EAL94	
Python programming	notes by Harry
rymon rogazione	
111 d is Programming	
What is Programming The Just like we use Hi	ndi or English to Communicate
Just like in which we	use a programming
With eller libe Putho	ndi or English to Communicate use a programming n to communicate with to instruct the computer
language the	
The Company is a way	to instruct the computer
Programming is the way	to instruct the computer tasks.
to perjount voices	
Q 14	
What is Python ?	and easy to understand
Python we which fee	Is like reading simple
language Pagudo C	ode nature of python makes
english the learn on	ls like reading Simple ode nature of python makes d understandable by beginners
il long to survive	0 0
Cature at Puthon	1.1
Features of 19 tond = La	ss development time
tasy to windersonal	San a
Lich land language	
Partille > Works on Linu	x/windows/Mac.
Features of Python  Easy to understand = Lo  Free and open source  High level language  Portable > Works on Linu  + Fun to work with	
7 4/1	
Installation	- 111 Lun buthon ATA
Python can be lasily	installed from putton
When you click on the	alle Vou Complete the Getyp
can be installed right	11- 10 you conficience serg
by executing the fige of	installed from python.org download button, python after you complete the getup or your platform
	Let install 10-07/
	Just install  it like a game!

//

	ELG3
-	
/	Chapter 1: Modules, Comments 2 pip
	The Alle Faladia (All Carlos Carlos All All All All All All All All All Al
	Lets write our very first by thon program. Create a file called hello-by and paste the below code in it
	Create of file colled hello the and baste the
1	below and in it
	WWW WWW I'V
	print ("Hello World") -> print is a function (More later)
	hit paid and store a hist Alle stranged
	Execute this file (by file) by typing bython hello by and you will see Hello World printed on the Screen.
	and you will see Hello World brinked on the
in an	Screen.
4 1	I would rather
	Modules
	A module is a file containing code written by somebody else (usually) which can be imported and used in our programs
	by somebody else (usually) which san be
	imported and used in our programs
INT	2. Math line Comments - shilled mind to Commen
	Pip
	Pib is the backage manager for buthon
	Pip is the package manager for python You can use pip to install a module
	On your System
	pip install flask installs
	flask module.
	The thing at the same of the s
	Types of modules
	There are two tubes of modules in Puthan
17	There are two types of modules in Python  Built in modules -> Pre installed in python  External modules -> Need to install using pip.
22	External modules - Need to install using his.
	The state of the s
	Some examples of built in modules are as about
	Some examples of built in modules are tensorfow, flork ek.
	John Ch.

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	Using Python as a Calculator We can use python as a calculator by typing "python" + I on the ferminal This opens REPL or Read Evaluate Print loop
	We can use python as a calculator by
	typing "python" + I on the terminal
1	This opens REPL
	or Read Evaluate Print loop
1	·
avol	Comments a trive - ("block alloll") trive
	Comments are used to write something which
1913.	the programmer does not want to execute.
BH	the you will see Help World granted on
	Comments Comments are used to write something which the programmer does not want to execute.  Lean be used to mark
1	author name, date ck
	The distribution of the state o
	Types of Commentsoins and a wonton
	There are two types of comments in Python
17	Single line Comments -> Written using #
27	Types of Comments  There are two types of comments in Python  Single line Comments - Written using ##  Multi line Comments - Wrillen using !!! Commend !!!
	Lad W. J. J. C. J.
4	
	abstract State Design did & Design Holle mobiles
	out the sail
	Tapes of modules
	Truck are two tipes of produces in Person:
	is failt in produler - it is white it
	de mil being e holy - relation larger I -
1-1	I forme examples it finds in admiss and
- 4,	Long examples of diseased mylaise we know four to

	Chapter 2 - Variables and Datatypes
ille	A variable is the name given to a memory location in a program for example
Sing	1 Habert
prafeson	C = 71.22   Keywords = Reserved words in Python  Identifiers = class (function / variable name  Primarily there are following data types in Python  Total total control of the control of
27	Floating point numbers 20 miles were
37 4, 5,	Booleans None H moldon m nothing more port all lodge
	Python is a fantastic language that automatically identifies the type of data for us.
	a = 71 ⇒ Identifies a as class <int> b = 88.44 ⇒ Identifies b as class &lt; flat?  name = "Harry" ⇒ Identifies name as class &lt; 5tr&gt;</int>
<b>→</b>	Rules for defining a Variable name -> Also applies to other Hurtyen A variable name can contain alphabets, digets and underscores.
<b>→</b>	A variable name can only start with an alphabet and underscore.
$\rightarrow$	A variable name cant start with a digit
<b>→</b>	A variable name cant start with a digit No while space is allowed to be used inside
	a variable name.

	ELG3
	Forambles of a Control
	tramples of a few variable names are: harry, one8, seven_, _seven_ etc.
	narry, onés, seven
114 Y	DICE I AD Accorded who there is
11	Operators in Python
141	tollowing are some common operators in rython:
17	Following are some common operators in Python: Arithmetic operators => + - , + / etc.  Assignment operators => - , + / etc.
4	$\underline{}$
3,	Comparison operators => == ,> ,> = , != etc.  Logical operators => and, or, not
4,	Logical operators => and or not
ij	the state of the s
ķ.	type () function and Typecasting
	type () function and Typecasting  type function is used to find the data type of a given variable in Python.
	a given variable in Python.
1	a = 31
	type(a) => class < int>
	b = "31"
B.	type (b) => class 25tr>
	A number can be converted into a string and Vice versa (If possible) There are many functions to convert one data type into another
Ci Ci	Vice versa (If bossible)
	There are many functions to convert one data type
	into another
	Str (31) => "31" => Integer to String Conversion
2	int (" 32") => 32 => String to Integer conversion
	5tr (31) => "31" ⇒ Integer to String Conversion int ("32") ⇒ 32 ⇒ String to Integer Conversion float (32) ⇒ 32.0 ⇒ Integer to float Conversion
	The Control of the Co
	oss and so on
	Here "31" is a string literal and 31 a numeric literal.

