the console and displaying output
- Errors: syntax errors, logical errors, runtime errors
- Flow of control: introduction, use of indentation, sequential flow, conditional and iterative flow control
- Conditional statements: if, if-else, if-elif-else, flowcharts, simple programs: e.g.: absolute value, sort 3 numbers and divisibility of a number
- Iterative statements: for loop, range function, while loop, flowcharts, break and continue statements, nested loops, suggested programs: generating pattern, summation of series, finding the factorial of a positive number etc
- Strings: introduction, indexing, string operations (concatenation, repetition, membership & slicing), traversing a string using loops, built-in functions: len(), capitalize(), title(), lower(), upper(), count(), find(), index(), endswith(), startswith(), isalnum(), isalpha(), isdigit(), islower(), isupper(), isspace(), lstrip(), rstrip(), strip(), replace(), join(), partition(), split()

TERM 2:

Unit II: Computational Thinking and Programming – 1

- Lists: introduction, indexing, list operations (concatenation, repetition, membership & slicing), traversing a list using loops, built-in functions: len(), list(), append(), extend(), insert(), count(), index(), remove(), pop(), reverse(), sort(), sorted(), min(), max(), sum(); nested lists, suggested programs: finding the maximum, minimum, mean of numeric values stored in a list; linear search on list of numbers and counting the frequency of elements in a list
- Tuples: introduction, indexing, tuple operations (concatenation, repetition, membership & slicing), built-in functions: len(), tuple(), count(), index(), sorted(), min(), max(), sum(); tuple assignment, nested tuple, suggested programs: finding the minimum, maximum, mean of values stored in a tuple; linear search on a tuple of numbers, counting the frequency of elements in a tuple
- Dictionary: introduction, accessing items in a dictionary using keys, mutability of dictionary (adding a new item, modifying an existing item), traversing a dictionary, built-in functions: len(), dict(), keys(), values(), items(), get(), update(), del(), clear(), fromkeys(), copy(), pop(), popitem(), setdefault(), max(), min(), count(), sorted(), copy(); suggested programs : count the number of times a character appears in a given string using a dictionary, create a dictionary with names of employees, their salary and access them
- Introduction to Python modules: Importing module using 'import <module>' and using from statement, Importing math module (pi, e, sqrt, ceil, floor, pow, fabs, sin, cos, tan); random module (random, randint, randrange), statistics module (mean, median, mode)

Unit III: Society, Law and Ethics

- Digital Footprints
- Digital society and Netizen: net etiquettes, communication etiquettes, social media etiquettes
- Data protection: Intellectual Property Right (copyright, patent, trademark), violation of IPR (plagiarism, copyright infringement, trademark infringement), open source softwares and licensing (Creative Commons, GPL and Apache)
- Cyber-crime: definition, hacking, eavesdropping, phishing and fraud emails, ransomware, preventing cyber crime
- Cyber safety: safely browsing the web, identity protection, confidentiality, cyber trolls and bullying.
- Safely accessing web sites: malware, viruses, Trojans, adware
- E-waste management: proper disposal of used electronic gadgets
- Indian Information Technology Act (IT Act)
- Technology & Society: Gender and disability issues while teaching and using computers

4. Practical

S.No.		Marks (Total=30)	Term-1 (15 Marks)	Term-2 (15 Marks)
1.	Python program	12	6	6
2.	Report file: Minimum 20 Python programs Term- 1 : Minimum 10 programs based on Term – 1 syllabus Term- 2 : Minimum 10 programs based on Term – 2 syllabus	7	4	3
	Viva voce	3	2	1
3.	Project + Viva voce Term – 1 : Synopsis of the project to be submitted by the students (documentation only) Term - 2 : Final coding + Viva voce (Student will be allowed to modify their Term 1 document and submit the final executable code.)	8	3	5

5. Suggested Practical List

Term - 1

Input a welcome message and display it.

- Input two numbers and display the larger / smaller number.
- Input three numbers and display the largest / smallest number.
- Generate the following patterns using nested loop.

Pattern-1	Pattern-2	Pattern-3
*	1 2 3 4 5	A
**	1 2 3 4	AB
***	1 2 3	ABC
****	1 2	ABCD
*****	1	ABCDE

- Write a program to input the value of x and n and print the sum of the following series:
 - $1 + x + x^2 + x^3 + x^4 + \dots + x^n$
 - $1 - x + x^2 - x^3 + x^4 + \dots + x^n$
 - $x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \dots + \frac{x^n}{n}$
 - $x + \frac{x^2}{2!} - \frac{x^3}{3!} + \frac{x^4}{4!} + \dots + \frac{x^n}{n!}$
- Determine whether a number is a perfect number, an armstrong number or a palindrome.
- Input a number and check if the number is a prime or composite number.

- Display the terms of a Fibonacci series.
- Compute the greatest common divisor and least common multiple of two integers.
- Count and display the number of vowels, consonants, uppercase, lowercase characters in string.
- Input a string and determine whether it is a palindrome or not; convert the case of characters in a string.

Term - 2

- Find the largest/smallest number in a list/tuple
- Input a list of numbers and swap elements at the even location with the elements at the odd location.
- Input a list/tuple of elements, search for a given element in the list/tuple.
- Input a list of numbers and find the smallest and largest number from the list.
- Create a dictionary with the roll number, name and marks of n students in a class and display the names of students who have scored marks above 75.

6. Suggested Reading Material

- NCERT Textbook for COMPUTER SCIENCE (Class XI)
- Support Materials on the CBSE website.

LIST

List - A List is a standard mutable data type of python than can store a sequence of values belonging to any data type. Lists are enclosed in square brackets and the elements of the list are separated by commas.

Eg. [] - empty list

[1,2,3] - list of integers

['abc', 'def', 'ghi'] - list of strings

Creating Lists-

1. **Creating empty list**- Empty lists can be created by writing empty square brackets or by using list() method with no parameters.

Eg. L = []

L=list()

2. **Creating long list**- If a list contains many elements, then the elements can be split in the next line

Eg. L = ['abcdefghijklmnopqrstuvwxyz', 'abcdefghijklmnopqrstuvwxyz' ,
'abcdefghijklmnopqrstuvwxyz', 'abcdefghijklmnopqrstuvwxyz']

3. **Creating nested list**- A list containing within itself another list is known as a nested list.

Eg. L = [1 , 2, [3,4,5], 6 , 7, [8,9,10]]

4. **Creating list from existing sequence objects**- A list can be created from a sequence object (such as other list, tuples, strings etc) by passing it as a parameter to the list() function.

Eg. L1=list('hello') # creates the list with elements ['h', 'e', 'l', 'l', 'o']

5. **Creating list from user input**- The user input is always accepted as a string. This string can be converted to a list object by passing it to either the function list() or to the function eval(). This list() function will try to convert the string to a list, whereas the eval() function evaluates the string and finds which data type best matches the string. If the string contains square brackets with values separated by commas then it creates a list.

Eg. L1=list(input('Enter a list of marks')) # list() used

L2=eval(input('Enter the list of holidays for the month:')) #eval used

List Functions/Operations

1. Displaying a List

Using print and passing a list object displays a list of elements in square brackets separated by commas.

```
L = [2,7,9,13,19]
```

```
print(L)
```

o/p:

```
[2,7,9,13,19]
```

2. Accessing element of a List

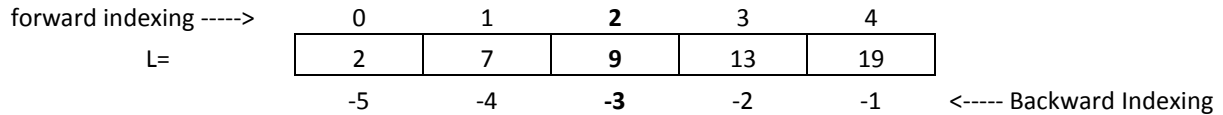
An element of a list can be accessed by using the list name and an integer value known as an index enclosed in square bracket, **L[index]**.

There are two indexing methods - forward indexing and backward indexing.

- In **forward indexing** the first element of the list has index number 0, the second element has index number 1 and so on.
- In **backward indexing** the last element of the list has index -1, the second last element has index -2 and so on.

- An element of a list can be accessed by using any one of the forward or backward indexing methods.

Consider the list L = [2, 7, 9, 13, 19]



The **element 9** of the list can be represented by either **L[2]** or by **L[-3]** , both will refer to the same element.

Eg.

```
L = [2,7,9,13,19]
print(L[2] )
print (L[-4])

o/p:
9
7
```

3. Modifying a List element/Mutability of a List

The elements of a list can be modified by using L[index]=new_value. Since a list can be modified in place, i.e. the existing list object is not destroyed and recreated, the list data type is said to be mutable.

```
L = [2,7,9,13,19]
L[2]=99
L[-1] = 77
print (L)

o/p:
[2, 7, 99, 13, 77]
```

4. Creating True Copy of a List

Usually the statement varname=newvalue creates a new variable (if varname is new) and stores newvalue into that variable.

This concept is modified when existing lists are assigned to a new list variable. Using assignment statement to assign an existing list to a new variable does not create a new list, but both the old and the new variable will point to the same list in memory. Any changes made to one variable will reflect in the other variable also.

```
L1=[1,2,3,4]
L2 = L1 #both L1 and L2 refer to the same list in memory
L2[1]=99
print('L1=', L1)
print('L2=', L2) #both L1 and L2 values are same

L3=[11,12,13,14]
L4=list(L3) #use list() method to create a new list from an existing list
L3[1]=99
print('L3=', L3)
print('L4=', L4) #L3 and L4 values are different since they are different objects
```

```
o/p:  
L1= [1, 99, 3, 4]  
L2= [1, 99, 3, 4]  
L3= [11, 99, 13, 14]  
L4= [11, 12, 13, 14]
```

If we want that the new variable create a new copy of an existing list, then the list() method must be used.

5. Finding number of elements in a List

The **len()** functions returns the number/count of elements present in a list.

```
L = [2,7,9,13,19]  
x=len(L)  
print(x )
```

```
o/p:  
5
```

6. Joining/Concatenating two Lists

The + operator can be used to join/concatenate two lists.

```
L1 = [1,2,3]  
L2=[7,8,9]  
L3=L2+L1  
print(L3 )
```

```
o/p:  
[7, 8, 9, 1, 2, 3]
```

7. Replicating Lists

The * operator can be used to replicate lists. The * operator when used with a list, one of the operands must be an int value that signifies the number of times the list is to be replicated.

```
L1 = [1,2,3]  
L2=L1*3  
print(L2 )
```

```
o/p:  
[1, 2, 3, 1, 2, 3, 1, 2, 3]
```

8. Adding single element at the end of a List

The **append()** method can be used to add a single element at the end of a List.

```
L1 = [1,2,3]  
L1.append(9)  
print(L1)
```

```
o/p:  
[1, 2, 3, 9]
```

9. Adding multiple elements at the end of a List

The **extend()** method can be used to add multiple elements that are present in another list to an existing list at the end

```
L1 = [1,2,3]
L2=[9,10]
L1.extend(L2)    #L2 is a list. elements of L2 i.e. 9,10 are added at the end of L1
print(L1)

o/p:
[1, 2, 3, 9]
```

10. Adding single element at particular index

The listname.**insert**(pos,item) method can be used to add 'item' element at index pos in the list - listname. All the existing elements from pos onwards till the end are shifted right.

```
L1 = [4,9,12,17,19]
L1.insert(2, 99) #insert 99 at index 2
print(L1)

o/p:
[4, 9, 99, 12, 17, 19]
```

11. Deleting single element using del via index position

The **del** command can be used to delete an element at a particular index location in the list. The syntax is : **del listname[index]**

```
L1 = [2,4,6,8,10]
del L1[3]
print(L1)

o/p:
[2, 4, 6, 10]
```

12. Deleting single element using pop via index position

The pop() method can also be used to delete from either the end of the list(when no parameter is passed) or from a particular index(when a single index value is passed). The difference between del and pop is that pop() also returns the element that was deleted whereas del command does not return the deleted element.

```
L1 = [2,4,6,8,10]
print('Now popping ', L1.pop())
print('List is', L1)
x=L1.pop(2)
print('Then popped', x)
print('List is now', L1)

o/p:
Now popping 10
List is [2, 4, 6, 8]
Then popped 6
List is now [2, 4, 8]
```

13. Deleting single element using remove via value

The **listname.remove(value)** method can be used to remove an element containing a particular 'value'. This is different from del and pop command which deletes an element from a particular index location. When using remove() method if there are multiple elements in a list having the same 'value' then only the first occurrence of 'value' is removed.

```
L1 = [1,2,3,4,1,2,3,4,1,2,3,4]
```

```
L1.remove(2)
```

```
print(L1)
```

o/p:

```
[1, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4]
```

14. Clearing the list

The **clear()** method clears all the elements of the list and makes it an empty list.

```
L1 = [1,2,3,4,1,2,3,4,1,2,3,4]
```

```
L1.clear()
```

```
print(L1)
```

o/p:

```
[]
```

15. Deleting an object from memory using del

The **del objectname** command can be used to delete any object from python's memory. After this command the variable does not exist in memory.

```
L1 = [1,2,3,4]
```

```
del L1
```

```
#print(L1) #This command will give an error since L1 object does not exist in memory
```

16. Counting the occurrence of elements in a list

The **count()** method can be used to count the number of times an item appears in the list. If the item is not present in the list, then count() returns zero.

```
L1 = [1,2,3,4,1,2,3,4,1,2,3,4]
```

```
print(L1.count(2))
```

```
print(L1.count(75))
```

o/p:

```
3
```

```
0
```

17. Reversing a list

The **reverse()** method reverses a list in place i.e. a new list is not created and the reversed items are placed in the same list.

```
L1 = [1,2,3,4]
```

```
L1.reverse()
```

```
print(L1)
```

o/p:

```
[4, 3, 2, 1]
```

18. Sorting a list using *listobject.sort()*

The `sort()` method sorts a list in ascending order. The list is modified in place i.e. a new list is not created and the sorted items are placed in the same list. To sort in descending order the parameter (`reverse = True`) must be passed. The '`key=' parameter can be used to pass a function that will be applied to each element of the list before being sorted. This can be used on a list of strings to pass the function 'str.lower' (as 'key=str.lower'), in which case the sorting is performed on a case-insensitive manner.`

```
L1 = [9,3,2,4]
L1.sort()
print(L1)

L2=[2, 7, 21, 4]
L2.sort(reverse=True)
print(L2)

L3=['Pqr', 'abc', '2np']
L3.sort(key=str.lower)
print(L3)

o/p:
[2, 3, 4, 9]
[21, 7, 4, 2]
['2np', 'abc', 'Pqr']
```

