

cw Ch - 5 → Getting Started with Python

* Q/A :

Q. 1 What is a cross-platform software?

Ans1 Cross platform software refers to software that can run on multiple platforms like Windows, Linux etc.

Q. 2 What are some advantages and disadvantages of Python?

Advantages :

- ① Easy to use
- ② Expressive language
- ③ Interpreted language
- ④ Free and open source
- ⑤ Cross platform language
- ⑥ Variety of uses

Disadvantages :

- ① Not the fastest language
- ② Lesser libraries than C, Java etc.
- ③ Not strong on type-binding
- ④ Not easily convertible

Q. 3 What are advantages and disadvantages of interactive mode in Python?

Ans3 Advantages - 1) It proves very useful for testing code
2) The commands can be typed one by one and get the result one - by - one.

Disadvantages - 1) It doesn't save your commands in the form of a program
2) The output is sandwiched between command lines

Q. 4 What are advantages and disadvantages of script mode in Python?

Advantages - 1) You can store all commands together in a program.
2) You can get all output lines together.

Disadvantages → ① It is difficult to find errors.

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→ program fails because of some mistake (syntax error)
→ user will not understand algorithm

→ syntax error which has no errors in logic

equivalent

→ copied instead of type

→ do not use reserved word

→ print instead of print

→ different signs like

case of fact

→ spayed memory

→ spayed before it

→ case register, case p

→ spayed initially, and

→ case of printed file

→ most common mistake is to forget about a punctuation mark

→ char instead of character, wrong if (→ forgot colon)

→ all the time we put a right address above our left ()

→ we - pt - with place

→ wrong or a different character was used when type at. (→ - aggrivation)

→ all the time we used tabulation instead of type at. (→ - aggrivation)

→ many a time a is written instead of a. (→ - aggrivation)

→ forgot to put a in the end (→ - aggrivation)

→ many a time a is written instead of a. (→ - aggrivation)

→ forgot to put a in the end (→ - aggrivation)

Ch 6 → Python Fundamentals

* Q/A:

Q. 1 What are tokens in python? How many types of tokens are allowed?

Ans 1 The smallest individual unit in a program is called a token.

Python allows the following types of tokens:

- Keywords for control
- Identifiers (Names)
- Literals
- Punctuation

Q. 2 How are keywords different from identifiers?

Ans 2 A keyword is a special word that has a special meaning and purpose.

→ for example if, elif, else etc. inside the code

• Identifier is a user defined name given to an object or part of a program viz. variable object function etc. They are not reserved.

• It is defined by the user but can have letters, digits & underscores. It must begin with a letter or underscore.

Eg. chk, trial etc.

Q. 3 Can non graphic be shown in Python? How? Give an example.

Ans 3 Python allows you to have non-graphic characters in string values.

Non-graphic characters cannot be typed directly from keyboard.

Eg. backspace, tab, carriage return etc.

These characters can be represented using escape sequences. It is represented by backslash.

Eg. \ -> Backslash

\r -> Carriage return

' -> Single quote

" -> Double quotes

Q.10 What is expression and statement with their meaning?

Ans10 • Expression is any legal combination of symbols that represents a value.

• Statement is a programming instruction that does something, i.e., some action takes place.

Q.12 What is block / code-block / suite in Python?

Ans12 A group of statements which are a part of another statement or a function, are called block / code-block or suite in Python.

Statements requiring a suite / code-block have a colon (:) at their end.

Q.13 What is the role of indentation in Python?

Ans13 Python uses indentation to create blocks of code. Statements at the same indentation level are part of the same block / suite.

Statements requiring suite / code-block have a colon (:) at their end.

Q.14 What are variables? How are they important for a program?

Ans14 A variable in Python represents a named location that refers to a value and whose values can be used and processed during program run.

For instance, to store the name of a student and marks of a student during a program run, we require some labels to refer to these marks so that these can be distinguished easily.

Variables, called symbolic variables serve the purpose. These variables are called symbolic variables because these are named variables.

Q.16 What is Dynamic Typing?

Ans16 A variable pointing to a value of a certain type, can be made to point to a value / object of different type. This is called dynamic typing.

How it is different from static typing

Initial value is 23/4/24. It can point to any type of value.

Statement 1: print("Hello")
Statement 2: print(23/4)
Statement 3: print([1, 2, 3])

print("Hello") and print(23/4) both are statements.

At 1, assignment stat -> field stat

HW Ch-7 → Data Handling

Q.1 What are data types? How are they important?

Ans1 Data types are the means to identify the type of data and associated operations for handling its various tasks.