•		
	Injute) function  This function allows the user to take input  from the keyboard as a String	
	This function allows the user to take input	
	from the keyboard as a string	
The state of the s	a = input (" Enter name") => If a is "harry"	the
	many user entered have	<b>y</b>
	10 = - = 1 = = = = = = = = = = = = = = = =	
. 1	It is important to note that => If a is "34"  the output of input is always entered 34  a string (even if the number	user
	the output of input is always entered 37	
	a string ( even if the number	
,	is entered) protocogy boro redone lody	
40	ight may out but of profit of non-own of his	
- A	of given joriable in Refrien	
	16 - 0	
	Lubela) => (lass sints	
	The area of the same	
31.	1/3/1/2 // 3/1/2 // 3/1/2 // 1	
	Lube 16 1 = 2 clara 25177 1	
<b>\</b>		
1	I A number can be converted into a strong as	
1 .	e Vice versa (if possible)	1
hi r	here the thought and the country and	ė.
	mant and all	
1		alexy.
1	the purple of many the state of the last o	
10	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	The state of the s	
. 1	Med our Mind)	
	There is a street board and it a more to the	
	The second secon	17.

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	Chapter 2 - Practice Set
1	Write a Python program to add two numbers
2 =	Write a Python program to find remainder when a number is divided by Z
3 =	(heck the type of the variable assigned using input () function.
4 =	Use Comparison operators to find out whether a given variable a is greater than b or not.  Take a = 34 and b = 80
5	Write a python program to find average of two numbers entered by the user.
6 =	Write a python program to calculate square of a number entered by the user

, save-	
	Chapter 3 - Strings
med	String is a data type in Python.  String is a sequence of characters enclosed in quotes.  We can primarily, write a string in these three ways
3,	Single quoted strings $\rightarrow$ a = 'Harry'  Double quoted strings $\rightarrow$ b = "Harry"  Triple quoted strings $\rightarrow$ c = ''' Harry''
muf D	String String a man strong of materials
	String Sticing A string in Python can be sticed for getting a part of the String- Consider the following string:
604	Consider the following string:
40	name = $\frac{1}{1} \frac{1}{a} \frac{1}{r} \frac{1}{r} \frac{1}{y} = \frac{1}{2} \frac{1}{3} \frac{1}{4}$ (-5)(-4)(-3)(-2)(-1)
	The index in a string starts from 0 to (length-1) in Python. In order to slice a string, we use the following syntax:
	sl = name [ind_start; ind_end]  first index included ast index is not included
	sl[0:3] returns "Har" - characters from 0 to 3 sl[1:3] returns "ar" - characters from 1 to 3
	Negative Indices: Negative Indices can also be used as shown in the figure above -1 corresponds to the (length-1) index, -2 to (length-2)
• • •	

	EUGE
5,	String find (word) - This function finds a word and returns the index of first occurrence of that word in the string.
6,	String replace (Oldword, newword) - This function replaces the oldword with newword in the entire string.
	Escape Sequence Characters
1	Escape Sequence Characters Sequence of characters after backslash > Escape Sequence characters
	MORALE TO I TO I HARRY K- I I HARRY CHARACTERS
^	Escape sequence character comprises of more than one characters but represents one character when used within the strings.
	characters but represents one character when used
	Within the strings.
bekariya	come of the martle martic accoming to beaution
	-xamples in it was etc.
	Examples n, t etc.  newline Tab Singlequake backslash.
40 14	10 (and) function - This launction returns the isno
10 14	Lie string
	The fields in the second secon
	Con-L'e Harry 1 - i so success 51 mess
	CA-L' HUNDY - T MARKEN S. MERCH
	The state of the s
3/48/14/0	All mortany End ("484") of his function tells
3.0; K	es brough out of your spice though office
91	mote it stand is "Hanty" it comments to
	Kar your space housed some dar has
Markey M.	to remain both the street of the court was to
	of any paracter
	The state of the s
1 hours	all ended the down in substant pour is
- 6	1 to the state of the matter of the state of
N.	

	LEGI_
	Chapter 4 - Lists and Tuples
benda	Python Lists are containers to store a set of values of any data type
estig :	friends = ["Apple", "Akash", "Rohan", 7, false]  Stri)  Can store Value of any  datatyte
· · · · · · · · · · · · · · · · · · ·	List Indexing A List can be indexed just like a string
2	vi mod L1 = 10 7, 9, "Heiry" negart of styles
A III	$ \begin{array}{c c}  & 1 & 0 & = > 7 \\  & 1 & 1 & 1 & = > 9 \\  & 1 & 1 & 1 & = > Error \\  & 1 & 1 & 1 & = > Error \end{array} $ $ \begin{array}{c c}  & 1 & 1 & 1 & 1 & 1 & 1 \\  & 1 & 1 & 1 & 1 & 1 & 1 \\ \end{array} $ $ \begin{array}{c c}  & 1 & 1 & 1 & 1 & 1 & 1 \\ \end{array} $ $ \begin{array}{c c}  & 1 & 1 & 1 & 1 & 1 \\ \end{array} $ $ \begin{array}{c c}  & 1 & 1 & 1 & 1 & 1 \\ \end{array} $ $ \begin{array}{c c}  & 1 & 1 & 1 & 1 & 1 \\ \end{array} $ $ \begin{array}{c c}  & 1 & 1 & 1 & 1 \\ \end{array} $ $ \begin{array}{c c}  & 1 & 1 & 1 & 1 \\ \end{array} $ $ \begin{array}{c c}  & 1 & 1 & 1 & 1 \\ \end{array} $ $ \begin{array}{c c}  & 1 & 1 & 1 & 1 \\ \end{array} $ $ \begin{array}{c c}  & 1 & 1 & 1 & 1 \\ \end{array} $ $ \begin{array}{c c}  & 1 & 1 & 1 & 1 \\ \end{array} $ $ \begin{array}{c c}  & 1 & 1 & 1 & 1 \\ \end{array} $ $ \begin{array}{c c}  & 1 & 1 & 1 & 1 \\ \end{array} $ $ \begin{array}{c c}  & 1 & 1 & 1 & 1 \\ \end{array} $ $ \begin{array}{c c}  & 1 & 1 & 1 & 1 \\ \end{array} $ $ \begin{array}{c c}  & 1 & 1 & 1 & 1 \\ \end{array} $ $ \begin{array}{c c}  & 1 & 1 & 1 & 1 \\ \end{array} $ $ \begin{array}{c c}  & 1 & 1 & 1 & 1 \\ \end{array} $
(UxiX)	List Methods experienced moreous and a
Latino	L1 = $\begin{bmatrix} 1, 8, 7, 2, 21, 15 \end{bmatrix}$
7	11. Sort (): updates the list to [1, 2, 7, 8, 15, 21]
27	[1. reverse(): updates the list to [15, 2), 2, 7, 8, 1]
3,	L1. append (8): adds 8 at the end of the list
4,	L1. inscrt (3,8): This will add 8 at 3 index
17	List Methods Consider the following list:  L1 = [1,8,7,2,21,15]  L1. Sort(): updates the list to [1,2,7,8,15,21]  L1. reverse(): updates the list to [15,2),2,7,8,1]  L1. append (8): adds 8 at the end of the list