19. Sorting a list using *sorted()*

*Syntax: sorted(iterable, *, key=None, reverse=False)*

The `sorted()` method works on any iterable sequence (such as a list, tuple, dictionary) and returns back a list of elements in sorted order. The original iterable object is passed as a parameter to the `sorted()` method and remains unchanged. The `sorted` method also accepts the parameter `reverse=True`, in which case the returned elements are sorted in descending order. The '`key=' parameter can be passed a value of 'str.lower' when sorting an iterable consisting of strings in which case the sort is performed in a case-insensitive manner.`

```
L1 = [9,3,2,4]
L2 = sorted(L1)
print('L1=', L1)
print('L2=', L2)

L3=[2, 7, 21, 4]
L4=sorted(L3,reverse=True)
print('L3=',L3)
print('L4=',L4)

L5=['Pqr', 'abc', '2np']
L6=sorted(L5)
L7=sorted(L5,key=str.lower)
print('L5=',L5)
print('L6=',L6)
print('L7=',L7)

o/p:
L1= [9, 3, 2, 4]
L2= [2, 3, 4, 9]
L3= [2, 7, 21, 4]
L4= [21, 7, 4, 2]
```

```
L5= ['Pqr', 'abc', '2np']
L6= ['2np', 'Pqr', 'abc']
L7= ['2np', 'abc', 'Pqr']
```

20. Finding the minimum and maximum element in a List

The min() method returns the minimum element in a list and the max() method returns the maximum element in a list.

```
L1 = [16,55,3,4]
print(min(L1))
print(max(L1))
```

```
o/p:
1
4
```

21. Finding the sum of elements in a List

The sum() method returns the sum of elements of a list. All the elements of the list must be numbers.

```
L1 = [16,55,3,4]
print(sum(L1))
```

```
o/p:
78
```

22. Getting the index of an element of a List

The index() method returns the index of an existing element of a list. If multiple elements with same value is present in the list then the index of the first occurrence is returned. If the list does not contain the element then python gives an error.

```
L1 = [9,3,1,2,4, 7, 9, 2]
print(L1.index(2))
```

```
#print(L1.index(99)) # will give error as 99 is not present in list
```

```
o/p:
3
```

23. Traversing a list using the index

The for loop can be used to go through all the valid indexes of the list and process the list. For this the len() function must be used to get count of number of elements of the list.

```
L1 = [9,3,2,4]
x=len(L1)
for i in range(x):
    print(L1[i])
```

```
o/p:
9
3
2
4
```

In this method L1[i] refers to the actual element of the list. Any updates done to L[i] will update the list in place. Use this method to update the list using for loop.

24. Traversing a list using the iterator

The for loop can be used to iterate over the elements of the list and process the list.

```
L1 = [9,3,2,4]
for i in L1:
    print(i)

o/p:
9
3
2
4
```

Here the loop variable *i* is only holding a copy of the list element. Any updates done to *i* does not affect the list in any way. So do not use this method if the list is to be updated using loops.

25. List Comparisons

The relational operators `>`, `>=`, `<`, `<=`, `==`, `!=` can be applied to two lists to arrive at a True or False value.

The following rules are observed:

- For equality (==) operator** - If equality evaluate to True only when all the elements of one list match all the elements of the other list and both the list have the same number of elements.
- For all other operators** - The elements are compared sequentially using the operator under consideration. If a clear answer (either True or False) is arrived then that becomes the result of the comparison between the two lists. A clear answer is not arrived when elements of both the list happen to have same value. Then in that case the next set of elements are checked and the process is repeated.
- If two lists are of different lengths and if one of the list has an element at an index position and the other list does not have an element at that position then the evaluation proceeds as follows:
 - something/somevalue `>` empty/nothing evaluates to True
 - something/somevalue `<` empty/nothing evaluates to False

```
print( [1,2,3] == [1,2,3])
print( [1,2,3] != [1,2,3])
print( [1,2,8,9] < [9,1])
print( [1,2,8,9] >= [1,9])
print( [1,2] < [1,2,3])
print( [2] > [1,2,3])

o/p:
True
False
True
False
True
True
```


26. List Slicing

List slice is creating a new list using elements of an existing list. It is created as:

`ListName[start : stop : step]` where start, stop, step are integers

The slice `[start : stop : step]` is used on many objects with index.

The basic rules of slice are:

- i. The slice generates index/integers from - start, start + step, start + step + step, and so on. All the numbers generated must be less than the stop value when step is positive.
- ii. If step value is missing then by default is taken to be 1
- iii. If start value is missing and step is positive then start value is by default taken as 0.
- iv. If stop value is missing and step is positive then start value is by default taken to mean till you reach the ending index(including the ending index)
- v. A negative step value means the numbers are generated in backwards order i.e. from - start, then start - step, then start -step -step and so on. All the numbers generated in negative step must be greater than the stop value.
- vi. If start value is missing and step is negative then start value takes default value -1
- vii. If stop value is missing and step is negative then stop value is by default taken to be till you reach the first element(including the 0 index element)

Consider the list L:

forward indexing ----->	0	1	2	3	4	5	6	7	8	9	
L=	2	7	9	10	13	15	17	19	23	25	
	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	<----- Backward Indexing

Slice	Generates
L[4:]	[13, 15, 17, 19, 23, 25]
L[:3]	[2,7,9]
L[2:5]	[9,10,13]
L[4: :2]	[13, 17, 23]
L[2 : 7 : 2]	[9, 13, 17]
L[: : -1]	[25, 23, 19, 17, 15, 13, 10, 9, 7, 2]
L[: : -2]	[25, 19, 15, 10, 7]
L[6 : 1: -2]	[17, 13, 9]
L[-8 : 8]	[9, 10, 13, 15, 17, 19]
L[3 : -2 : 2]	[10, 15, 19]
L[6 : -9 : -2]	[17, 13, 9]

27. Updating / Deleting multiple elements using List Slice

The list slice can be used to update multiple elements of a list. On the left side of the assignment operator (=) the list slice is written and on the right side of the =, a list containing the same number of elements as the number of elements in the list slice is written.

For deleting multiple elements in a List, the syntax is: `del list_slice`

```

L=[2,7,9,10,13,15,17,19,23,25]
L[1:5:2]=[77,99]          #updating index 1 element with 77, index 3 element with 99
print(L)

del L[5: :2]              #delete elements at index 5,7,9
print(L)
```

```
o/p:  
[2, 77, 9, 99, 13, 15, 17, 19, 23, 25]  
[2, 77, 9, 99, 13, 17, 23]
```

28. List Membership testing

The **in** and **not in** operators can be used to test whether a value is present / is not present in a list.

```
L=[1,2,3,4,5]  
x=int(input('Enter an element to search:'))  
if x in L:  
    print(x, 'is present in', L)  
if x not in L:  
    print(x, 'is not present in', L)
```

```
o/p1:  
Enter an element to search:2  
2 is present in [1, 2, 3, 4, 5]  
o/p2:  
Enter an element to search:20  
20 is not present in [1, 2, 3, 4, 5]
```

29. Accessing Nested Lists

A list containing another list within it is known as nested list. For accessing nested list member we can use two square brackets- the first showing the index in the outer list and the next showing the index for the inner list.

```
L=[1,2,[3,4,5], [6,7,8] ]  
print('L[0]=', L[0])  
print('L[2]=', L[2])  
print('L[2][1]=', L[2][1])  
print('L[3][2]=', L[3][2])
```

```
o/p:  
L[0]= 1  
L[2]= [3, 4, 5]  
L[2][1]= 4  
L[3][2]= 8
```

EXTRA TOPICS

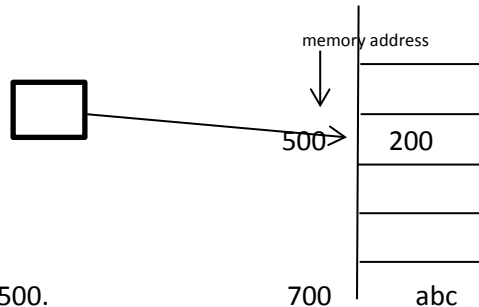
Identity (id)- Everything in python is structured as an object. All the objects are stored in memory. Each location in computers memory (RAM) has a unique addressing number, the memory address, associated with it. The identity (id) of an object is the memory address/location of the first byte where that particular object is stored. The `id()` function can be used to access the memory address of any object/variable.

In python the variable name is stored separately and the memory content is stored separately. For example the variable declaration

```
x=200
```

The name 'x' is stored separately.

The content/value 200 is stored starting at memory address 500.



The function `id(x)` will return a value of 500.

When another statement,

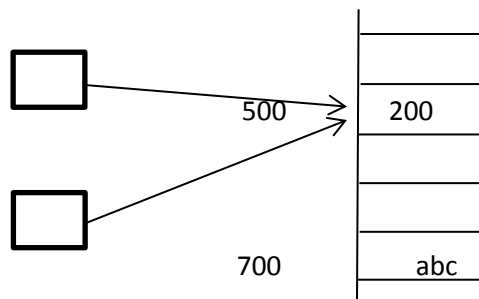
`x='abc'` is written, the content/value 'abc' is stored starting at memory address 700 and if now `id(x)` is executed it will return a value of 700.

In python usually the content/value for almost all types of objects is created only once during an entire program. This means that if there are two variables `x` and `y` as shown below:

```
x = 200
```

```
y=200
```

Then the content/value/literal 200 of type `int` is created only once. The variable names `x` and `y` are different, but they will refer to the same memory address i.e. 500 as shown below-



The variables `x` and `y` will return the same value when `id` function is applied to both of them.

is operator - The `is` operator checks the `id` of two variables and returns `True` if both are same otherwise it returns `False`.

is not operator- The `is not` operator check if the `ids` of two variables are dis-similar. It returns `True` if the `ids` of both the variables are different otherwise it returns `False`.

Eg.

```
x = 5
```

```
y = 5
```

```
z = 6
```

```
print(x is y)
```

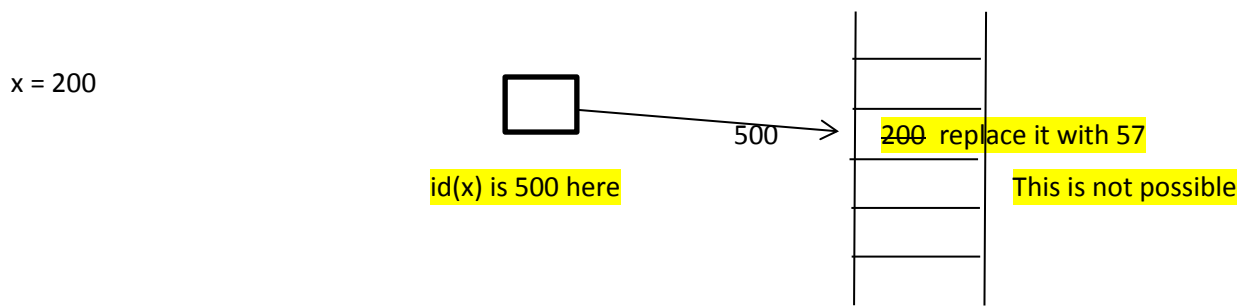
```
print(y is z)
print(x is not z)
```

o/p:
True
False
True

Immutable data type- The data types in which the values of the variables cannot be changed in place are known as Immutable data type. Eg. int, float, Boolean, complex, strings, tuples, sets.

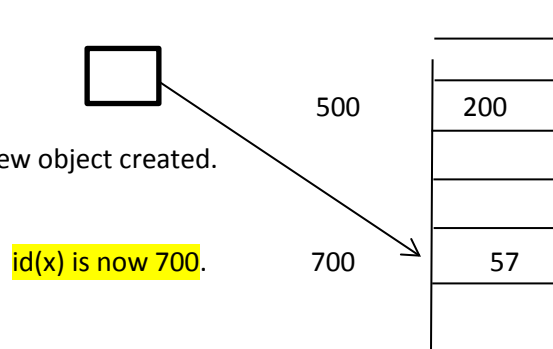
Mutable data type- The data types in which the values of the variables can be changed in place are known as mutable data types. Eg. list, dictionary.

In **immutable datatype** we cannot go to the memory location of a variable and overwrite the content of that memory location.



Although we can write
x=57, what actually happens is-

A new object with value 57 is
created and the id of variable x
is changed to 700 to reflect the new object created.

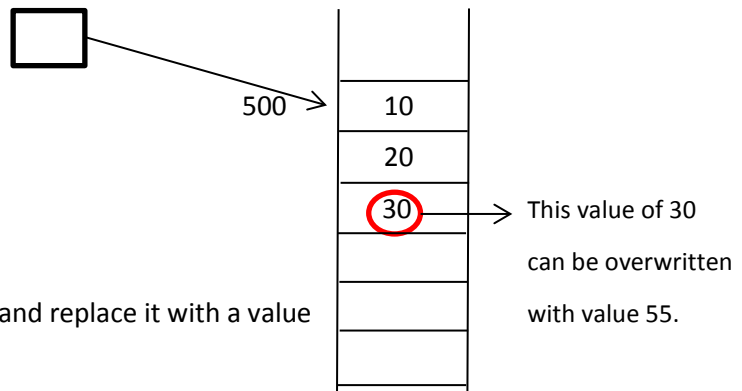


In **mutable data types** we can go to the memory address of an object and replace the existing value with a new value.

Eg.

L=[10,20,30]

#L is a list object with values 10,20,30



Using the statement -

L[2]=55

we can overwrite the value of 30 in place and replace it with a value of 55.