To represent various types of real-life data, programming languages ~~offer~~ provide ways and facilities to handle these through data types.

Python has following core data types:

- Numbers (integer, floating-point, complex, Boolean)
- String
- Tuples
- Dictionary

Q.7 What are immutable and mutable data types?

Ans7 Immutable types are those which can never change their value in their place.

Immutable types:-

- Integers
- Booleans
- Tuples

~~Floating-point numbers~~

- Strings

Mutable types are those whose values can be changed in their place.

Mutable types:- Lists, Dictionaries, Sets

Q.82 What is the difference between implicit type conversion and explicit type conversion?

Ans12 Implicit type conversion is a conversion performed by the compiler without programmer's intervention. It is generally applied when differing data types are intermixed in an expression, so as to not lose information.

Explicit type conversion is a user-defined conversion that forces an expression to be of a certain type. It is also known as Type-Casting.

Q.17 What are augmented assignment operators? How are they useful?

Ans17 Python offers augmented assignment operators which combine the impact of an arithmetic operator with assignment operator. e.g.; if you want to add value of a & b & assign the result to a, then instead of writing

$$a = a + b$$

you may write,

$$a += b$$

Q.39 Differentiate between syntax error & logical error? Where is each type of error likely to be found?

Ans39 Syntax errors occur when rules of a programming language are violated, i.e., when a grammatical rule of Python is violated.

Eg. $x \leftarrow y^* z$ [Syntax error as ' \leftarrow ' is not an assignment operator in Python.]
 if $x = (x^* y)$.

{ logical errors occur because of programmers mistake analysis of problem he or she is trying to solve. }

Eg. Average of three values Avg = $a+b+c/3$ ~~but neglecting~~

Logical error will give result but it will be undesired.

Correct code \rightarrow Avg = $(a+b+c)/3$

Q. 40 What is the difference between error and exception?

Ans 40 Error represents any bug in the code that disrupts running of program or causes improper output.

Exception refers to any irregular situation occurring during execution, which you have no control over.

Q. (1) $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ write a program

$$d = \text{math.sqrt}(\text{math.pow}((x_2 - x_1), 2) + \text{math.pow}((y_2 - y_1), 2))$$

$$2) n = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

$$\rightarrow n = \frac{(-b) + (\text{math.sqrt}(\text{math.pow}(b, 2) - (4 * a * c))))}{2 * a}$$

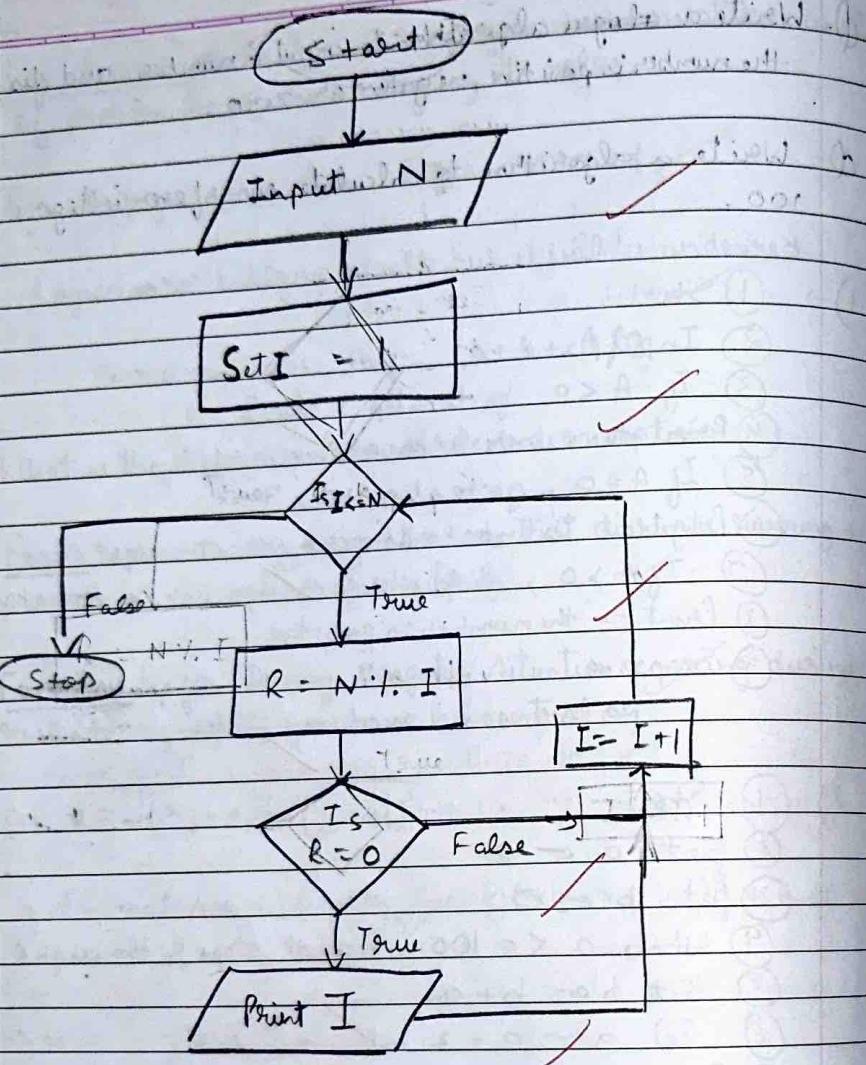
Q. Write a C program algorithm to input a number and display if the number is positive, negative or zero.