-	ELG3
5,	1.1. pop (2): Will delete element at index 2 and veturn its value
	vi si uni santi di
67	11. remove (21): Will remove 21 from the list.
nkol2	Tuples in Python
	Tuples in Python  A tuple is an immutable data type in python.  Gannot change
N.	
	a = () => Empty tuble
	a = (1,) => Tuble with only one element needs a commo
1	$Q = (1) \Rightarrow \text{Empty tuble}$ $Q = (1, ) \Rightarrow \text{Tuble with only one element needs a common } Q = (1, 7, 2) \Rightarrow \text{Tuble with more than one element}$
	Ask will reason.
	Once defined a tuple's elements can't be altered or manipulated.
Settle .	or manipulated
	in the following the second of
i de	Tuple methods Consider the following tuple
Ka -T	Consider the following tuple
	Q = (1, 7, 2)
	( 1, 1), a ( m) [a) will rely as more of lines 1
17	a. (ount (1): A. (ount [1) will return number of times 1
-	occurs in a.
2.	O. index (1): a. index (1) will return the index of first
47	occurrence of 1 in a
1	Decarring of I m my
1	
	The state of the s

	EDGE
ectan se	Chapter 4- Practice Set
1	Write a program to store seven fruits in a list entered by the user.
2	Write a program to accept marks of 6 students and display them in a sorted manner
3 =	Check that a tuple samuet be changed in by thon
4 /	Write a program to sum a list with 4
5 3	Write a program to count the number of zeros in the following tuple: $a = (7,0,8,0,0,9)$
1 20	the following mobiles than (1) through 1 : (1) through 10: (1)
tab	Les interests in the factor of the interests of the color of

hills	Chapter 5: Dictionary & Sels
09	AND THE STATE OF THE PARTY OF T
V1	Dictionary is a collection of key-value pairs
14,	,
	Syntax: keys values
18	Syntax: keys values  Q = 2 "key": "Value",  "harry": "Ode",
	"harry": "(ade", month of stall
	"list": [1,2,9] }
Als	withi May Mas Mas a -1 Hair s B
	Q ["key"] => Prints "Volue"
31	a ["list"] => Prints "value"  a ["list"] => Prints [1,2,9]
	1 111100 [ 1, 1, 1, 1]
with	Properties of a Puthon Dictionaries
1171	Properties of a Python Dictionaries  It is unordered
2	Italis mutable mind ni xta to soo when
37	It is indexed could anguel probable
4.5	Cannot Contain duplicate keys
7/	at 10 milestant
eith.	Dictionary Methodes hardroom son die
h	Consider the following dictionary
	Construct the following sawithmen
	a = 2 "name": "Harry"
	"Fram": "India"
	"from": "India", "marks": [92,98,96] }
	the property of the soliday
1_	a. items(): returns a list of (Rey, value) tuples
17	
1-	a keys(): returns a list containing dictionary's keys
37	a update (E"friend": "Sam"}): updates the dictionary with Supplied key-value pairs
- 17	Supplied but - Volum baits
	supplied pay: time pasts

4:	0. get ("name") : returns the value of the specified keys (and Value is returned eq. "Harry" is returned here)
	keys (and Value is returned
874	Harry is returned here
*	
	More methods are available on does pythonorg.
	all a series " " John
No.	Sets in Python Set is a collection of non repetitive elements
	Set is a collection of non repetitive elements
	2117 118
	S = Set () => No repetition allowed
	5. add (1) => or set = \(\frac{2}{2}\)
A -1	g. add (2) => or set = 21,2}
12	TO O. 11 (C. 11 (C. 1 )
-	If you are a programming beginner without much knowledge of mathematical operations on sets, you can simply look at sets in python ias data types containing unique values.
	knowledge of mathematical oberations on sels, you can
	Simply look all sels in python his data types
	and shally makes tones
	Properties of Sets
17	Sets are unordered => Ekment's order doesn't matter
	Sets are unindexed > Cannot access elements by index
3,	There is no way to change items in sets.
4,	Sets connot contain duplicate values
	" what " Property " " " " " " " " " " " " " " " " " " "
	Operations on Sets January
	Consider the following Set:
25/4	( anti) ( 6) = \ \( \frac{1}{8}, \frac{1}{8}, \frac{1}{2}, \frac{3}{3} \) \( \frac{3}{1} \) \( \frac{1}{1} \) \( \frac{1} \) \( \frac{1}{1} \) \( \frac{1} \) \( \frac{1}{1} \) \( \frac{1} \
	La J.N. O.H. W. H. L. W. A. W. A. W.
241 17	len(s): Returns 4, the length of the set
1.0	5 remove (8): Updates the set 5 and removes 8 from 5
2,	5 miles (c) upantes The set of and removes of flat
· · ·	

•	EBGH
3,	5. pop(): Removes an arbitrary element from the set and returns the element vernoved
4.	G. clear (): Empties the set 5
5 7	5. Union ({28,113): Returns a new set with all
6.11	when the items from both sets. => 21,8,2,3,115
12/8	S. intersection ( & 8,113): Returns a Set which contains only items in both sets. => 283
. 3	$\begin{array}{c c} R_1 & R_3 \\ \hline R_2 & R_3 \\ \hline R_1 + R_2 + R_3 \Rightarrow A \cup B \end{array}$
P Emil	$(OC) R + R_3 \Rightarrow A \triangle B$ $(OCC) R \Rightarrow A - B$ $(OCC) R_1 \Rightarrow A - B$ $(OCC) R_2 \Rightarrow B - A$
	5 5 = 5 }
0	what is the type of 5?  ( reate an early dictionary Allow 4 faineds
and	ust pays as their names the une that
file	Today of 2 frigates our same what
	to the program in Robbins 61
ton	1 I Paramagin of two friends and increments