TUPLES AND DICTIONARIES

CONCEPT OF DATA STRUCTURE

Data Structures are the structures that hold and organize data or information

SEQUENCE/COLLECTION DATA STRUCTURES IN PYTHON

- String
- List
- Tuple
- Range
- Dictionary

FEATURES OF TUPLE

- It is a standard data type of Python.
- It is a sequence data type and each element has an index value
- It is a heterogeneous data type
- It is an immutable data type
- It is indicated with the help of parenthesis
- You can't add elements to a tuple because of their immutable property.
- There are no append() and extend() methods
- You can't remove elements from a tuple because of their immutable property.
- Tuples don't have remove() and pop() methods
- To change a tuple, you can unpack it, change it and then pack it again
- You can also use list() or tuple() method to change the values of a tuple

Creating a Tuple

<tuple name > = (<tuple of values separated by comma >)

Subject = ("Eng", "Phy", "Chem", "Mat", "CS")

Address = (4, "S M Street", "Calicut", 673002)

Difference of List and Tuple

List uses [] whereas tuple uses ()

List is mutable whereas tuple is immutable

Built – in functions of tuple :

Function Name	Purpose
len()	Gives number of elements of tuple
id()	Gives address of tuple
type()	Gives data type of tuple
index()	Gives the index at which element is present
count()	Number of occurrences of an element
min()	Gives Lowest value of tuple
max()	Gives Highest value of tuple
sum()	Gives Total of all elements.
any()	Gives True if tuple has elements
sorted()	Arrange elements in ascending order

Operations on tuple :

Concatenation	+	Attaches two tuples T1=(1,2) T2=(3,4) T1+T2 = (1,2,3,4)
Replication	*	Replicates the tuples a particular number of times T1=(1,2) T2=T1*2 T2=(1,2,1,2)
Membership	In not in	Checks whether an element is present or not. T1=(1,2,3) 3 in T1 will give True

DICTIONARIES IN PYTHON

Dictionaries are used to store data values in key: value pairs.

A dictionary is a collection which is ordered, changeable and do not allow duplicates.

Each dictionary is a set of *key: value* pairs.

You can create it by using the following **syntax**.

```
dict = {'key1':'value1', 'key2':'value2', 'key3':'value3',  
key4': 'value4', ..... 'keyn':'valuen'}
```

- To create a dictionary, the items entered are separated by commas and enclosed in curly braces.
- Each item is a key value pair, separated through colon (:)
- The keys in the dictionary must be unique and should be of any immutable data type i.e. number, string or tuple.

Dictionary keys

- Dictionary keys must be unique
- A key in a dictionary is like an index in a list
- Python must know exactly which value you want
- Keys can be of *any data type* as long as it is *immutable*

Dictionary Values

- Dictionary keys have many rules, but the values do not have many restrictions
- They do not have to be unique
- They can be mutable or immutable

For creating empty dictionaries, following methods can be used

1. dict1={ }
2. dict2 = dict()

```
print(dict1)    → { }
```

```
print(dict2)    → { }
```

dict3 is a dictionary that maps names of the students to marks in percentage

```
dict3 = { ' Neeraj ' : 76, ' Suman' : 56, 'Rony ' : 34, 'Ajmal' : 85}
```

```
print (dict3) → {'Neeraj': 76, 'Suman' : 56, 'Rony': 34, 'Ajmal': 85}
```

ACCESSING DICTIONARY

- The items of a dictionary are accessed via the keys rather than via their relative positions or indices.
- Each key serves as the index and maps to a value.

```
print(dict3['Suman'])
```

56

```
print(dict3['Ajmal'])
```

85

If the key is not present in the dictionary, we get KeyError.

TRAVERSING A DICTIONARY

We can access each item of the dictionary or traverse a dictionary using a for loop.

```
dict3 = { ' Neeraj ' : 76, ' Suman' : 56, 'Rony ' : 34, 'Ajmal' : 85}
```

```
# Method 1
```

```
for key in dict3:
```

```
    print(key, ':', dict3[key])
```

OUTPUT

Neeraj : 76

Suman : 56

Rony : 34

OUTPUT

Ajmal : 85	Neeraj : 76
# Method 2	Suman : 56
for key,value in dict3.items():	Rony : 34
	Ajmal : 85

```

print(key,':',value)

```

TO ADD AN ITEM TO THE DICTIONARY

To add an item to the dictionary (empty string), we can use square brackets for accessing and initializing dictionary values.

```

dict3 = { ' Neeraj ' : 76, ' Suman' : 56, 'Rony ' : 34, 'Ajmal' : 85}
dict3['Nisha']=87
print(dict3) → { ' Neeraj ' : 76, ' Suman' : 56, 'Rony ' : 34, 'Ajmal' : 85, 'Nisha': 87 }

```

TO MODIFY AN ITEM IN DICTIONARY

The existing dictionary can be modified by just overwriting the key-value pair.

```

dict3 = { ' Neeraj ' : 76, ' Suman' : 56, 'Rony ' : 34, 'Ajmal' : 85}
dict3['Suman']=99
print(dict3) → { ' Neeraj ' : 76, ' Suman' : 99, 'Rony ' : 34, 'Ajmal' : 85 }

```

REMOVING AN ITEM FROM DICTIONARY

You can remove an item from the existing dictionary by using **del** command or using **pop ()** method.

Using del command

```

dict3 = { ' Neeraj ' : 76, ' Suman' : 56, 'Rony ' : 34, 'Ajmal' : 85}
del dict3['Suman']
print(dict3) → { ' Neeraj ' : 76, 'Rony ' : 34, 'Ajmal' : 85 }

```

To delete the dictionary from the memory we can use:

del dictionary_name

```
del dict3
```

Using pop() method

pop () method will not only delete the item from the dictionary, but also return the deleted value.

Syntax:

```
dictionary.pop(key)
```

```
dict3 = { ' Neeraj ' : 76, ' Suman' : 56, 'Rony ' : 34, 'Ajmal' : 85 }
```

```
dict3.pop('Suman')
```

56 → It also returns the deleted value

```
print(dict3) → { ' Neeraj ' : 76, 'Rony ' : 34, 'Ajmal' : 85 }
```

MEMBERSHIP OPERATORS (in and not in)

The membership operator in checks if the **key** is present in the dictionary and returns True, else it returns False.

```
dict3 = { ' Neeraj ' : 76, ' Suman' : 56, 'Rony ' : 34, 'Ajmal' : 85 }
```

```
'Rony' in dict3 → True
```

```
34 in dict3 → False
```

```
'Ajmal' not in dict3 → False
```

```
85 not in dict3 → True
```

DICTIONARY METHODS AND FUNCTIONS

1. len() -- It Returns the length or number of key: value pairs of the dictionary passed as the argument.
2. keys() -- It Returns a list of keys in the dictionary.
3. values() -- It Returns a list of values in the dictionary.
4. items() -- It Returns a list of tuples (key — value) pair
5. get() -- It Returns the value corresponding to the key passed as the argument. If the key is not present in the dictionary it will return None.

6. del() -- It Deletes the item with the given key.
7. pop () -- method will not only delete the item from the dictionary, but also return the deleted value.
8. clear() -- It Deletes or clear all the items of the dictionary.

PROGRAMS USING DICTIONARY

1. Program to authenticate users

```
USERS={'admin': '123@wq','staff': '789sdf','student': '709klp'}
```

```
userid=input("Enter the user id:")
```

```
passwd=input("Enter the password:")
```

```
if userid in USERS:
```

```
    if USERS[userid]==passwd:
```

```
        print("Login successful, access granted")
```

```
    else:
```

```
        print("Incorrect password, access denied")
```

```
else:
```

```
    print ("Wrong credentials")
```

OUTPUT

Enter the user id: student

Enter the password: 709klp

Login successful, access granted

2. Write a program to count the number of times a character appears in a given string.

```
str=input("Enter a string:")
```

```
dict={}
```

```
for ch in str:
```

```
    if ch in dict:
```

```
        dict[ch]+=1
```

```

else:
    dict[ch]=1
for key in dict:
    print (key," :",dict[key])

```

OUTPUT

```

Enter a string: THIS IS A TREE
T : 2
H : 1
I : 2
S : 2
  : 3
A : 1
R : 1
E : 2

```

Suggested Programs on Dictionary

Program : Write a program to enter names of employees and their salaries as input and store them in a dictionary.

#Program to create a dictionary which stores names of the employee and their salary

```
n = int(input("Enter the number of employees whose data to be stored: "))
```

```
count = 1
```

```
employee = dict() #create an empty dictionary
```

```
while count <= n:
```

```
    name = input("Enter the name of the Employee: ")
```

```
    salary = int(input("Enter the salary: "))
```

```
    employee[name] = salary
```

```
    count += 1
```

```
print("\n\nEMPLOYEE_NAME\tSALARY")
```

```
for k in employee:
```

```
print(k, '\t\t', employee[k])
```

OUTPUT :

Enter the number of employees whose data to be stored: 5

Enter the name of the Employee: Kiran

Enter the salary: 25000

Enter the name of the Employee: Asha

Enter the salary: 20000

Enter the name of the Employee: Annie

Enter the salary: 35000

Enter the name of the Employee: Vijay

Enter the salary: 50000

Enter the name of the Employee: Aakash

Enter the salary: 15000

EMPLOYEE_NAME	SALARY
Kiran	25000
Asha	20000
Annie	35000
Vijay	50000
Aakash	15000

Program : Write a program to count the number of times a character appears in a given string.

```
#Count the number of times a character appears in a given string
str = input("Enter a string: ")
dict = { } #creates an empty dictionary
for ch in str:
    if ch in dict: #if the character is already in the dictionary
        dict[ch] += 1
    else:
        dict[ch] = 1 #if ch appears for the first time
for key in dict:
    print(key,':',dict[key])
```

OUTPUT :

Enter a string : programming

p : 1

r : 2

o : 1

g : 2

a : 1

m : 2

i : 1

n : 1

MCQ

1. Which of the following is a Python tuple?
 - a) [1, 2, 3]
 - b) (1, 2, 3)
 - c) {1, 2, 3}
 - d) {}

2. Suppose `t = (1, 2, 4, 3)`, which of the following is incorrect?
 - a) `print(t[3])`
 - b) `t[3] = 45`
 - c) `print(max(t))`
 - d) `print(len(t))`

3. What is the output of the following code:

```
t=(1,2,4,3)
print( t[1:3] )
```

- a) (1, 2)
- b) (1, 2, 4)
- c) (2, 4)
- d) (2, 4, 3)

- . 4. What will be the output of the following Python code?

```
t=(1,2,4,3)
print( t[1:-1])
```

- a) (1, 2)
- b) (1, 2, 4)
- c) (2, 4)
- d) (2, 4, 3)

5. What will be the output of the following Python code?

```
d={"John":40,"Peter":45}
print(d["John"])
```

- a.40
- b. 45
- c. "john"
- d. "peter"

6. What will be the output of the following Python code?

```
t= (1,2)
print(2*t)
```

- a) (1, 2, 1, 2)
- b) [1, 2, 1, 2]
- c) (1, 1, 2, 2)
- d) [1, 1, 2, 2]

7. What will be the output of the following Python code?

```
T1=(1,2,3,4)
T2=(1,2,4,3)
print( T1 < T2 )
```

- a) True
- b) False
- c) Error
- d) None

8. What will be the output of the following Python code?

```
T=(3, 4)
T.append(5)
print(T)
```

- a) 1
- b) 2
- c) 5
- d) Error

9. Which of the following creates a tuple?

- a. tuple1=("a","b")
- b. tuple1[2]=("a","b")
- c. tuple1=(5)*2
- d. None of the above

10. Choose the correct option with respect to Python.

- a. Both tuples and lists are immutable.
- b. Tuples are immutable while lists are mutable.
- c. Both tuples and lists are mutable.
- d. Tuples are mutable while lists are immutable.

11. Choose the correct option.

- a. In Python, a tuple can contain only integers as its elements.
- b. In Python, a tuple can contain only strings as its elements.

- c. In Python, a tuple can contain both integers and strings as its elements.
- d. In Python, a tuple can contain either string or integer but not both at a time.

12. What will be the output of below Python code?

```
tuple1=(5,1,7,6,2)
tuple1.pop(2)
print(tuple1)
```

- a. (5,1,6,2)
- b. (5,1,7,6)
- c. (5,1,7,6,2)
- d. Error

13. What will be the output of below Python code?

```
tupl=("annie","hena","sid")
print(tupl[-3:0])
```

- a. ("annie")
- b. ()
- c. None
- d. Error as slicing is not possible in tuple.

14. Which of the following options will not result in an error when performed on tuples in Python where tupl=(5,2,7,0,3)?

- a. tupl[1]=2
- b. tupl.append(2)
- c. tupl1=tupl+tupl
- d. tupl.sort()

15. Which one of the following is correct?

- a. Dictionary is the only mutable data type
- b. Dictionary is an immutable data type
- c. Both list and dictionary are mutable data type
- d. All of the above

16. What will be the output of above Python code?

```
d1={"abc":5,"def":6,"ghi":7}
print(d1[0])
```

- a. Abc

- b. 5
- c. {"abc":5}
- d. Error

17. What will be the result of above Python code?

```
dict={"Joy":1,"Rachel":2}
dict.update({"Philip":2})
print(dict)
```

- a. {"Joy":1,"Rachel":2,"Philip":2}
- b. {"Joy":1,"Rachel":2}
- c. {"Joy":1,"Philip":2}
- d. Error

18. Which of the following functions will return the key, value pairs of a dictionary?

- a. evs()
- b. values()
- c. items()
- d. all of the above

19. Let d = {"Amit":40, "Abhay":45}

To delete the entry for "Amit" what command do we use?

- a. d.delete("Amit":40)
- b. del d("Amit":40)
- c. del d["Amit"]
- d. d.delete("Amit")

20. What will be the output of the following Python code snippet?

```
d1 = {"Amit":34, "Arnav":45}
d2 = {"Amit":46, "Arnav":45}
d1 == d2
```

- a. True
- b. False
- c. None
- d. Error

21. What will be the output after the following statements?

```
x = {1:'Jan', 2:'Feb', 3:'March', 4:'April'}
print(x[2])
```

- a. Jan
- b. Feb
- c. March
- d. April

22. What would the following code print?

```
d = {'spring': 'autumn', "autumn": "fall", "fall": "spring"}  
print (d["autumn"])
```

- a. autumn
- b. fall
- c. spring
- d. Error

23. What will be the result of the following code?

```
d1 = {"abc":5,"def":6, "ghi":7}  
print (d1[0])
```

- a. Abc
- b. 5
- c. ("abc" : 5)
- d. Error

24. Which of the following will modify key_value pair for key = "lion" in dictionary?

```
di = {"lion" : "wild", "tiger" : "wild", "cat": "domestic", "dog" : "domestic"}
```

- a. di.update({"lion": "king"})
- b. di["lion"]="king"
- c. None
- d. Both a and b

25. What is printed by the following statements?

```
D1 = {"cat":17, "dog":6, "elephant":23, "bear":20}  
print (25 in D1)
```

- a. True
- b. False
- c. Error
- d. None

26. What is printed by the following statements?

```
D1 = {"cat":17, "dog":6, "elephant":23, "bear":20}
print ("dog" in D1)
```

- a. True
- b. False
- c. Error
- d. None

27. Which of the following data types fall under mappings:

- a. List
- b. Tuple
- c. String
- d. Dictionary

28. Which of the following will give error?

```
Let dict1={"a":1, "b" :2, "c" :3 }
```

- a. `print(len(dict1))`
- b. `print(dict1.get("b"))`
- c. `dict1["a"]=5`
- d. None of these.