Q. Write a algorithm to calculate sum of even integers b/w 1 & 100.

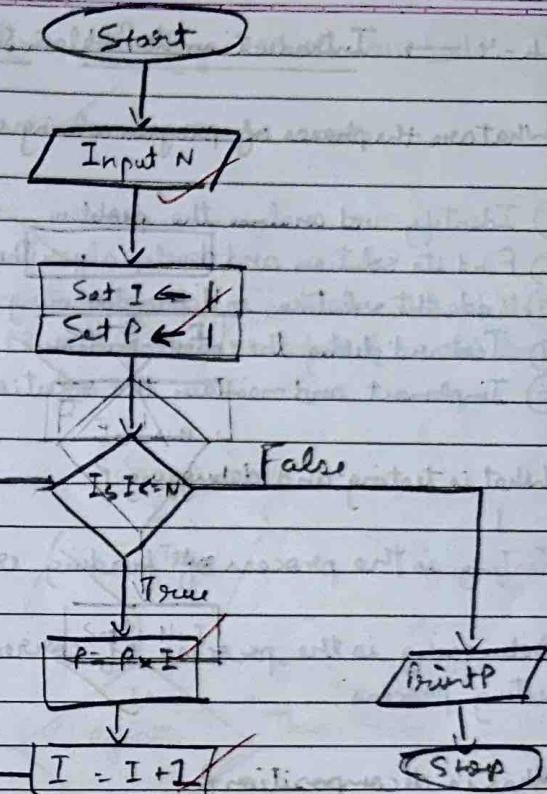
- 1) \rightarrow ① Start
- ② Input A.
- ③ If $A < 0$, go to step 4 else 5
- ④ Print \rightarrow the number is negative
- ⑤ If $A = 0$, go to step 6 else 7
- ⑥ Print \rightarrow The number is zero
- ⑦ If $A > 0$, go to step 8
- ⑧ Print \rightarrow the number is positive.
- ⑨ Stop.

- 2) ① Start
- ② Set $a \leftarrow 2$
- ③ Set $b \leftarrow 100$
- ④ While $a \leq 100$, repeat steps 5 through 6.
- ⑤ Set $b \leftarrow b+a$
- ⑥ Set $a \leftarrow a+2$
- ⑦ Print S

Q. Write a flowchart to display all factors of a number.



- Q- Draw flowchart to print factorial of a given input number.



HW Ch-4 → Introduction to Problem Solving

Q.1 What are the phases of program solving cycle?

- Ans1 ① Identify and analyse the problem.
 ② Find its solution and develop algorithm for its problem.
 ③ Code the solution in a programming language.
 ④ Test and debug the coded solution.
 ⑤ Implement and maintain the solution.

Q.2 What is testing and debugging?

Ans4 Testing is the process of finding errors in a program.

Debugging is the process of correcting errors during the testing process.

Q.3 What is decomposition?

Ans3 Decomposition is the process of breaking down a big or complex problem into a set of smaller subprocesses in order to understand a problem or situation better, is known as decomposition.

Q.11 What is dry run? How is it useful?

Ans11 A dry run is the process of a programmer manually working through their code to trace the value of variables.

It is useful for:

- ① Testing the design, implementation, testing or maintenance.