	EDG1
1	Write a program to create a dictionary of Hindi
2	Write a program to create a dictionary of Himi words with values as their english translation.  Provide user with an option to look it up!  Write a program to input eight numbers from the
	Write a program to input eight numbers from the user and display all the unique numbers (once).  Can we have a set with 18 (int) and "18" (str) as a values in it?
AUK ( AAB 8-8-	What will be the length of following Set 5:  5 = Set ()  5 add (20)  6 add (20.0)  5 add ("20") => length of 5 after these operation?
5	5= { } what is the type of 5?
6	Create an empty dictionary. Allow 4 friends to enter their favourite language as values and use keys as their names. Assume that the names are unique
7	If names of 2 friends are same; what will to the program in Problem 6?
8 =	If languages of two friends are same; what will happen to the program in Problem 6?
· · · · · · · · · · · · · · · · · · ·	

9 Can you change the values inside a list which is contained in set 5  5 = {8, 7, 12, "Harry", [1,2]}		
	9	000
	1	you change the values inside a Met which
		18 Contained
		in set 5
5 = {8, 7, 12, "Harry", [1,2]}		
5 = 28, 7, 12, "Harry", [1,2]\$	-	
7 - 2 a , + , 12 , "Hawy" , [1, 2] 3	1	6- 10 1 10 111 5 - 7
		70, +, 1/ "Marry" 1,23
	A STATE OF THE PARTY OF THE PAR	
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	OF ST.	
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	- MATERIAL TO THE PARTY OF THE	
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	2.33	
	315	
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	100	
	46	

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1	Chapter 6 - Conditional Expressions
1415	
Į.	Sometimes we want to play puls on our phone if the day is sunday.  Sometimes we order Tuecream online if the day
	if the day is sunday.
	Sometimes we order Tuerream online if the day
	Gometimes we go hiking if our farents allow.
	All these are decisions which depends on a
	Condition being met
	In Python programming too, we must be able
	to execute instructions on a condition (s) being net
	In Python programming too, we must be able to execute instructions on a condition (s) being net. This is what conditionals are for!
	The else and elil in Duthan
	If else and elif in Python  If else and elif statements are a multiway decision taken by our program due to certain conditions in our code.
	Labora he our brookens due la certain conditions in
	The code program will to commission in
	Due Coul.
	Syntax:
	Jynnax.
	Indentation ( ): => if (and tion 1 is true
	elif (condition 2):   print (" Yes")  elif (condition 2):   print (" No")
	elif (condition 2):   if condition 2 is true
	print ("No")
	else:   Otherwise
	print ("Maybe")
9	Code example:
	Q = 22
[V]	if(a>9):
	brint /" Greater "
	print (" ksser")

Acres and the second	HA4110	EDG3
	ZW131	
madu)	Infortant notes: There can be any number last else is executed on	er of elif statements.  Ly if all the Conditions inside
	elik faul:	Relational Operator
Area de	has lowless of hear	Relational operators are
lation.	A La regional surge of	inside the 1 stoleman
		: DEAD WAY OF :
		May(P)
	Ut. (page)	Jo - 1
		coiral merators
Section 1	ers operate on condition	torsea lacical assert
		and Sintemants - Example - Los
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	The same of the sa	m aut linsur - tom
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-		al 1 st
	the time taken and the	1/2 million 1/ 1/2
	All the secondary	which the
	24)	(s midden) into
		about to

1	Wrik a program to find greatest of four numbers entered by the user.
1	White a program to find arratest of four numbers
1	Write a program to find printest of four numbers
	Write a hungroun to find arestest of four numbers
	THE VE PROFESION OF THE VY CHARLES OF THE PROFESION OF TH
	entered by the user.
2	Write a program to find out whether a Student is pass or fail, if it requires total 40% and At least 33% in each subject to pass. Assume 3 Subjects and take marks as an input from
	is pass or fail if it requires total 40% and
	At least 33% in each subject to pass Assume
i jir	3 Subjects and take marks as an input from
	the user
3	A spam comment is definded as a text containing
2	following Reywords:
	"make a lot of money" buy now", subscribe this,
134	following Reywords: "make a lot of money" buy now", Subscribe this", "click this". Write a program to detect these spains.
4	Write a program to find whether a given username Contains less than 10 characters or not.
1	Contains less than 10 characters or not.
_5_	Write a program which finds out whether a given name is present in a list or not:
	name is present in a list or not.
	11 + a 1 · · · · · · · · · · · · · · · · · ·
6	Write a program to calculate the grade of a Student from his marks from the following
	Student from his marks from the following
	scheme:
	$90 - 100 \rightarrow Ex$
-	$80 - 90 \rightarrow A$
_	$70 - 80 \rightarrow B$
35	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
	50 - 60 - D ∠50 - F
-	270 - T

•	EDG3
J.	Write a program to find out whether a given post is talking about "Harry" or no
	The way to prest of
Just	are a majerial true time or morning of
No. VK	For low way it is light a way
-300	3 supports and take panes all and input of
i had	A span parament is definded as a tat
SAMONE L	while the minutes a sequence to that their
int 1	some is breakent in a list on not
	short of papers to calculate the strain state of the strain of the state of the sta
	13 - 1001 - OF
	- OF -48
	C - ON OF

## Chapter 7 - Loops in Python Sometimes we want to repeat a set of statements in our program. For instance: Print 1 to 1000 Loops make it easy for a programmer to tell the computer, which set of instructions to repeat and how! Types of loops in Python Primarily there are two types of loops in Python 1- While loop 2, for bop We will look into these one by one! The syntax of a while box looks like this: While Condition: => The block Reeps executing until the condition is true In while loops, the condition is checked first If it evaluates to true, the Body of the loop is executed, otherwise not! If the loop is entered, the process of [Condition Check & execution] is continued until the condition becomes false. Quick aug: Write a program to print 1 to 50 using a while loop.