29. Which one of the following is correct?

- a. In python, a dictionary can have two same keys with different values.
- b. In python, a dictionary can have two same values with different keys
- c. In python, a dictionary can have two same keys or same values but cannot have two same key-value pair
- d. In python, a dictionary can neither have two same keys nor two same values.

30. Which of the following will delete key_value pair for key="tiger" in dictionary?

```
dic={"lion" : "wild", "tiger" : "wild", "cat" : "domestic", "dog" : "domestic"}
```

- a. `del dic["tiger"]`
- b. `dic["tiger"].delete()`
- c. `delete(dic["tiger"])`
- d. `del(dic["tiger"])`

MCQ Answers:

QNO	OPTION	QNO	OPTION	QNO	OPTION
1	b	11	c	21	b
2	b	12	d	22	b
3	c	13	b	23	d
4	c	14	c	24	d
5	a	15	c	25	b
6	a	16	d	26	a
7	a	17	a	27	d
8	d	18	c	28	d
9	a	19	c	29	b
10	b	20	a	30	a

OUTPUT FINDING QUESTIONS

1. Find output of the following code:

```
mydict={'a':27,'b':43,'c':25,'d':30}
val=""
for i in mydict:
    if i>val:
        val=i
        valb=mydict[i]
print(val)
print(valb)
print (30 in mydict)
```

2. Find output:

```
d1={'5':"number","a":"string",(1,2):"tuple"}
for x in d1.keys():
    print(x,":",d1[x],end="")
    print(d1[x]*3)
    print()
```

3. Find output:
d=dict()
d['left']='<
d['right']='>
print(d['left'] and d['right'] or d['right'] and d['left'])

4. Find output:
text="abracadabraaabbccrr"
counts={}
lst=[]
for word in text:
 if word not in lst:
 lst.append(word)
 counts[word]=0
 counts[word]=counts[word]+1
print(counts)

5. Find output:
d={1:"a",2:"b",3:"c"}
d1={}
for x in d:
 d1[d[x]]=x
print(d1)

6. Find output:
d1={1:"a",2:"b"}
d2={3:"c",2:"d"}
for x in d1:
 if x in d2:
 print(x)

7. Find output:

```
tuple = {}
tuple[(1,2,4)] = 8
tuple[(4,2,1)] = 10
tuple[(1,2)] = 12
_sum = 0
for k in tuple:
    _sum += tuple[k]
print(len(tuple) + _sum)
```

8. Find output:

```
T = 'abcde'
a, b, c, d, e = T
b = c = '*'
T = (a, b, c, d, e)
print(T)
```

9. Find output:

```
T = (1, 2, 3, 4, 5, 6, 7, 8)
print(T[T.index(5)], end = " ")
print(T[T[T[6]-3]-6])
```

10. Find output:

```
D = dict()
for i in range (3):
    for j in range(2):
        D[i] = j
print(D)
```

11. Find output

```
d1={"a":45,"b":78}
d2={"c":45,"b":88}
d1.update(d2)
print(d1)
```

12. Find output:

```
d1={"a":45,"b":78}
d2={"c":45,"b":88}
d3=d2.copy()
print(d1.keys())
print(d2.values())
print(d3.keys())
```

13. Find output:

```
d1={101:["A","B"],102:["C","D"],103:["E","F"]}
for i in d1:
    for j in d1[i]:
        print(j, end=" ")
    print()
```

14. Find output:

```
d1={1:"Mars",2:"Venus",3:"Earth"}
d1[3]="Jupiter"
print(d1)
print(d1.items())
```

15. Find output:

```
d1={1:"Mars",2:"Venus",3:"Earth"}
for i in d1:
    s=d1[i]
    print(len(s))
```

Answers- Output finding

1. Ans:

```
d
30
False
```

2. Ans:

```
5 : numbernumbernumbernumber
a : stringstringstringstring
(1, 2) : tupletupletupletuple
```

3. Ans:

>

4. **Ans:**

{'a': 7, 'b': 4, 'r': 4, 'c': 3, 'd': 1}

5. **Ans:**

{'a': 1, 'b': 2, 'c': 3}

6. **Ans:**

2

7. **Ans**

33

8. **Ans:**

('a', '*', '*', 'd', 'e')

9. **Ans:**

5 8

10. **Ans:**

{0: 1, 1: 1, 2: 1}

11. **Ans:**

{'a': 45, 'b': 88, 'c': 45}

12. **Ans:**

```
dict_keys(['a', 'b'])
dict_values([45, 88])
dict_keys(['c', 'b'])
```

13. **Ans:**

A B
C D
E F

14. **Ans:**

```
{1: 'Mars', 2: 'Venus', 3: 'Jupiter'}
dict_items([(1, 'Mars'), (2, 'Venus'), (3, 'Jupiter')])
```

15. **Ans:**

4
5
5

PROGRAMS

1. Write a program to read a tuple from the user using loop

```
n=int(input("Enter the number of elements:"))
t=tuple()
for i in range(n):
    a=int(input("Enter number"))
    t=t+(a,)
print(t)
```

2. Read a tuple from user and find the mean of the elements

```
t=eval(input("Enter a tuple of numbers"))
s=sum(t)
mean=s/len(t)
print("Mean is ",mean)
```

3. Read a tuple from the user and print its reverse .

```
t=eval(input("Enter a tuple of numbers"))
print("Revrse is : ",t[::-1])
```

4. Read a tuple from the user and add an element at the end of it using list.

```
t=eval(input("Enter a tuple of numbers"))
l=list(t)
a=int(input("Enter the number to add at the end:"))
l.append(a)
t=tuple(l)
print(t)
```

5. Read a tuple from the user and modify it so that all the even numbers get multiplied by 2 and all odd numbers get multiplied by 3.

```
t=eval(input("Enter a tuple of numbers"))
l=list(t)
for i in range(len(l)):
    if l[i]%2==0:
        l[i]=l[i]*2
    else:
        l[i]=l[i]*3
t=tuple(l)
print(t)
```

6. Write a program to interchange to tuples. For example, if t1=(1,2) and t2=(3,4), then the tuples must be changed as t1=(3,4) and t2=(1,2)

```
t1=eval(input("Enter first tuple"))
t2=eval(input("Enter second tuple"))
t1, t2=t2, t1
print(t1, t2)
```

7. Write a program to read a tuple from the user and create a list from the tuple which contains unique elements of the tuple.

```
t1=eval(input("Enter first tuple"))
l=[]
for i in t1:
    if t1.count(i)==1:
        l.append(i)
print(l)
```

8. Create a dictionary of books with book number as key and book name as value

```
n=int(input("Enter number of books:"))
d={}
for i in range(n):
    key=int(input("Enter book number:"))
    val=input("Enter name:")
    d[key]=val
print(d)
```

9. Create a dictionary of books with book number as key and book name as value. Read a book number and search for it.

```
n=int(input("Enter number of books:"))
d={}
for i in range(n):
    key=int(input("Enter book number:"))
    val=input("Enter name:")
    d[key]=val
print(d)
x= int(input("Enter book number to search:"))
if x in d:
    print("Found")
else:
    print("Not Found")
```

10. Create a dictionary of students with roll number, name and mark with roll number as key and name as values in the form of tuple.

```
n=int(input("Enter number of students:"))
d={}
for i in range(n):
    key=int(input("Enter roll no:"))
    val1=input("Enter name:")
    val2=int(input("Enter total mark:"))
    d[key]=(val1,val2)
print(d)
```

11. Create a dictionary of students with roll number, name and mark with roll number as key and name as values in the form of tuple. Display the details of student who has scored marks above 75

```
n=int(input("Enter number of students:"))
d={}
for i in range(n):
    key=int(input("Enter roll no:"))
    val1=input("Enter name:")
    val2=int(input("Enter total mark:"))
    d[key]=(val1,val2)
print(d)
for i in d:
    t=d[i]
    if t[1]>75:
        print(d[i])
```

12. Create a dictionary of items with item number and price. Display the sum of all items.

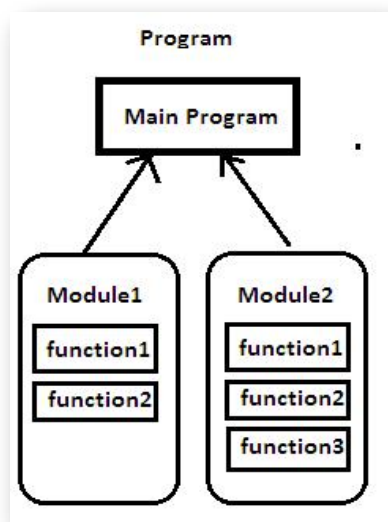
```
n=int(input("Enter number of items:"))
d={}
for i in range(n):
    key=int(input("Enter item no:"))
    price=int(input("Enter price"))
    d[key]=price
print(d)
s=0
for item in d:
    s+=d[item]
print("Sum is ",s)
```

INTRODUCTION TO PYTHON MODULES

A module is a logical organization of Python code. Related codes are grouped into a module which makes the code easier to understand and use. Any python module is an object with different attributes which can be bind and referenced.

Simply, it is a file containing a set of functions which can be included in our application.

Python provide inbuilt standard modules, like math, random etc.



Using a Module

We can use the import statement in three ways to be able to use functions from a particular module.

1. `import <module-name>`

For example, in order to find the square root of a given number, we can use the `sqrt()` function from the `math` module, we can write the following code:

```
import math
x=int(input("Enter a number"))
print(math.sqrt(x))
```

Output:

Enter a number 81

9.0

We can also use the following two ways to import modules and use the functions they contain:

2. `from <module-name> import <method-name>`

Example:

```
from math import sqrt
print(sqrt(81))
```

Output:

9.0

3. `from <module-name> import *`

Example:

```
from math import *  
print(sqrt(81))
```

Output:

9.0

Note that in the first method we need to specify the module name followed by the function name in order to use the function.

Math module

The math module is a standard module in Python and is always available. To use mathematical functions under this module, we have to import the module using import math statement.

Method	Description
<code>sqrt()</code>	Accepts a number and return its square root
<code>ceil()</code>	Accepts a floating-point value and returns a smallest integer greater than or equal to the argument passed
<code>floor()</code>	Accepts a floating-point value and returns the largest integer less than or equal to the given number
<code>pow()</code>	Accept two numbers (x,y) and return x raised to y, same as <code>x**y</code>
<code>fabs()</code>	Accepts a number and returns absolute value
<code>sin()</code>	Accepts a number (value of angle in radians) and

	return its sine value
cos()	Accepts a number (value of angle in radians) and return its cosine value
tan()	Accepts a number (value of angle in radians) and return its tangent value

How to use math function

```
import math
```

```
math.sqrt(4)
```

```
math.sqrt()
```

The math.sqrt() method returns the square root of a given number.

```
>>>math.sqrt(100)
```

Output-10.0

```
>>>math.sqrt(3)
```

Output- 1.7320508075688772

The ceil() function approximates the given number to the smallest integer, greater than or equal to the given floating point number. The floor() function returns the largest integer less than or equal to the given number.

```
>>>math.ceil(4.5867)
```

Output-5

```
>>>math.floor(4.5687)
```

Output- 4

```
math.pow()
```


The `math.pow()` method receives two float arguments, raises the first to the second and returns the result. In other words, `pow(2,3)` is equivalent to `2**3`.

```
>>>math.pow(2,4)
```

Output- 16.0

```
math.fabs()
```

Returns the absolute value of x

```
>>> import math
```

```
>>> math.fabs(-5.5)
```

Output-5.5

The `math` module contains functions for calculating various trigonometric ratios for a given angle. The functions (`sin`, `cos`, `tan`, etc.) need the angle in radians as an argument.

```
>>> math.sin(270)
```

Output-0.1760459464712114

Using the random module

This module contains functions to generate random numbers between two values. Among other uses the random module can be used to display elements randomly from a list, dictionary etc.

Method	Description
<code>random ()</code>	Does not accept any argument.Returns a floating point random number in the range 0.0 to 1.0(upper limit not included)
<code>randint()</code>	Accept two numbers (a &b) and returns a random integer between the two numbers(a and b inclusive)

randrange()	Accepts three arguments as range(start,stop[,step]) .Third one is optional with default value 1.Returns a random integer in the range.
-------------	--

1. random()

This function generates a random number between 0.0 and 1.0(not including) . It does not accept any argument in the brackets.

Example:

```
import random  
  
print(random.random())
```

Output-0.7489153508852794

In order to get a larger number or use it as part of a larger calculation, we can multiply it by an integer.

Example -To generate a number between 1.0 and 10.0:

```
import random  
  
print(random.random()*10)
```

Output-7.168087410165594

2. randint(x,y)

The `randint()` function accepts two arguments and generates a random number between the two. For example if the arguments are `x` and `y` it will generate an integer value between `x` and `y`.

Example:

```
import random
print(random.randint(2,7)) #will generate a number between 2 and 7, inclusive
```

Output:

2

We can also use the `randint()` function to generate and assign a random number to a variable. For example; `p=randint(9,11)`, will assign a value between 9 and 11 to the variable `p`.

The `randint()` function can be implemented in numerous ways.

Example:

Consider the code below:

```
import random
y=random.randint(4,9) #y will be assigned a value between 4 and 9
for i in range(1,y+1): # depending on the value of y, the loop will run from
1 to n where 4<=n<=9
    print(i, end=" ")
```

In the above code `y` can have value between 4 and 9. Thus the loop will run from 1 to `n`, ***n being in the range 4-9***. Thus we can have any ***one*** of the following outputs in this case:

option 1: 1 2 3 4

option 2: 1 2 3 4 5

option 3: 1 2 3 4 5 6

option 4: 1 2 3 4 5 6 7

option 5: 1 2 3 4 5 6 7 8

option 6: 1 2 3 4 5 6 7 8 9

Here the minimum value generated for y is 4 and maximum 9.

Let's take a look at another example:

```
import random
x=random.randint(2,4)
y=random.randint(4,7)
for i in range(x,y+1):
    print(i, end=" ")
```

There are two random numbers generated in the above code, x and y. The minimum and maximum values that the variables x and y will assume are as follows:

	x	y
min	2	4
max	4	7

Thus the loop will give output starting with anything between 2 - 4 and ending between 4-7.

3. randrange (x,y,z)

This function also generates a random integer between x and y but there is a step value, z which has a default value of 1. Also the step parameter is optional.

Example:

```
import random
y=random. randrange (4,20,2) # y will be assigned value between 4 and 20 which are
even as step is 2. So it can be
```

#4,6,8,10,12,14,16,18,20

```
print(y)
```

Output:

18

In the above example y will be assigned a value between 4 and 20 in multiples of 2.

Statistics Module

This module offers functions that perform statistical tasks on numeric data. There are numerous functions in this module. We shall cover three of these, viz, **mean()**, **median()**and **mode()**.

Method	Description
mean()	Calculate the mean(average) of a set of values or data

median()	Calculates the median(middle value) of a set of values or data
mode()	It returns the value with the most number of occurrences in a set of values or data

1. mean()

This function will return the average of a list of values.

Example:

```
import statistics
list1=[3,4,20,7,9,8]
print(statistics.mean(list1))
```

Output-8.5

In the above code the numbers in the list are added and then divided by 6 to give average or mean.

2. median()

The function median() returns the middle value in a list of given numbers/data by first arranging them in ascending order and then finding the exact middle element.

Example:

```
import statistics
list1=[3,4, 7,9,8]           #when ordered, the list will be; 3,4,7,8,9 and the
middle is 7
print(statistics.median(list1))
```

Output-7

If the list contains even numbers then the two middle numbers (after arranging the list) are added and divided by two to get the median.

Example:

```
import statistics
list1=[2,15,4,6,8,9]      #ordered list will be : 2,4,6,8,9,15 and the middle two
values are 6,8. So median=(6+8)/2=7
print(statistics.median(list1))
```

Output-7.0

3. mode()

This function returns the value in a given list that occurs the most number of times.

Example:

```
import statistics
list1=[2,15,4,6,8,9,4,9,8,4,9,9,7]
print(statistics.mode(list1))
```

Output-9

NOTE: If there are more than one values in the list having same number of occurrences, then this function returns the first number.

Example:

```
import statistics
list1=[2,15,4,6,8,9,4,9,8,4,9,9,7,4] # 4 and 9 each occur four times in the list
print(statistics.mode(list1))
```

Output-4

Unit III: Society, Law and Ethics – I

Topics covered

- Digital Footprints
- Digital society and Netizen: net etiquettes, communication etiquettes, social media etiquettes
- Data protection: Intellectual Property Right (copyright, patent, trademark), violation of IPR (plagiarism, copyright infringement, trademark infringement), open source software and licensing (Creative Commons, GPL and Apache)
- Cyber-crime: definition, hacking, eavesdropping, phishing and fraud emails, ransomware, preventing cyber crime

Introduction

We are living in the era called information age where we see that most our activities are technology-influenced such as online payment, creating or development of own piece of art. With the reach of technology to our day to day life, there has been a paradigm shift, and it has also raised specific issues and problems related to society, ethics and law. This creates the significance of learning the net etiquettes and related knowledge on cyber safety.

Digital Footprints

Digital Footprints are the records and traces individuals leave behind as they use the Internet. Your interaction on social media, your friend circle on social media sites, site you visits, online purchase, location visited through Facebook check-ins. etc. all make up your Digital Footprints.

Digital footprints are also referred to as "digital tattoos". Digital footprints get created actively and passively. An active digital footprint includes data that you intentionally submit online, e.g., Sending an email, sending messages online, posting a social media post, replying to post or commenting online etc.

A passive digital footprint gets created through your data trail that you unintentionally leave online. For example, when you visit a website, the web server may log your IP address, which identifies your Internet service provider and your approximate location.

Digital society and Netizen

Digital society 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. Being a good netizen means practicing safe, ethical and legal use of digital technology. A responsible netizen must abide by net etiquettes, communication etiquettes and social media etiquettes.

- **Net Etiquettes:**

It refers to online manners while using Internet or working online. While online, you should be courteous, truthful and respectful of others. Following lines list basics rules of netiquettes.

1. Refrain from personal abuse. If you disagree to something, you may express robust disagreement, but never call them names or threaten them with personal violence.
2. Never spam. That is, don't repeatedly post the same advertisement for products or services.
3. Write clearly and concisely. On a site that has many non-native English speakers, avoid using slang they may not understand.
4. Always post correct content in respectful language. Remember that your posts are public. They can be read by your friends, your siblings, your parents, or your teachers.
5. In a discussion forum, stick to the topic. Don't post about football in a hair-care forum or about hair care in a gardening forum!
6. Never expect other people to do your homework for you. Never ask for or expect that

your complete homework solution will be made available to you. Also, while asking for help, include details of what attempts you've made to solve the problem. It will save time and also show people that you are making an effort to help yourself,

7. Do not post copyrighted material to which you do not own the rights. It is plagiarism

If you need to use the copy righted material, then follow these rules :

(a) Ask permission from the copyright holder.

(b) Enclose the copyrighted information that you are using and cite its source. Hing this will put you and the site in legal trouble.

- **Communication Etiquettes:**

- **Email Etiquettes:**

It is important that whether for business or personal use that we should follow the basics of email etiquettes. Following lines enlist some important email etiquette that everyone needs to be aware of and follow.

1. Be concise and to the point. Do not make an e-mail longer than it needs to be. A long e-mail can be very discouraging to read.

2. Use proper spelling, grammar & punctuation. It is important for conveying the message properly. Improper spelling, grammar and punctuation give a bad impression.

3. Use proper structure & layout. Since reading from a screen is more difficult than reading from paper, the structure and lay out is very important for e-mail messages Use short paragraphs and blank lines between each paragraph. When making points, number them or mark each point as separate to keep the overview.

4. Do not write in CAPITALS (Case Sensitivity). IF YOU WRITE IN CAPITALS IT SEEMS AS IF YOU ARE SHOUTING. This can be highly annoying and might trigger an unwanted response. Therefore, try not to send any email text in capitals.

5. Add an e-mail disclaimer. Disclaimers in your internal and external mails can help protect you from liability if you inadvertently forwarded a virus by e-mail.

6. Handle abbreviations and emoticons with care. In business e-mails, use of abbreviations (such as BTW for by the way) and emoticons (smiley faces) is generally inappropriate.

7. Gender Sensitivity. If you are writing to a person unknown to you, your email should be gender neutral.

- **Social Media Etiquettes:**

Rules to be followed while working on social networking sites

- Don't give or post any personal information.

- Never give out your password to anyone except your parent or guardian.

- When you are choosing a social networking site, privacy issues should be considered.

- Add only those people as friends to your page whom you know in real life.

- Delete any unwanted messages, inappropriate comments and immediately report those comments to the networking site.

Care about the share: Social media wants us to share as much as we can, but “Never share your passwords, private/personal information, your location, etc.” Always use strong passwords that are difficult to guess.

- Privacy Matters: Regularly check your privacy settings on social media and always think before posting because it spreads all over the internet. Respect privacy of others: Ask your friends' permission before uploading their photos and videos.

- Keep everything updated: Most security breaches on the internet happen as the software is not up-to-date. Be vigilant about updating software like apps, anti-viruses and the browsers.

- Be aware of Spams: It is the modern version of junk mails. Learn the difference between real mails and messages and dodgy things with unreliable links. Always be suspicious of emails with hyperlinks.

Data Protection:

Data or Information forms the intellectual capital for a person or body. There are many ethical issues involved with the usage and availability of information online. Some common ethical issues are:

- **Intellectual Property Rights:** Intellectual property rights are the rights of the information to decide how much information is to be exchanged shared or distributed. Also it gives the owner a right to decide the price for doing (exchanging / sharing/distributing) so. The creator/producer of the information is the real owner of information. And the owner has every right to protect his/her intellectual property. To protect one's intellectual property rights one can get information copyrighted or patented or use trademarks.
- ❖ **Copyright:** A copyright is a collection of rights automatically vested to someone who has created an original work. The copyright owner has the authority to keep or to transfer the rights to use/distribute, individually to one or more people, or to transfer them collectively to one or more people.
- ❖ **Patent:** A patent is a grant of exclusive right to the inventor by the government. Patents give the holder a right to exclude others from making, selling, using or importing a particular product or service, in exchange for full public disclosure of their invention.
- ❖ **Trademark:** A trademark is a word, phrase, symbol, sound, colour and/or design that identifies and distinguishes the products and goods of one party from those of others.
- **Violation of Intellectual Property Rights:**
- ❖ **Plagiarism:** Plagiarism is stealing someone else's intellectual work (can be an idea, literary work or academic work etc.) and representing it as your own work without citing the source of information.

Any of the following acts would be termed as Plagiarism:

- Using some other author's work without giving credit to the author.
- Using someone else's work in incorrect form than intended originally by the author/creator.
- Modifying/lifting someone's production such as music-composition etc. without attributing it to the creator of the work.
- Giving incorrect or incorrect source of information i.e., wrongful citation.
- Failure in giving credit or acknowledging the contribution of others in a collaborative effort, to which you are also part of.
- ❖ **Copyright Infringement:** When someone uses a copyrighted material without permission, it is called copyright infringement. Copyright infringement is the use or production of copyright-protected material without the permission of the copyright holder.
- ❖ **Trademark Infringement:**
Trademark Infringement means unauthorised 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
- **Open Source Software and Licensing:**
Open source software can be freely used in terms of making modifications, constructing business models around the software and so on. But it doesn't have to be free of charge. Here the company constructing the business models around open source software may receive payments concerning support, further development.
- ❖ **Creative Commons license:**
Creative Commons is a non-profit organisation (<https://creativecommons.org/>) that aims to build a publically accessible global platform where a range of creative and academic works are shared freely. Any one across the globe can access them, share them, and even use them for creating their own work out of it without infringing the copyright or Intellectual Property rights of the owners. In fact, it gives proper attribution to the owners.
A Creative Commons license is one of several public copyright licenses that enable the free distribution of an otherwise copyrighted "work". A Creative Commons license is used when an author wants to give other people the right to share, use, and build upon a work that the author has created. Creative Commons provides an author flexibility (for example, they might choose to allow only non-commercial uses of a given work) and protects the people who use or

redistribute an author's work from concerns of copyright infringement as long as they abide by the conditions that are specified in the license by which the author distributes the work.

❖ **GPL**

The GNU General Public License (GNU GPL or simply GPL) is a series of widely used free software licenses that guarantee end users the four freedoms to run, study, share, and modify the software.

❖ **Apache**

The Apache License is a permissive free software license written by the Apache Software Foundation (ASF). It allows users to use the software for any purpose, to distribute it, to modify it, and to distribute modified versions of the software under the terms of the license, without concern for royalties.

Cyber-crime

Cyber-crime is any criminal offense that is facilitated by, or involves use of electronic communications of information system including any electronic device, computer or the Internet.

➤ **Hacking**

Hacking refers to gaining unauthorised access to a network or computer or digital files, with an intention to steal or manipulate data or information or to install malware.

Hacking can be ethical or unethical. Ethical Hacking is done on behalf of a company, which wants to find out the loopholes in the system in context to security. Unethical Hacking, on the other hand, is done in order to harm or cause loss to an individual or a company.

➤ **Eavesdropping:**

Unauthorised monitoring of other people's communications is called eavesdropping. It is a passive attack in which an attacker gains access to the communication medium through which some communication is taking place and then listens to the communication and gets information about the content of the message.

➤ **Phishing:**

Phishing is the practice of attempting to acquire sensitive information from individuals over the internet, by means of deception. Phishing attacks are the practice of sending fraudulent communications that appear to come from a reputable source. It is usually done through email. The goal is to steal sensitive data like credit card and login information, or to install malware on the victim's machine.

➤ **Fraud emails:**

Email fraud (or email scam) is intentional deception for either personal gain or to damage another individual by means of email.

➤ **Ransomware:**

Ransomware is a type of malware, or malicious software, which locks all known files through strong encryption and prevents users and administrators from accessing their networks, systems or data.

Ransomware effectively denies access to organizational data by encrypting it and withholding decryption tools until a ransom is paid. Paying the ransom assumes the bad guys are ethical, but there is no guarantee that paying will get an organization the decryption key they need to access their data. The sole objective of ransomware is to make sure that people cannot access their electronic files.

➤ **Preventing Cyber-crimes:**

The challenges of cyber crime can be mitigated with the twin approach of being alert and taking legal help. Following points can be considered as safety measures to reduce the risk of cyber crime:

- Take regular backup of important data.

- Use an 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 websites. 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.