	An Example
30	i = 0 while i < 5:   prints "Harry" - 5 times!  print ("Harry")  i = i + 1
	Note: If the condition never becomes false, the loop keeps getting executed.
	Quick Quiz: Write a program to print the content of a list using while loops.
	For loop  A for loop is used to iterate through a sequence is  list, tuple or string [Iterables]
	The syntax of a for loop looks like this:
41	l= [1, 7, 8]  for item in l:  print (item)  print 1, 7 and 8
toda Lun	Range function in Python The range function in python is used to generate a sequence of numbers. We can also specify the Start, Stop and Step-Size as follows:
	range (Start, Stop, 5kp-size)  Step size is usually not used with range()

	An Example demonstrating range () function
	Cor i in vamor ( a 2): -> range (2) can also be used
	for i in range (0, 7): → range (7) can also be used  print (i) → prints 0 to 6
-	
	For loop with else
	For loop with else can be used with a for loop if the code is to be executed when the loop exhausts Example:
	if the code is to be executed when the loop exhausts
	Example:
	V = 1 1 7 8 1
	for item in l:
	print (item)
	for item in l:  print (item)  else:
	print ("Done") -> This is printed when the
	loop exhausts!
	Output:
	1 Selemnya
	7 18 1 1 1 = 3
	8 I mi mod are
1	Done
	Balling tool (III)
	The break statement
	break is used to come out of the loop when encountered
	'break' is used to come out of the loop when encountered It instructs the program to - Exit the loop now
-	
	Example:
	for i in range (0,80):  print (i)   This will print 0, 1, 2
	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
	if $i=3$ : and 3  break
	J. Co.

The continue Statement 'Continue' is used to stop the current iteration of the loop and continue with the next one It instructs the program to "skip this iteration" Example: for i in range (4):

print ("printing")

if i = = 2: => if i is 2, the iteration

(antinue is skipped

print (i) pass stakment
pass is a null stakement in python
It instructs to "Do nothing" Example: l = [1, 7, 8]for item in l:
pass -> Without pass, the program

adt d	Chapter 7 - Practice Set
1	Write a program to print multiplication table of a given number using for loop.
2	Write a program to greet all the person names Stored in a list l1 and which starts with 5  l, = ["Harry", "Sohan", "Sachin", "Rahul"]
3	Attempt problem 1 using while loop.
4	Write a program to find whether a given number is prime or not
5	Write a program to find the Sum of first n natural numbers using while loop.
6 ==	Write a program to calculate the factorial of a given number using for loop.
7 =	Write a program to print the following star pattern
	***  ***  ***  ***  ****  ****  ****  ****
8	Write a program to print the following star pattern:
	* * * * for n = 3

9	Write a program to print the following Star pattern
0 10	* * for n = 3
	* * for n = 3
10	a Wate a Grovenia to arest all the beside con
10	Write a program to print multiplication table of n using for loop in reversed order.
	n using for loop in reversed order.
	I Adapt problem I wang white loop
150	a linte a traggam to find retather a gard run
	tac so shirt is
	S with a frozens to find the Suns of fixed
	esteral mindress using while loop
in in	and a byogram to calculate the factorial
	dod seet pour reduction to
neetled 	rell exiculat the trust of margons a stand
	* = * * * * * * * * * * * * * * * * * *
	with a proposal of the following the following the follow
	ESA JA . A A .
1	

## Chapter 8 - Functions & Recursions A function is a group of statements performing a specific task. When a program gets bigger in size and its complexity grows, it gets difficult for a programmer to keep track on which piece of code is doing what! A function can be reused by the programmer in a given program any number of Example and Syntax of a function The syntax of a function looks as follows: def func 1 (): print ("Hello") This function can be called any number of times, anywhere in the program. tunction Call Whenever we want to call a function, we put the name of the function followed by parenthesis as follows: func 1 () -> This is called function call function definition The part containing the exact set of instructions which are executed during the function call.

Quick Quiz: Write a program to greet a user with "Good day" using functions. Types of functions in Python

There are two types of functions in Python:

17 Built in functions

2> User defined functions 

Defined by the user Examples of built in function includes len(), print(), range() etc. The func I() function We defined is an example of user defined function Functions with arguments

A function can sacept some values it can work

with we can put these values in the parenthesis

A function can also return values as shown below: def greet (name) gr = "Hello" + name return gr

"Harry" is passed to greet in name

a = greet ("Harry")

a will now contain "Hello Harry" Default Parameter Value us default argument in a If we specify name = "stranger" in the line containing def, this value is used when no argument is passed.

For example: def greet (name = "stranger"):
# function body greet ("Harry") -> Name will be "Stranger" in function body (default)
greet ("Harry") -> Name will be "Harry" in function body (passed) Recursion Recursion is a function which calls itself
It is used to directly use a mathematical formula
as a function for example: factorial  $(n) = n \times factorial (n-1)$ This function can be defined as follows: def factorial (n):

if i = = 0 or i == 1: > Base condition which doesn't call

return) the function any further

else: return n \* factorial (n-1) -> function calling itself This works as follows: Factorial (4)

J → [Function called] 4 x factorial (3) 4 x [3 x factorial (2) 4 x 3 x [2 x factorial(1)] 4 × 3 × 2 × [1] [ function returned

	The programmer need to be extremely careful while working with recursion to ensure that the function doesn't Infinitely keep calling itself.  Recursion is sometimes the most direct way to code or alogorithm
(dotted	That will a figure of the second of Contract I have
	Keinkkion is a feet est of the test
	Promision is a function which allo itself.  It is used to directly use a nothinatical formal
- 1	The Continue for example:
	$factorial(n) = n \times factorial(n-1)$
	This function can be defined as follows:
	- ( - ( - ( - ( - ( - ( - ( - ( - ( - (
Mai I	the factorial (m):  (If i == 0 th i == 1: = bus writing which does
3101	redicted and farction and farction
* **	else:
Date	volume nx factorial (n-1) + function collection
7	
	Institute of opposition
	the female and the females and
	a manager 14 X for and 13)
	(S) hardard x 4s 7 x 4s
	Million and the first of the first fall
	Investor of the Till I was a K at the middle of

	Chapter 8 - Practice Set
1	Write a program using function to find greatest Of three numbers
2	Write a python program using function to convert Celsius to fahrenheit
3	How do you prevent a python print () function to print a new line at the end.
4 //	Write a recursive function to calculate the sum of first n natural numbers.
5	Write a python function to print first a lines of the following pattern:
9	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
6	Write a python function which converts inches to coms
7	Write a python function to remove a given word from a list and steep it at the same fine.
8 =	Write a python function to print multiplication table of a given number.

ton	Project 1: Snake, Water, Gun Game  We all have played snake, water gun game in our childhood. If you haven't, google the rules of this game and write a Python program capable of playing this game with the user.
ot ot	s Hout do you brownt so putton briet 1) function
40 0	e Write a recursive function to calculate the sea
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	5 Wit a fulfion hunction to bent first a line the following pattern:  * * *  * * *  * * *  * * *  * * *  * * *
À1	by Write a python function which converts inch
Mari)	I Write a further function to Kensove a given word  I white a fully function to the same from
340	that a python function to print multiplicate white of the square municipal a lower municipal

_	
_	Chapter 9 - file I/O
-	To had Alexander
	The rundom Access memory is Volatile and all its
-	Contents de lost once a program ferminates
-	The transform Access memory is Volatile and all its contents are lost once a program ferminates  In order to persist the data forever, we use files
	H file is mala stored in a storage device. A rython
	program can tack to the tile by relating content
	A file is data stored in a storage device A Python program can talk to the file by reading content from it and writing content to it
	Comp. Program Written in Python Read FILE
	Comp. Program Written in Tython Road + LE
	THE THE HUMANIE TO SERVICE THE
	VIII VOICHIC
	Tile of File
	Types of tiles
-	There will be types of tiles.
7_	River Ciles ( )1 let at
7	Types of files  There are 2 types of files:  Text files (. txt, c etc)  Binary files (.) pg, dat, etc)
	Python has a lot of functions for reading, updating and deleting files
	and deleting liles
	tome necessity files.
	WASHINGTON TO A TOTAL OF THE PARTY OF THE PA
	Rolling to The share () Europian Cox sheming Elex. Th
	Opening a file Python has an open() function for opening files. It takes 2 parameters: filename and made.
	takes 2 parameters of lename rank male.
	Oben (" Whie Lut" "")
	Open ( 1rus txt )
31	Open (" this txt", "")  Filename  This txt", ""  mode of opening (read mode)
Eq.	open is a built-in function
	open 15 a built - in function

Writing files in Python

In order to write to a file, we first open it in write or append mode after which, we use the python's f. write() method to write to the file!

f = open ("this. txt", "w")

f. write ("This is nice") → (an be called multiple times

f. Close() With statement The best way to open and close the file automatically is the with statement with open ("this txt") as f:

f. read ()

Don't need to write f. clase()

as it is done automatically. while a program to senerate multiplication to from 2 to 20 with write it to the di A Fly Rondows a word "Runky" multiple transis with a program to prime a log wite is proposed to find but the

	Chapter 9 - Practice Set
	The state of the s
1	Write a program to read the text from a given file poems txt and find out whether it contains the word twinkle.
11.1.	the word furnile.
2	The game () function in a program of
"	The game () function in a program lets a user play a game and returns the score as an integer. You need to read a file 'History txt' which is either blank or contains the previous Hi-score.
	in begat. Vous need to keep a file 'History tre!'
	is either blank or contains the brevious His
170	Vou need to utility a program to whate the up of
436	You need to write a program to update the Hi-some whenever game() breaks the Hi-some
-	
3	Write a program to generate multiplication tables from 2 to 20 and write it to the different files. Place these files in a folder for a 13- year old.
1	from 2 to 20 ward write it to the different
	files. Place these files in a folder for a 13-
	year old.
4	A file contains a word "Donkey" multiple times you
	need to write a program which replaces this word
	A file Contains a word "Donkey" multiple times you need to write a program which replaces this word with ###### by updating the Same file.
-	
5	Repeat program 4 for a list of such words to be consored.
	De Censocea.
6	Write a brockage to mine a log file and find
2	Write a program to mine a log file and find out whether it contains python:
	with the the continue pyrion.
7	Write a program to find out the line number
i	Write a program to find out the line number where python is present from Ques 6

8	Write a program to make a copy of a text file "this txt"
9	Write a program to find out whether a file is identical & matches the content of another file.
	Write a program to wipe out the contents of a file using python
11/	Write a python program to rename a file to "renamed by python txt"

# Chapter 10 - Object Oriented Programming Solving a problem by creating objects is one of the most popular approaches in programming. This is called Object oriented programming. This concept focuses on using reusable code. Implements DRY principle A class is a blueprint for creating objects. Blank => Filled by an Student => Application form == Filled by an Student Contains info to Creak a valid Application « ⇒ Object instantiation ⇒ Object Contains info to Creak a valid object The syntax of a class looks like this: Class Employee: # methods & variables Lassname is written in Parcallase Object An Object is an instantiation of a class. When class is defined, a template (info) is defined. Memory is allocated only after object instantiation. Objects of a given class can invoke the methods available to it without revealing the implementation details to the user. Abstraction & Encapsulation.

EDGA	
CLG3	

Modelling a problem in 00%
Modelling a problem in 00 Ps We identify the following in our problem
Adjective -> Attributes -> name, age, salary Verbs -> Methods -> getSalary(), increment()
are the metalogical are tradeal to a second
Class Attributes
An attribute that belongs to the class rather than
An attribute that belongs to the class rather than a particular object.
· SMUKANA (MAKA)
Example:
Class Employee:
Class Employee:  (ompany = "Google" → [Specific to each class]
harry = Employer() -> object instantiation
harry Company
harry · Company = "YouTube" -> changing class attribute
Instance Attributes
An attribute that belongs to the Instance (object)
An attribute that belongs to the Instance (object) Assuming the class from the previous example:
harry name = "Harry"  harry 5alary = "30 K" => Adding instance attributes
harry - Salary = "30 K" => Adding instance attributes
Note: Instance attributes take preference over class attributes
Note: Instance attributes take preference over class attributes during assignment & retreival
THE THE PROPERTY OF THE PROPER
harry attributes $\rightarrow \odot$ Is attributed present in object?  ② Is attributed present in class?
(2) Is attributed present in class?

self parameter
self refers to the instance of the class
It is automatically passed with a function call
from an object harry get Salary () - here self is harry equivalent to Employee get Salary (herry) The function getsalary is defined as: Class Employee:

Company = "Google"

def get Salary (Self):

print ("Salary is not there") Sometimes we need a function that doesn't use the Self parameter we can define a static method like this: @ Statione thod def greet ():

def greet ():

as a static method print ("Hello user") init\_\_() Constructor -init-() is a special method which is first run as soon as the object is created init-() method is also known as constructor It takes self argument and can also take further arguments

For Example:

Class Employee:

def -- init -- (self, name):

Self name = name

def get Salary (Self):

harry = Employee ("Harry")

Deject can be instantiated using constructor like this!