MCQ

1. You are planning to go for a vacation. You surfed the Internet to get answers for the following queries —
 - a) Places to visit
 - b) Availability of air tickets and fares
 - c) Best hotel deals
 - d) All of these

Which of your above mentioned actions might have created a digital footprint?
2. A responsible netizen must abide by _____
 - a. Net etiquettes
 - b. Communication etiquettes
 - c. Social media etiquettes
 - d. All of the above
3. Which of the following activity is an example of leaving Active digital footprints?
 - a) Surfing internet
 - b) Visiting a website
 - c) Sending an email to a friend
 - d) None of the above
4. Legal term to describe the rights of a creator of original creative or artistic work is called
 - a) Copyright
 - b) Copyleft
 - c) GPL
 - d) BSD
5. A software that can be freely accessed and modified is called
 - (a) Synchronous Software
 - (b) Package Software
 - (c) Open Source Software
 - (d) Middleware

6. Data which has no restriction of usage and is freely available to everyone under Intellectual Property Rights is categorised as :
 - (a) Open Source
 - (b) Open Data
 - (c) Open Content
 - (d) Open
7. Which of the following is an advantage of 'open source software' ?
 - (a) You can edit the source code to customise it.
 - (b) You need to be an expert to edit code.
 - (c) You have to pay.
 - (d) Can sometimes be too generic for specialist purposes.
8. Which of the following is a disadvantage of 'open source software'?
 - (a) High quality software with lots of features
 - (b) Not as customizable
 - (c) May not have been tested as much as proprietary software, so might have bugs
 - (d) You can edit the source code to customise it
9. Which of the following would be a creative work protected by copyright?
 - (a) A list of all Indian President names
 - (b) A portrait of your family
 - (c) A song you wrote
 - (d) The name of your pet dog
10. Which of the following is not a type of cybercrime?
 - (a) Data theft
 - (b) Forgery
 - (c) Damage to data and systems
 - (d) Installing antivirus for protection
11. What is meant by the term 'cyber-crime'?
 - (a) Any crime that uses computers to jeopardise or attempt to jeopardise
 - (b) The use of computer networks to commit financial or identity fraud
 - (c) The theft of digital information
 - (d) Any crime that involves computers and networks
12. The rights of the owner of information to decide how much information is to be shared/exchanged/distributed, are collectively known as ___ (IPR).
 - (a) Intelligent Property Rights
 - (b) Intellectual Property Rights
 - (c) Interactive Property Rights
 - (d) Instance Property Rights
13. Stealing someone else's intellectual work and representing it as own, is called
 - (a) Intellectual steal

- (b) Pluckism
- (c) Plagiarism
- (d) Pickism

14. The information/art/work that exists in digital form is called

- (a) e-work
- (b) e-asset
- (c) digital property
- (d) e-property

15. Every activity you perform on the Internet is saved for how long?

- (a) one month
- (b) one year
- (c) as per my setting
- (d) forever

16. The digital trail which gets created as a person's Internet usage using computers, smartphones, gaming consoles etc. is called -

- (a) Internet data
- (b) Internet trail
- (c) Digital footprint
- (d) e-footprint

17. Gaining unauthorised access to a network or computer or digital files with malicious called

- (a) Cracking
- (b) Hacking
- (c) Banging
- (d) Phishing

18. Legal term to describe the rights of a creator of original creative or artistic work is called

- (a) Copyright
- (b) Copyleft
- (c) GPL
- (d) none of these

19. OSS stands for

- (a) Open Source Software
- (b) Open Software Source
- (c) Open Software Service
- (d) Open Service Software

20. Any fraudulent business practice that extracts money from an unsuspecting, ignorant person is called a
- (a) Plagiarism
 - (b) Scam
 - (c) Hacking
 - (d) Phishing
21. The attack that focuses on capturing small packets from the network transmitted by other computers and reading the data content in search of any type of information is
- (a) Phishing
 - (b) Eavesdropping
 - (c) Scam
 - (d) PC intrusion
22. Which of the following is / are source of spreading viruses from one computer to another?
- (a) Email
 - (b) Infected data
 - (c) Infected programs
 - (d) All of the above
- 23..... are the attempts by individuals to obtain confidential information from you through an original looking site and URL.
- (a) Phishing Scam
 - (b) Spoofing
 - (c) Eavesdropping
 - (d) Pharming
- 24..... is an attempt where a hacker tries to divert network traffic to a bogus site.
- (a) Phishing Scam
 - (b) Spoofing
 - (c) Eavesdropping
 - (d) Pharming attack
25. A research student is expected to write a thesis on a topic. The student browses Internet for the topic and luckily finds it on the internet. He copies and submits the entire thesis as his own research work. Which of the following activities appropriately categorises the act of the writer ?
- (a) Spamming
 - (b) Phishing
 - (c) Plagiarism
 - (e) Trojan

ANSWERS

1. d) All of these
2. d. All of the above

3. c) Sending an email to a friend
4. a) Copyright
5. c) Open Source Software
6. (b) Open Data
7. (a) You can edit the source code to customise it.
8. (c) May not have been tested as much as proprietary software, so might have bugs
9. (c) A song you wrote
10. (d) Installing antivirus for protection
11. (d) Any crime that involves computers and networks
12. (b) Intellectual Property Rights
13. (c) Plagiarism
14. (c) digital property
15. (d) forever
16. (c) Digital footprint
17. (b) Hacking
18. (a) Copyright
19. (a) Open Source Software
20. (b) Scam
21. (b) Eavesdropping
22. (d) All of the above
23. (a) Phishing Scam
24. (d) Pharming attack
25. (c) Plagiarism

Cyber Safety

Cyber safety is trying to be safe on the internet and is the knowledge of maximizing the user's personal safety and security risks to private information and property associated with using the internet.

Safely browsing the web: Protecting yourself by securing your devices, software and connections is important. There are potential risks involved in doing things online, but by making smart choices you can reduce that risk.

By using a combination of preventative measures and making good choices online you can stay safe when browsing the web.

Update software: Protect yourself before you start browsing the web by making sure that your operating system, web browser, security software, browser plugins (like Java or Adobe products) and other applications are up-to-date.

Protect web browser: Most web browsers will give you warnings when they detect you visiting a malicious website or possibly being exposed to malicious content. Pay attention to these warnings – they can help protect you from malware, phishing and identity theft.

Use safe behaviour:

Use the following advice when browsing the web to significantly reduce your risk of being a victim of cybercrime:

- Use strong unique passwords online.
- Only download files and applications from websites that you trust, such as from official app stores or legitimate organisations.
- Think carefully before clicking on links in email, messages or on social networking sites. Don't click on links in messages if you don't know the sender or if the message is unexpected.
- If you do not recognize or trust the address, try searching for relevant key terms in a web browser. This way you can find the article, video, or webpage without directly clicking on the suspicious link.
- Expand shortened URLs to check if they are safe. Short URLs are often used in social media.
- Be wary of offers that seem too good to be true. Leave websites that ask for your personal or banking details in return for money – these are scams.

- Don't agree to friend requests from people you don't know on social media networks - people are not always who they say they are.

Identity protection: Your personal identity is important as it defines who you are. Your identity includes your personal information; information such as name, address, contact information, bank account, credit card numbers, and social security numbers should all be kept private.

Confidentiality: Confidentiality is roughly equivalent to privacy. Measures undertaken to ensure confidentiality are designed to prevent sensitive information from reaching the wrong people, while making sure that the right people can in fact get it: Access must be restricted to those authorized to view the data in question. It is common, as well, for data to be categorized according to the amount and type of damage that could be done should it fall into unintended hands. More or less stringent measures can then be implemented according to those categories.

Sometimes safeguarding data confidentiality may involve special training for those privy to such documents. Such training would typically include security risks that could threaten this information. Training can help familiarize authorized people with risk factors and how to guard against them. Further aspects of training can include strong passwords and password-related best practices and information about social engineering methods, to prevent them from bending data-handling rules with good intentions and potentially disastrous results.

A good example of methods used to ensure confidentiality is an account number or routing number when banking online. Data encryption is a common method of ensuring confidentiality. User IDs and passwords constitute a standard procedure; two-factor authentication is becoming the norm. Other options include biometric verification and security tokens, key fobs or soft tokens. In addition, users can take precautions to minimize the number of places where the information appears and the number of times it is actually transmitted to complete a required transaction. Extra measures might be taken in the case of extremely sensitive documents, precautions such as storing only on air gapped computers, disconnected storage devices or, for highly sensitive information, in hard copy form only.

Social networks: Social networking is playing a huge role in our life. Now a days businesses heavily rely on social media for their promotions and sale of their products. But on the other hand lot of frauds are being done using social media. Person shouldn't accept any random request. There are lot of fake accounts on social media which might be hackers they might intrude in your PC.

Cyber bullying

Cyberbullying is a form of bullying or harassment using electronic means. It includes any insulting, degrading or intimidating online behaviour like repeated posting of rumours, giving threats online, posting the victim's personal information, comments aimed to publicly ridicule somebody etc.

Cyber Troll

A cyber troll is a person who starts flame wars or intentionally upsets people on the Internet by posting inflammatory and digressive, extraneous, or off-topic messages in an online community with the intent of provoking readers into displaying emotional responses and normalizing tangential discussion, either for the troll's amusement or a specific gain.

Network Security: Network security is concerned with protection of our device as well as data from illegitimate access or misuse.

Malware (Malicious software): Malware is any software developed with an intention to damage hardware devices, steal data, or cause any other trouble to the user. Viruses, Worms, Ransomware, Trojans, and Spyware are some of the kinds of malware.

1. **Virus:** A virus is a piece of software code created to perform malicious activities and hamper resources of a computer system like CPU time, memory, personal files, or sensitive information. A computer virus infects other computer systems that it comes into contact with by copying or inserting its code into the computer programs or software (executable files). A virus remains dormant on a system and is activated as soon as the infected file is opened (executed) by a user. Some of the most common intentions or motives behind viruses include stealing passwords or data, corrupting files, spamming the user's email contacts, and even taking control of the user's machine. Some well-known viruses include CryptoLocker, ILOVEYOU, MyDoom, Sasser and Netsky, Slammer, Stuxnet, etc.
2. **Worms:** Worms are also malicious software but they are standalone programs that are capable of working on its own. Whereas a virus needs human trigger for replication (i.e. when a user pens/executes the infected file), a worm replicates on its own and can spread to other computers through the network. Some prominent examples of worms include Storm Worm, Sobig, MSBlast, Code Red, Nimda, Morris Worm, etc.
3. **Trojan:** A Trojan is a malware, that looks like a legitimate software and once it tricks a user into installing it, it acts pretty much like a virus or worm. However, a Trojan does not self-replicate or infect other files, it spreads through user interaction such as opening an email attachment or downloading and executing a file from the Internet. Some Trojans create backdoors to give malicious users access to the system.
4. **Adware:** An Adware is a malware that is created to generate revenue for its developer. An adware displays online advertisements using pop-ups, web pages, or installation screens.
5. **Trojan:** A Trojan is a malware, that looks like a legitimate software and once it tricks a user into installing it, it acts pretty much like a virus or worm. However, a Trojan does not self-replicate or infect other files, it spreads through user interaction such as opening an email attachment or downloading and executing a file from the Internet. Some Trojans create backdoors to give malicious users access to the system.

6. **Adware:** An Adware is a malware that is created to generate revenue for its developer. An adware displays online advertisements using pop-ups, web pages, or installation screens.

Preventive measures against malware

- Using antivirus, anti-malware, and other related software and updating them on a regular basis.
- Configure your browser security settings
- Always check for a lock button in the address bar while making payments.
- Never use pirated or unlicensed software. Instead go for Free and Open Source Software (FOSS).
- Applying software updates and patches released by its manufacturers.
- Taking a regular backup of important data.
- Enforcing firewall protection in the network.
- Avoid entering sensitive (passwords, pins) or personal information on unknown or public computers.
- Avoid entering sensitive data on an unknown network (like Wi-Fi in a public place) using your own computer.
- Avoid clicking on links or downloading attachments from unsolicited emails.
- Scan any removable storage device with an antivirus software before transferring data to and from it.
- Never share your online account or banking password/pins with anyone.
- Remove all the programs that you don't recognise from your system.
- Do not install an anti-spyware or antivirus program presented to you in a pop-up or ad.
- Use the pop-up windows 'X' icon located on the top-right of the popup to close the ad instead of clicking on the 'close' button in the pop-up. If you notice an installation has been started, cancel immediately to avoid further damage.

Antivirus: Antivirus is software that detects and removes viruses as well as other malware from a system.

E-waste:

E-waste or electronic waste is used to describe all discarded electric and electronic devices. All electronic items are made up of plastics and contain traces of rare metals. If e-waste is not handled properly then chances of all the pollutants leaking into the atmosphere, contaminating the soil and water resources is there.

E-waste Disposal Techniques:

- Sell/Donate your e-waste to someone in need.
- Dispose e-waste to certified e-waste recycler
- Refurbish/Reuse the e-waste
- Segregate if possible different kinds of e-waste and give to appropriate recyclers.
- Give back e-waste in buyback or exchange schemes or at company recommended drop points

Health concerns related to the usage of technology

- Using improper posture while using computer/mobile/device for a long time can cause serious health issues such as fatigue, backaches, neck and shoulder pains. Ergonomically designed furniture/products can reduce the strain on the body.
- Spending too much time on the internet can be addictive
- Social bonds can become weak
- Children tend to be attracted towards online games rather than actually playing outdoors which can lead to long term health issues

Indian Information Technology Act 2000 (ITA-2000 or IT act):

It is the primary law in India dealing with cyber law, cybercrime and electronic commerce. Some of the major sections are:

SECTION	OFFENCE	PENALTY
66A	Sending of offensive messages	
67A	Publishing images containing sexual acts	Imprisonment up to 7 years and/or fine up to Rs. 10,00,000.
67B	Publishing child porn or predating children online	Imprisonment up to 5 years and/or fine up to Rs. 10,00,000 on 1 st conviction. Imprisonment up to 7 years and/or fine up to Rs. 10,00,000 on 2 nd conviction.
67C	Failure to maintain records	Imprisonment up to 3 years and/or fine up to Rs. 2,00,000.
68	Failure/Refusal to comply with orders	Imprisonment up to 7 years and/or possible fine.
69	Failure/Refusal to decrypt data	Imprisonment up to 3 years and/or fine up to Rs. 1,00,000.
70	Securing access or attempting to secure access to protected system	Imprisonment up to 10 years and/or fine.
71	Misrepresentation	Imprisonment up to 3 years and/or fine up to Rs. 1,00,000.

Technology & Society: Gender and disability issues while teaching and using computers

Whenever we are designing a software or a hardware product/service care should be taken to see that it is usable by people with different background, gender, nationalities, differently abled persons etc.

For example-

- If you are designing a hardware product, then it should be usable by both the sexes as well as by left- handed and right handed persons also.
- If you are designing a software/terminal designed to be used by the general public such as a kiosk/ATM machine, it should be in multiple languages. It should have features such as voice controlled operations/touch screen operations such that even people with visual disabilities can be able to operate it.
- Whenever you are designing a product to be used by general public, preferably use gender neutral language for the user interface.
- Avoid using language/content that discriminates especially based on the user's gender/background/ physical abilities etc.

Short Answer Question

1. What is cyber safety?

Ans: Cyber safety refers to the safe and responsible use of internet to ensure safety and security of personal information. It also includes not creating threat for anyone else's information.

2. What is cyber crime?

Any illegal activity done with the help of electronic communication system, computer and internet is called cyber crime.

3. What is virus? What can it do to our computer?

Virus stands for Vital Information Resource Under Seize. It a computer software that can harm your computer. It can harm our computer in following ways:

It can delete files.

It can corrupt operating system.

It can slow down the computer.

4. What should we practise confidentiality of information?

1. Use firewall wherever possible.
2. Control browser settings to block tracking.
3. Browse privately wherever possible.
4. Be careful while posting on Internet.
5. Ensure Safe sites while entering crucial information.
6. Carefully handle emails.
7. Do not give sensitive information on wireless networks.
8. Avoid using public computers.

5. How can we safely browse the web?

We can safely browse the web by keeping following things in mind:

1. Try to avoid opening websites which are not secure (without HTTPS).
2. Don't provide your email, contact number, credit card/debit card information, address and other such information on websites/apps you are not fully sure of.
3. Don't download softwares or other files from every website.