	Chapter 10 - Practice Set
1 =	Create a class programmer for storing information of few programmers working at microsoft.
	Write a class calculator capable of finding square, cube and squareroot of a number.
3 =	Create a class with a class attribute a; create an object from it and set a directly using object a = 0. Does this change the class attribute?
4	Add a static method in problem 2 to great the user with hello.
5	Write a class Train which has methods to book a ficket, get Status (no of seats) and get fare information of trains running under Indian Railways.
6 =	Can you change the self parameter inside a class to something else (say 'harry'). Try changing self to 'sif' or 'harry' and see the effects.

	Chapter 11 - Inheritance & more on OOPs
0475	the state of the s
	Inheritance is a way of creating a new class from
	Inheritance is a way of creating a new class from an existing class
	Standill Manager
	Syntax:
	Class Employee: → Base Class # Code
	# code
	o.o and mid builded
Yel	tous rot twing a many deast title a many
	class Programmer (Employee): -> Derived or child class # code
	# Code
	.1
	We can use the methods and allribuly of employee in
	We can use the methods and attribute of Employee in Programmer object. Also, we can overwrite or add new attributes and methods in Programmer class.
	1950, we can overware or dad new att nowes and
	The thous in trogrammed class.
	Types of Inheritance
	19 per of truentiance
17	
2 -	Multible inheritance
3,	Single inheritance  Multiple inheritance  Multilevel inheritance
	a solvanting this was
	Single Inheritance
	Single inheritance occurs when shild class inherits
	Single inheritance occurs when still class inherits only a single parent class
4	of through an Arabid Laboration in a mathem to the terms of
1 0	Base I to divide with four home and
bor	to a consecution of the second
	Derived

Multiple Inheritance Multiple inheritance occurs when the schild class inherits from more than one parent class. Parent 2 Parent 1 Multilevel Inheritance When a child class becomes a parent for another child class Super() method Super method is used to access the methods of a super class in the derived class Super(). \_\_init\_\_()

Lalls constructor of the base class class methods A class method is a method which is bound to the class and not the object of the class.

Classmethod decorator is used to create a class method

Syntax to create a class method:	1.20
Jan 10 Course of Class Michigan	0 240 4000
@ classmethod	San Tar In and the
@ Classmethod  def (cls, p, p2):	1 4 1
	4 11
Later (a) day de to	4 2 4 4
Obroberty decorators	31 34 6
Oproperty decorators Consider the following class	1 4 1
	4
Class Employee:  @ property  def name (self):  Veturn Self-ename	to be discourse
@ property	-1 - 1
def name (self):	ad Wilde
return Self-ename	The Halling
modified in which are supported	James Hollo
if e = Employee() is an object of	class employee
if e = Employee() is an object of we can print (e-name) to print the ename	/call name () function.
Lado Lutta official modification	
@ getters and @ setters The method name with eproperty decorate	
The method name with eproperty decorate	or is called getter
We can define a function + @ name. Set	ter decorator like
below:	a Salat N
@ name · Setter	
@ name · Setter	
@ name · Setter	
@ name Setter  def name (self, Value):  Self ename = Value	
@ name Setter  def name (self, Value):  Self ename = Value	
@ name setter  def name (self, value):  self ename = value  Operator overloading in Python Operators in python can be overloaded	
@ name Setter  def name (Self, Value):  Self ename = Value  Operator overloading in Python  Operators in python can be overloaded.	using dunder
@ name Setter  def name (Self, Value):  Self ename = Value  Operator overloading in Python  Operators in python can be overloaded.	using dunder
@ name setter  def name (self, value):  self ename = value  Operator overloading in Python Operators in python can be overloaded	using dunder

by thou can be overloaded using the methods: operators in following -> p, -- add - (p) p1 + p2 -> p1 -- Sub -- (b2) p1 - p2 -> p1 .-- mul- (b) b, \* p2 -> p1. - truediv -- (p2) p. / p2 -> p, -- floordiv -- (p2) p, 11 p2 Other dunder/magic methods in python \_\_\_Str\_\_() -> used to set what gets displayed upon calling Str Loby) \_\_len\_\_() → used to set what gets displayed upon (alling.\_\_len\_\_() or len(obj)

	EDG3
-to	Chapter 11- Practice Set
1	Create a class E2d vector and use it to create another class representing a 3-d vector.
71	further create class Dog from Pets- Add a method bark to class Dog.
3 =	Create a class Employee and add salary and increment properties to it. Write a method salary After Increment method with a sproperty decorator with a setter which changes the Value of increment based on the salary.
4 2	Write a class Complex to represent complex numbers, along with overloaded operators + and * which adds and multiplies them
5 =	Write a class vector representing a vector of n dimension. Overload the + and * operator which calculates the sum and the dot product of them.
6 2	Writestr() method to print the vector as follows:
	Assume vector of dimension 3 for this problem.

7 =	Override the len- 1) methon on Vector of problem 5 to display the dimension of the Vector.
bu p	Treate a does total from Peter Added to the Add to the Add to the total play from Peter Add to the
0	their of the fall bureles and solve and in the limit of their which all the solve and and and a solve and a solve and a solve and a solve a so
	Alpite of colonia feedbast of suprime feedbast and the second of the sec
- Joseph	described the the dead we obserted a distributed the dat product
1.1	volume of least of point the verby:
	Figure vector of dimension 3 for other spools

### Project 2 - The Perfect Guess

We are going to write a program that generates a random number and asks the user to guess it.

If the player's guess is higher than the actual number, the program displays "Lower number please". Similarly if the user's guess is too low, the program prints "higher number please" when the user guesses the correct number, the program displays the number of guesses the player used to arrive at the number.

Hint: Use the random module

# Chapter 12 - Advanced Python 1

Exception Handling in Python
There are many built-in exceptions which are raised in Python when something goes wrong.
Exceptions in Python can be handled using a try statement. The code that handles the exception is written in the except clause.

# code which might throw exception as e: Exception print (e)

When the exception is handled, the code flow continues without program interruption.

We can also specify the exceptions to catch like below:

except ZeroDivision Error:

# Code

except TypeEmor:

# code

except: → All other exceptions are handled here.

Raising Exceptions We can raise custom exceptions using the raise keyword in python.

	try with else clause
	Sometimes we want to run a piece of code whom
	Sometimes we want to run a piece of code when try was successful.
	fery:
1.	# Some code
-	except o
	# Some Code else:
	CISC o
	# Code - This is executed only if the try was successful
	Try was salarsful
	CAMPA STOWN
	try with finally
	Python offers a finally clause which ensures execution of a piece of code irrespective of the exception.
	of a piece of code irrespective of the exception.
	Alle matters an broad
	few:
	# Some code scales
	exapt :
	# some code
	[· 11 0
1	finally:
+	# some code -> executed regardless of error!
+	
-	If name == = main - in Tython
-	name evaluates to the name of the module in lython
	ifname_ == 'main' in Python name_ evaluates to the name of the module in Python from where the program is ran
T	If the module is being run directly from the command line, thename is set to string "main_"  Thus this behaviour is used to check whether the module is run directly or imported to another file.
1	the name is set to string " main"
+	The Will believe it used to check whether the
+	Thus this penavious us were to check where file
+	module is run ducicity or imported to another file.
1	

The global keyword global keyword is used to modify the variable outside of the current scope. Enumerate function in Python.
The enumerate function adds counter to an iterable and returns it for i, item in list 1: print (i, item)

Prints the items of list 1

with index! list comprehensions is an elegant way to create lists based on existing lists list 1 = [1, 7, 12, 11, 22] list 2 = [i for item in list1 if item 78]

	EDG3
	Chapter 12 - Practice Set
1,,	Write a program to open three files 1.txt, 2.txt and 3.txt. If any of these files are not present, a message without exiting the program must be printed prompting the same.
The state of the s	Write a program to print third, fifth and seventh element from a list using enumerate function
3 =	Write a list comprehension to print a list which contains the multiplication table of a user entered number.
4	Write a program to display of b where a and b are integers. If b=0, display Infinite by handling the Zero Division Error.
5 =	Store the multiplication tables generated in Problem 3 in a file named Tables txt.

## Chapter 13 - Advanced Python 2

Virtual Environment
An environment which is same as the system interpretor but is isolated from the other python environments on the system.

Installation
To use virtual environments, we write

pip install virtualenv → Install the package

We create a new environment using:

Virtualenv myprojectenv - creates a new venv

The next step after creating the virtual environment is to activate it:
We can now use this virtual environment as a separate python installation.

pip freeze returns all the packages installed in a given python environment along with the versions

pip freeze > requirements txt

The above command creats a file named requirements tot in the same directory containing the output of pip freeze.

We can distribute this file to other users and they can recreate the same environment using:

URBAN	
EDGE	
LLG7	

	pip install - r requirements ext
9	Lambda functions  functions created using an expression using lambda  keyword  Curlor:
	functions (treated using an expression using lands
100	Renword
	Syntax:
	lambda arguments: expressions
	Syntax:    lambda arguments: expressions
	Example:
	Square = lambda x: x*x  Square (6) -> returns 36
	Square (6) -> returns 36
	Sum = lambda a, b, c: a+b+c
	Sum (1, 2, 3) > returns 6
	1. U.A. (Claiman)
	bin method (Strings) Creates a String from iterable objects
	MAN DE LANGE MAN MAN DE LA NOME DELA NOME DE LA NOME DELA NOME DE LA NOME DELA NOME DE LA NOME DELA NOME DE LA NOME DELA NOME DELA NOME DELA NOME DELA NOME DELA NOME DELA NOME
	l = ["apple", "mango", "banane"]
	personal and desired the court of ISI of contract and the
	"and," join (l)
	The above line will return apple, and, mango, and, banana"
	Maliana regular a management
	format method (Strings)  formats the values inside the string into a desired
1	formats the values inside the string into all alsored
	output
	template format (p, p2)  arguments
	Torque to order ( P1 > P2 - ) arguments
	the land of the land of the function
	I the lanction computer sum of two numbers and h

Syntax for format looks like: " { 3 is a good { 3" format ("Harry", "boy") -0 " { 13 is a good { 03 · format ("Harry", "tog") - 3 Output for 10 Harry is a good boy Dutput for @ boy is a good Harry Map, Filter & Reduce
Map applies a function to all the items in an input-list Syntax: Map (function, input\_list) Filter creates a list of items for which the function returns true. list (filter (function))

Less Can be a lambda function Reduce applies a rolling computation to sequential pair of elements from functools import reduce

val = reduce (function, list1)

Li can be a lambda function If the function computes sum of two numbers and the

6003
Chapter 13 - Practice Set
Chapter 1
Crete tus virtual environments, Install few packages
the first one. How do you oceall it similar
Create two virtual environments, install few packages in the first one. How do you create a similar environment in the second one?
Write a program to input name, marks and phone number of a student and format it using the format function like below:
Write a program to input name, metro votal
Shore number of a student una journal in many
the format function like below.
The name of the student is Harry, his marks are 72 and phone number is 99999888"
The name of the student 13 1000g;
and phone number 13
A lik a tains the multiplication table of 7. Write
a brooken to convert it to a vertical string
A list contains the multiplication table of 7. Write a program to convert it to a vertical string of same numbers (7)
i i i i i i i i i i i i i i i i i i i
O. J. L. A. malared which
Write a program to filter a list of numbers which are divisible by 5
are divisible by 5
11:6 a 1 came to C. I the maximum of the
Write a program to find the godine function
Write a program to find the maximum of the numbers in a list using the reduce function.
Run pip freeze for the system interpretor. Take the contents and create a Similar Virtualen.
the contents and create a Similar Virtualent.
Explore the Flask module and create a web server
Explore the Flask module and create a web server using Flask & Python.

# Project 3 - Student Library Implement a Student library System using OOPs where Students can borrow a book from the list of books. Create a separate Library and Student class. Your program must be menu driven. You are free to choose methods and attributes of your choice to implement this functionality.