6. Which types of gender and disability issues are created while teaching and using computer?

1. There is decline in women in the field of computer and this has made gender gap for using computer and males are more interested in the usage of computer.
2. The disability issues while using computer for those individuals with blindness find it difficult to access the computer monitor and some individuals with low visions also face the same problem.
3. Some individuals have hearing or speech impairments in such case they can use standard keyboard sign language devices are used for this purpose.

7. What are malware? What type damages can they cause to your computer?

"Malware" is short for malicious software and used as a single term to refer to virus, spy ware, worm etc. Malware is designed to cause damage to a stand-alone computer or a networked pc. So wherever a malware term is used it means a program which is designed to damage your computer it may be a virus, worm or Trojan.

8. What is the need for secure passwords?

A password that is difficult to detect by both humans and computer programs, effectively protecting data from unauthorized access. A strong password consists of at least six characters (and the more characters, the stronger the password) that are a combination of letters, numbers and symbols (@, #, \$, %, etc.) if allowed. Passwords

are typically casesensitive, so a strong password contains letters in both uppercase and lowercase. Strong passwords also do not contain words that can be found in a dictionary

9. What are different types of threats to computer security?

A Threat is a potential violation of security. When a threat is actually executed, it becomes attack. Those who execute such actions, or cause them to be executed are called attackers. Some common threats the average computer user faces everyday are

1. Viruses 2. Worms 3. Trojans 4. Spyware 5. Adware 6. Spamming 7. PC Intrusion: 8. Denial of Service 9. Sweeping 10. Password Guessing 11. Phishing

10. What is the significance of Firewall in a computer's security scheme?

An Internet firewall is a device or a software that is designed to protect the computer from data and virus.

Kendriya Vidyalaya Sangathan, Ernakulam Region
Sample Question Paper
COMPUTER SCIENCE
CLASS XI

SET-I

Maximum Marks: 35

Time: 2 hours

General Instructions

- The question paper is divided into 3 sections – A, B and C
- Section A, consists of 7 questions (1-7). Each question carries 2 marks.
- Section B, consists of 3 questions (8-10). Each question carries 3 marks.
- Section C, consists of 3 questions (11-13). Each question carries 4 marks.
- Internal choices have been given for question numbers 7, 8 and 12.

Section -A Each question carries 2 marks		
1	How are Tuples different from Lists when both are sequences?	2
2	(i) What do you mean by eavesdropping? (ii) Write any two tips to safely browse internet.	2
3	(i) What is the length of the tuple shown below? T = (((("a", 1), "b", "c"), "d", 2), "e", 3) (ii) Find the output of the following code <pre>import math k=math.pow (2,4) print(k)</pre>	2
4	(i) Name any 2 social networking apps (ii) A computer program encrypts (lock by password) all your important documents on the computer and asks you to deposit money in a certain bank account to decrypt (unlock) those files. What that malicious program is known as?	2
5	How can we hide our identity on the internet? (Any two points)	2

6	What are nested Lists? Give an example	2
7	<p>What is cyber Bullying? Give an example to explain it.</p> <p>OR</p> <p>(i) Which of the following is not a type of cybercrime? a)Unauthorized account access b) Email spoofing and spamming c)Mass attack using Trojans as botnets d) Report vulnerability in any system</p> <p>(ii) A _____ is a computer program that can replicate itself and spread from one computer to another. i) Antivirus ii) Pendrive iii) Mouse iv) Computer Virus</p>	2
SECTION – B		
Each question carries 3 marks		
8	<p>(i) Predict the output of the following code:</p> <pre>L1=[16,52,14] L2=["Hello","Good",56] L3=L1 L3.append("Morning") print(L3) L1.extend(L2) print(L1)</pre> <p>(ii) Which is the correct form of declaration of dictionary? a) Day={1:'monday',2:'tuesday',3:'wednesday'} b) Day=(1;'monday',2;'tuesday',3;'wednesday') c) Day=[1:'monday',2:'tuesday',3:'wednesday'] d) Day={1'monday',2'tuesday',3'wednesday'}</p> <p>OR</p> <p>(i) List is said to be a mutable datatype. Explain the reason (ii)Write a program to accept a list of numbers and find the sum of all the numbers in the list.</p>	3
9	Write a program to accept a list of numbers and replace all numbers greater than or equal to 33 with “PASS” and less than 33 with “FAIL” eg: if the accepted list is [23,45,56,29,90,33], it should be replaced as [“FAIL”,” PASS”,” PASS”,” FAIL”,” PASS”,” PASS”]	3
10	<p>(i) Expand IPR (ii) Indian IT Act came to existence in -----</p>	3

	(iii) Which of the following is not a proper e-waste disposal technique? a) Dismantling b) Segregation c) Recycling d) Throwing away	
	Section C Each question carries 4 marks	
11	(i) Write a program to accept a string tuple and print all those strings which are palindrome in it. eg: if the accepted tuple is ('hello', 'level', 'good', 'morning', 'malayalam') output should be level Malayalam (ii) What will be the output of following code? t1 = ("computer science", "informatics practices", 2017, 2018) t2 = (15, 21, 26, 88, 9, 33) print("t1[-3:]:", t1[-3:]) print("t2[1:5]:", t2[1:5])	4
12	(i) Write a program to accept name and marks of 10 students. Create a dictionary with name as key and marks as values (ii) Predict the output of the following code: d1={"Physics":52,"Maths":69,"Chemistry":58} d2={"Maths":87,"Biology":55,"IP":54} d2.update(d1) print(d1) print(d2) OR Ms. Niya, a computer science teacher created the following list List = [12,15,18,19,45,76,11,28,16] (i) She wants to know the number of elements in the list. Which function she should use to get an answer. (ii) Ms. Niya wants to add two new elements 25,11 in the last. Which of the following is the correct option? a. List.append(25,11) b. List.insert(25,11) c. List.extend(25,11) d. List.extend([25,11]) (iii) She wants to remove value 15 from the list. Please help her to write correct code. (iv) Help her to write code to display the values of the list in descending order.	4

13

The school offers wireless facility (Wi-Fi) to the Computer Science students of Class XI. For communication, the network security staff of the school have a registered URL *schoolwifi.edu*. On 17 January 2022, the following email was mass distributed to all the Computer Science students of Class XI. The email claimed that the password of the students was about to expire. Instructions were given to go to URL to renew their password within 24 hours.

4



- (i) Do you find any discrepancy in this email?
- (ii) What will happen if the student click on the given URL?
- (iii) Is the email an example of cyber crime? If yes, then specify which type of cyber crime is it
- (iv) Is the email an example of Hacking? If yes, then justify your answer

Marking Scheme
COMPUTER SCIENCE
CLASS XI

Maximum Marks: 35

Time: 2 hours

General Instructions

- The question paper is divided into 3 sections – A, B and C
- Section A, consists of 7 questions (1-7). Each question carries 2 marks.
- Section B, consists of 3 questions (8-10). Each question carries 3 marks.
- Section C, consists of 3 questions (11-13). Each question carries 4 marks.
- Internal choices have been given for question numbers 7, 8 and 12.

Section -A Each question carries 2 marks		
1	Tuples are similar to lists in many ways like indexing, slicing, and accessing individual values, but they are different in the sense that <ul style="list-style-type: none"> ➤ Tuples are immutable while lists are mutable. ➤ List can grow or shrink while tuples cannot 	2
2	(i) Eavesdropping is the act of secretly or stealthily listening to the private conversation or communications of others without their consent in order to gather information (ii) Only download software from sites you trust. Carefully evaluate free software and file-sharing applications before downloading them Update your operating system regularly Increase your browser security settings. Type in a trusted URL for a company's site into the address bar of your browser to bypass links in an email or instant message. Use antivirus protection and a firewall (Any two)	2
3	(i) 3 (ii) 16.0	2
4	(i) Ans: Facebook, WhatsApp, Twitter, Instagram, Snapchat, LinkedIn, etc (Any 2 from these)	2

	(ii) Ransomware	
5	<ul style="list-style-type: none"> • Use Virtual Private Network (VPN) • Use Proxy (Torr Browser has proxy integrated in it) • Use Incognito Browsing 	2
6	<p>A list can have an element in it, which itself is a list. Such a list is called a nested list. e.g. L = [1,2,3,4, [5,6,7],8]</p>	2
7	<p>Harassing, demeaning, embarrassing, defaming or intimidating someone using modern technologies like social networking sites, internet, cell phones, etc. is called cyber bullying. Dev and Jerin had a fight. After fight, Jerin started posting negative comments about Dev on the facebook. This incident can be considered as cyber bullying.</p> <p>OR</p> <p>(i) d) Report vulnerability in any system (ii) iv) Computer Virus</p>	2
SECTION – B		
Each question carries 3 marks		
8	<p>(i) [16, 52, 14, 'Morning'] (1 mark) [16, 52, 14, 'Morning', 'Hello', 'Good', 56] (1 mark)</p> <p>(ii) option a (1 mark)</p> <p>OR</p> <p>(i) List is said to be a mutable datatype because individual elements inside the list can be modified in place at run time. (1 mark)</p> <p>(ii) <pre>slist=eval(input("Enter a list of numbers:")) sumlist=0 for ele in slist: sumlist+=ele print("Sum of elements=", sumlist)</pre> (2 marks)</p>	3
9	<pre>mark=eval(input("Enter a list of numbers:")) length=len(mark) for i in range(length): if mark[i]>=33: mark[i]="PASS" else: mark[i]="FAIL" print("Modified List=", mark)</pre>	3

10	(i) Intellectual Property Rights (ii) 2000 (iii) Throwing away	3
	Section C Each question carries 4 marks	
11	(i) t1 = eval(input("Enter a tuple of strings:")) (2 mark) for s in t1: if s==s[::-1]: print(s) (ii) t1[-3:]: ('informatics practices', 2017, 2018) (2 mark) t2[1:5]: (21, 26, 88, 9)	4
12	(i) d={} for i in range(5): nm=input("Enter name of student:") mk=eval(input("Enter mark of student:")) d[nm]=mk print(d) (ii) {'Physics': 52, 'Maths': 69, 'Chemistry': 58} {'Maths': 69, 'Biology': 55, 'IP': 54, 'Physics': 52, 'Chemistry': 58} OR (i) len(List) (ii) List.extend([25,11]) (iii) List.remove(15) or List.pop(1) (iv) List.sort(reverse=True) print(List)	4
13	(i) Yes (ii) If the student clicks on the URL, they will be directed to a fake website which captures personal information (iii) Yes. Phishing (iv) Yes. Hacking is the process of obtaining user's information without their consent. By the above process, the hacker will gain access to users' username and password without their knowledge	4

KENDRIYA VIDYALAYA SANGATHAN, ERNAKULAM REGION
CLASS XI – COMPUTER SCIENCE (083)

SET-II

General Instructions

- The question paper is divided into 3 sections – A, B and C
- Section A, consists of 7 questions (1-7). Each question carries 2 marks.
- Section B, consists of 3 questions (8-10). Each question carries 3 marks.
- Section C, consists of 3 questions (11-13). Each question carries 4 marks.
- Internal choices have been given for question numbers 7, 8 and 12.

		Section -A	
		Each question carries 2 marks	
1		Given the lists L=[22,7,8,16,9,177,91,56,33] Write output of i. print(L[5 : 7]) ii. print(L[-7:-2])	2
2	a	Identify the correct option to print the value 58 from the following data: T=(15,28,36,58,41,9,81)	1
	b	Suppose d=4,5,6. Write name of datatype d represents?	1
3	a	Write a statement in Python to declare a dictionary whose keys are X,Y, 3.3 and values are Monday, Tuesday and Wednesday respectively.	1
	b	What will be the output of following python code >>>d1={"abc":5,"def":6,"ghi":7} >>>d1["abc"]	1
4		What we can see on the screen as output m1=['x','y',8,10] m1.extend([55,44]) print(m1) m1.append(6) print(m1)	2
5		Write the difference between list pop() method and remove() method	2
6		Predict the output: t1=('Mega')*2 print(t1) print(t1+2)	2

7	<p>Match the following:</p> <table border="1" data-bbox="276 178 1421 630"> <thead> <tr> <th data-bbox="276 178 576 231">Column A</th> <th data-bbox="576 178 1421 231">Column B</th> </tr> </thead> <tbody> <tr> <td data-bbox="276 231 576 357">Plagiarism</td> <td data-bbox="576 231 1421 357">Fakers, by offering special rewards or money prize asked for personal information, such as bank account information</td> </tr> <tr> <td data-bbox="276 357 576 451">Hacking</td> <td data-bbox="576 357 1421 451">Copy and paste information from the Internet into your report and then organise it</td> </tr> <tr> <td data-bbox="276 451 576 535">Credit card fraud</td> <td data-bbox="576 451 1421 535">The trail that is created when a person uses the Internet.</td> </tr> <tr> <td data-bbox="276 535 576 630">Digital Foot Print</td> <td data-bbox="576 535 1421 630">Breaking into computers to read private emails and other files</td> </tr> </tbody> </table> <p data-bbox="276 672 341 714">OR</p> <p data-bbox="211 724 1315 808">What is meant by confidentiality of information? List any two best practices for confidentiality of information?</p>	Column A	Column B	Plagiarism	Fakers, by offering special rewards or money prize asked for personal information, such as bank account information	Hacking	Copy and paste information from the Internet into your report and then organise it	Credit card fraud	The trail that is created when a person uses the Internet.	Digital Foot Print	Breaking into computers to read private emails and other files	2
Column A	Column B											
Plagiarism	Fakers, by offering special rewards or money prize asked for personal information, such as bank account information											
Hacking	Copy and paste information from the Internet into your report and then organise it											
Credit card fraud	The trail that is created when a person uses the Internet.											
Digital Foot Print	Breaking into computers to read private emails and other files											
<p>SECTION – B Each question carries 3 marks</p>												
8	<p data-bbox="211 913 1429 1039">Write a program to accept elements of a list from the user . Multiply elements of the list with 7,if an elements is a multiple of 7 otherwise multiply each element with 4. After processing , display the elements.</p> <p data-bbox="803 1071 860 1113" style="text-align: center;">OR</p> <p data-bbox="211 1144 1380 1270">Consider the following list, s=['W','e','a','r', ' ', 'a', ' ', 'M','a','s','k'] Write a program to display each character along with its positive index and negative index.</p>	3										
9	<p data-bbox="154 1270 1396 1354">a What are the possible outcome(s) executed from the following code? Also specify the maximum and minimum values that can be assigned to variable N.</p> <pre data-bbox="211 1386 885 1711">import random NAV = ["LEFT","FRONT","RIGHT","BACK"] NUM = random.randint(1,3) NAVG = "" for i in range(NUM,1,-1): NAVG = NAVG+NAV[i] print(NAVG)</pre>	2										
	<p data-bbox="154 1711 836 1753">b Write the use of import statement in python?</p>											
10	<p data-bbox="211 1806 1169 1848">What do you understand by Net Ettiquetes? Explain any two such ettiquetes.</p>	3										
<p>SECTION – C Each question carries 4 marks</p>												

11	<p>Consider the following list L=[13,18,20,10,18,23] Write python statements to perform (a) count number of times the value 18 is repeating (b) arrange values in descending order (c) remove the last element (d) insert 15 at index position 3</p>	4
12	<p>Consider the following tuple: r=(7,14,21,23,8,88,5,10) Write output of : (a) r[2:6] (b) r[0:7:2] (c) r[::3] (d) r[-8:-2]</p> <p style="text-align: center;">OR</p> <p>Consider the following tuples, tuple1 and tuple2: tuple1 = (23, 1, 45, 67, 45, 9, 55, 45) tuple2 = (100, 200) Find the output of the following statements: i. print (tuple1.index(45)) ii. print (max(tuple1)) iii. print (tuple1 + tuple2) iv. print (sorted(tuple1)) print (tuple1)</p>	4
13	<p>Consider the following dictionary Capital:</p> <pre>Capital={"AndhraPradesh":"Hyderabad", "Bihaar":"Patna", "Maharashtra":"Mumbai", "Rajasthan":"Jaipur"}</pre> <p>Find the output of the following statements:</p> <pre>i. print (Capital.get("Bihaar")) ii. print (Capital.items()) iii. print ("Maharashtra" in stateCapital) iv. del stateCapital["Rajasthan"] print (stateCapital)</pre>	4

Answers

		Section -A	
		Each question carries 2 marks	
1		i. [177, 91] ii. [8, 16, 9, 177, 91]	
2		a. T[3] 2. tuple	
3		a. d1={'X':'Monday', 'Y2':'Tuesday', 3.3:'Wednesday'} b. Key Error	
4		['x', 'y', 8, 10, 55, 44] ['x', 'y', 8, 10, 55, 44, 6]	
5		<p>remove() → Removes the given element from the list. If the element is present multiple times, only the first occurrence is removed. If the element is not present, then ValueError is generated</p> <pre>>>> list1 = [10,20,30,40,50,30] >>> list1.remove(30) >>> list1 [10, 20, 40, 50, 30] >>> list1.remove(90) ValueError:list.remove(x):x not in the list</pre> <p>pop() → Returns the element whose index is passed as parameter to this function and also removes it from the list. If no parameter is given, then it returns and removes the last element of the list</p> <pre>>>> list1 = [10,20,30,40,50,60] >>> list1.pop(3) 40 >>> list1 [10, 20, 30, 50, 60] >>> list1 = [10,20,30,40,50,60] >>> list1.pop() 60 >>> list1 [10, 20, 30, 40, 50]</pre>	
6		MegaMega TypeError: can only concatenate str (not "int") to str	

7

Column A	Column B
Plagiarism	Copy and paste information from the Internet into your report and then organise it
Hacking	Breaking into computers to read private emails and other files
Credit card fraud	Fakers, by offering special rewards or money prize asked for personal information, such as bank account information
Digital Foot Print	The trail that is created when a person uses the Internet.

OR

Confidentiality of Information ensures that only authorized users get access to sensitive and protected data.

Best practices used to ensure confidentiality are

1. Use of Firewall.
2. Control browser settings to block Tracking.
3. Browse Privately.
4. Be careful while posting on Internet.
5. Ensure safe sites while entering crucial information.

SECTION – B

Each question carries 3 marks

8

```
h=eval(input("Enter values"))
length=len(h)
for x in range(0,length):
    if h[x]%7==0:
        h[x]=h[x]*7
    else:
        h[x]=h[x]*4
print("Elements are ",h)
```

OR

```
s=['W','e','a','r',' ','a',' ','M','a','s','k']
length=len(s)
for i in range(length):
```

3

		<code>print("The element ",s[i], "is at indexes ",i, "and" ,(i-length))</code>	
9	a	i) BACKRIGHT Max value 3 and minimum value 1 for variable NUM	
	b	When the import is used, it searches for the module initially in the local scope by calling <code>__import__()</code> function. The value returned by the function is then reflected in the output of the initial code.	
10		Net Etiquets refers to the proper manners and behaviour we need to exhibit while being online. These include : 1. No copyright violation: we should not use copyrighted materials without the permission of the creator or owner. We should give proper credit to owners/creators of open source content when using them. 2. Avoid cyber bullying: Avoid any insulting, degrading or intimidating online behaviour like repeated posting of rumours, giving threats online, posting the victim's personal information, or comments aimed to publicly ridicule a victim.	
11		(a) <code>L.count(18)</code> (b) <code>L.sort(reverse=True)</code> (c) <code>L.pop()</code> (d) <code>L.insert(3,15)</code>	
12		<code>r=(7,14,21,23,8,88,5,10)</code> Outputs of : (a) <code>r[2:6]</code> → (21, 23, 8, 88) (b) <code>r[0:7:2]</code> → (7, 21, 8, 5) (c) <code>r[::3]</code> → (7, 23, 5) (d) <code>r[-8:-2]</code> → (7, 14, 21, 23, 8, 88) OR <code>tuple1 = (23,1,45,67,45,9,55,45)</code> <code>tuple2 = (100,200)</code> Outputs of the statements: i. <code>print(tuple1.index(45))</code> → <code>print(tuple1.index(45))</code> ii. <code>print(max(tuple1))</code> → 67 iii. <code>print(tuple1 + tuple2)</code> → (23, 1, 45, 67, 45, 9, 55, 45, 100, 200) iv. <code>print(sorted(tuple1))</code>	

	<pre>print(tuple1) → [1, 9, 23, 45, 45, 45, 55, 67] (23, 1, 45, 67, 45, 9, 55, 45)</pre>	
13	<pre>Capital={"AndhraPradesh":"Hyderabad", "Bihar":"Patna","Maharashtra":"Mumbai", "Rajasthan":"Jaipur"} Outputs of the statements: i. print(Capital.get("Bihar")) → Patna ii. print(Capital.items()) → dict_items([('AndhraPradesh', 'Hyderabad'), ('Bihar', 'Patna'), ('Maharashtra', 'Mumbai'), ('Rajasthan', 'Jaipur')]) iii. print("Maharashtra" in Capital) → True iv. del Capital["Rajasthan"] print(Capital) → {'AndhraPradesh': 'Hyderabad', 'Bihar': 'Patna', 'Maharashtra': 'Mumbai'}</pre>	

KENDRIYA VIDYALAYA SANGATHAN, ERNAKULAM REGION
SAMPLE QUESTION PAPER TERM 2-SET 3
COMPUTER SCIENCE(CODE:083)
CLASS XI

**TOTAL
MARKS
35**

**Time: 2
Hours**

General Instructions

- The question paper is divided into 3 sections – A, B and C
- Section A, consists of 7 questions (1-7). Each question carries 2 marks.
- Section B, consists of 3 questions (8-10). Each question carries 3 marks.
- Section C, consists of 3 questions(11-13). Each question carries 4 marks.
- Internal choices have been given for question numbers – 1 , 3, 8 and 12.

SECTION A
Each Question carry 2 marks

QNO	QUESTION	MARKS
1	A List is declared as <code>L = [5,6,9,8,16,8]</code> , What will be the output of the following : (i) <code>print(len(L))</code> (ii) <code>print(L[2:6])</code> <p style="text-align: center;">OR</p> Write the built in functions for the following: (i) To find the maximum value from a given list L (ii) Reverses the order of elements in the given list	2
2	A tuple is declared as <code>tuple1 = (2,4,6,8,10,12)</code> Write the output of the following: (i) <code>print(tuple1[1+4])</code> (ii) <code>print(tuple1[-1])</code>	2
3	Consider the following dictionary stateCapital: <code>stateCapital =</code> <code>{"AndhraPradesh": "Hyderabad", "Bihar": "Patna", "Maharashtra": "Mumbai",</code> <code>"Rajasthan": "Jaipur"}</code> Find the output of the following statements: (i) <code>print(stateCapital.values())</code> (ii) <code>print("Maharashtra" in stateCapital)</code> <p style="text-align: center;">OR</p> Write the output of the following python statements: i) <code>>>>math.floor(3.5687)</code> ii) <code>print(random.randint(2,7))</code>	2
4	The following functions belongs to which module: (i) <code>fabs()</code> (ii) <code>randint()</code> (iii) <code>mode()</code> (iv) <code>ceil()</code> (v)	2
5	Differentiate between active digital footprint and passive digital footprint	2

- 6 Define IPR .Give one example. 2
- 7 Name the cyber crime committed in the below cases: 2
- (i) Sanush Copied and pasted information from the Internet into his report and then organise it. And submitted to the teacher as his own work.
 - (ii) Breaking into computers to read private emails and other files .

SECTION – B
Each question carries 3 marks

- 8 What will be the output of the following code segment: 3
- ```
myList = [1,2,3,4,5,6,7,8,9,10]
for i in range(0,len(myList)):
 if i%2 == 0:
 print(myList[i])
```

**OR**

What possible outputs(s) are expected to be displayed on screen at the time of execution of the program from the following code?

```
import random
x = 3
N = random, randint (1, x)
for i in range (N):
 print(i, '#', i + i)
```

- a. What is the minimum and maximum number of times the loop will execute?
- b. Find out, which line of output(s) out of (i) to (iv) will not be expected from the program?
  - i. 0#1
  - ii. 1#2
  - iii. 2#3
  - iv. 3#4

- 9 Write a program to enter names of employees and their salaries as input and store them in a dictionary. 3
- 10 Write any three health hazards caused due to over usage of digital technologies. Suggest any three safety measures to prevent the same. 3

**SECTION – C**  
**Each question carries 4 marks**

- 11 Consider the following tuples, tuple1 and tuple2: 4
- ```
tuple1 = (23,1,45,67,45,9,55,45)
tuple2 = (100,200)
```
- Find the output of the following statements:**
- i. print(tuple1.index(45))
 - ii. print(tuple1.count(45))
 - iii. print(tuple1 + tuple2)
 - iv. print(len(tuple2))

- 12 Write a program to search an element from a list. 4

OR

WAP to check whether the number is divisible by 7 or not in a list.

13

Explain the following:

4

i)FOSS

ii)Propriety Software

iii)Identity Theft

iv) Copyright Infringement

KENDRIYA VIDYALAYA SANGATHAN ,ERNAKULAM REGION
SAMPLE QUESTION PAPER TERM 2-SET 3
COMPUTER SCIENCE(CODE:083)
CLASS XI

**TOTAL
MARKS
35**

**Time:
2 Hours**

MARKING SCHEME

SECTION A

Each Question carry 2 marks

QNO	PART NO	QUESTION	MARKS
1		(i) 6 (ii) [9,8,16,8] <p style="text-align: center;">OR</p> (iv) print(max(L)) (v) L.reverse()	2
2		(i) 12 (ii) 12	2
3		(iii) dict_values(['Hyderabad ', ' Patna ', ' Mumbai ', ' Jaipur ']) (iv) True <p style="text-align: center;">OR</p> i) 3 ii) will generate a number between 2 and 7, inclusive	2
4		(vi) fabs()-math module (vii) randint()-random module (viii) mode()-statistics module (ix) ceil()-math module	2
5		<ul style="list-style-type: none"> • Active digital footprints which includes data that we intentionally submit online. This would include emails we write, or responses or posts we make on different websites or mobile Apps, etc • The digital data trail we leave online unintentionally is called passive digital footprints. This includes the data generated when we visit a website, use a mobile App, browse Internet, etc., 	2
6		<ul style="list-style-type: none"> • Intellectual Property Rights (IPR) help in data protection through copyrights, patents and trademarks. <p>Intellectual Property refers to the inventions, literary and artistic expressions, designs and symbols, names and logos.</p>	2
7		<ul style="list-style-type: none"> • Plagiarism • Hacking 	2
SECTION – B			
Each question carries 3 marks			
8		1	3

3
5
7
9

OR

OUTPUT: (ii)

a. Minimum Number = 1

Maximum number = 3

b. Option (iv)

9

```
num = int(input("Enter the number of employees whose data to be stored: "))
count = 1
employee = dict() #create an empty dictionary
while count <= num:
    name = input("Enter the name of the Employee: ")
    salary = int(input("Enter the salary: "))
    employee[name] = salary
    count += 1
print("\n\nEMPLOYEE_NAME\tSALARY")
for k in employee:
    print(k, '\t\t', employee[k])
```

3

10

Health Hazards

- Eye strain is a symptom commonly complained by users of digital devices.
- Bad posture, backaches, neck and shoulder pains.
- Stress, physical fatigue and obesity are the other related impacts.

Safety Measures

- It is better to periodically focus on distant objects, and take a break for outdoor activities.
- Position devices and t position our posture.
- Arranging workplaces including the furniture, equipments and systems so that it becomes safe and comfortable for the user.

3

SECTION – C

Each question carries 4 marks

11

i. 2
ii. 3
iii (23, 1, 45, 67, 45, 9, 55, 45, 100, 200)
iv. 2

4

12

Write a program to search an element from a list.

```
lst=eval(input("enter the elements:"))
n=len(lst)
x=int(input("enter the element to be searched:"))
for i in range(n):
    if(x==lst[i]):
        print("The element",x," is found at index",i)
        break
else:
    print("The element is not found")
```

OR

WAP to check whether the number is divisible by 7 or not in a list.

```
lst=eval(input("enter the elements:"))
n=len(lst)

for i in range(n):
```

4

```
if(lst[i]%7==0):
    print("The element",lst[i]," is divisible by 7")
else:
    print("The element",lst[i]," is not divisible 7")
```

13

- Explain the following:
- i)FOSS-OPEN SOURCE SOFTWARE
- Free and Open Source Software (FOSS) allow users to not only access but also to modify (or improve) them.(Python,MySQL etc)
- ii)Proprietary Software-
- Proprietary software that we use are sold commercially and their program code (source code) are not shared or distributed.(Microsoft Office,Wndows etc)
- iii)Identity Theft-
- Personal information stolen from computers or computer networks, to commit fraud by using the data gained unlawfully is calledidentity theft. A user’s identifiable personal data like demographic details, email ID, banking credentials, passport, PAN, Aadhaar number and various such personal data are stolen and misused by the hacker on behalf of the victim
- iv) 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.

4