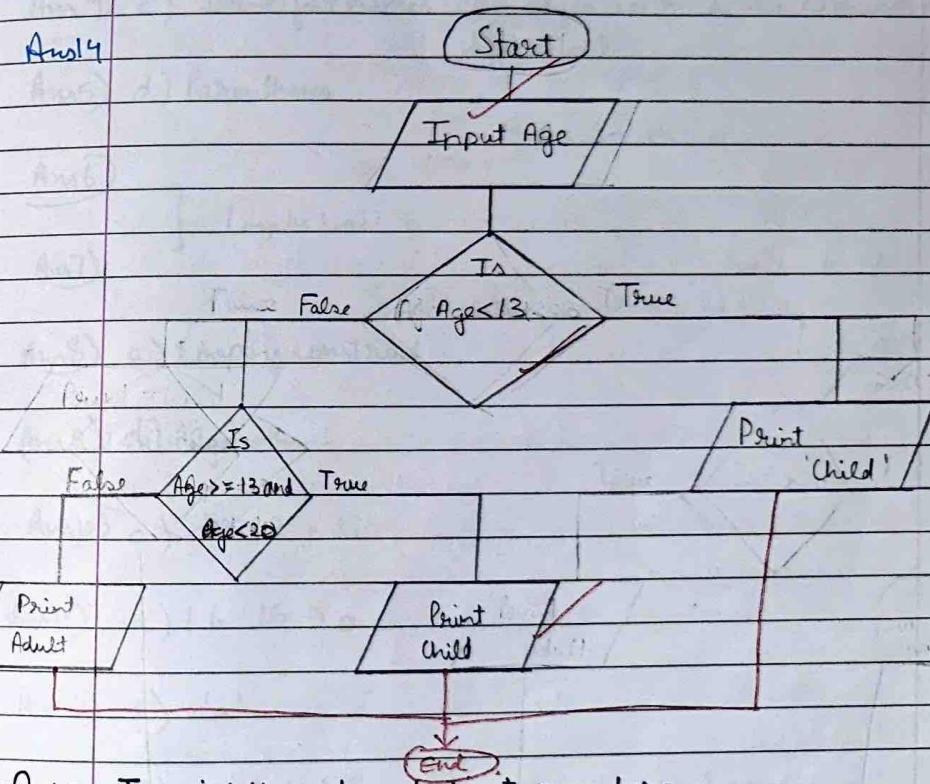
② It is used to identify the logic errors in a code.

③ It cannot find execution errors in a code.

* APBO

Q.14 Write a program to categorise a person either child (< 13), teenager ($>= 13$ but < 20) or adult ($>= 20$) based on age input.

Ans14



Q.15 To print the cubes of first numbers.

Ans15 1) Start.

2) Input n - n is a natural number

3) ~~Set N = n**3~~ Set i = 1 & N = i ** 3

4) For i <= n, repeat steps 4 to 6.

- 1) ~~N = i**3~~
- 5) print N
- 6) i = i + 1
- 7) Stop.

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cew revision

Ans1) a) 99 flag 8 (b) An \$ user

Ans2) b) 20

25

Ans3) d) id (d)

Ans4) c) Identifier names can begin with either alphabets or digits.

Ans5) d) Parentheses

Ans6)

} Loop hei

Ans7)

Ans8) a) Looping construct

Ans9) d) Algorithm

Ans10) c) $R = 2 + 3i$

Ans11) a) 16 15 > 20

Ans12) a) 'a'

Ans13) A) Both A & R are true , & R is correct ans.

Ans14) C) A is true, R is false



Ans 15 Pluses:
 ① Easy to use
 ② Portable

Minuses:
 ① Not strong on type-binding
 ② Doesn't have as many libraries as C++, Java

- Ans 20 (1) a) $\text{volume} = 1 * b * h$
 otherwise semantic error
- (b) $L = a * b + c * d$
- (c) $\text{Area} = 2217 * \text{math.pow}(x, 2)$
- (d) Num - 0XABC3Z → invalid value

(2) A variable pointing to a value of one type can be made to point to a value of other type.

Eg n = 10
 $x = \text{'Hello'}$

- Ans 21 (1) a) weight ≥ 115 and weight ≤ 125
 b) Donation ≥ 4000 and donation ≤ 5000 | or Guest-

(ii) Associativity is the order in which an expression consisting of multiple operators is evaluated.

It is generally left to right but in case of exponentiation operator it is right to left.

import math

Ans side

$\text{side} = \text{int}(\text{input}("Enter the side :"))$
 round()

$\text{Area} = (\text{math.sqrt}(3)/4) * \text{math.pow}(\text{side}; 2);$

$\text{Perimeter} = 3 * \text{side}$

print(Area); (Area)

print(Perimeter)

Ans 11 a) Market is "vastly" situated in a large

extensive, boundless area of country as well as

b) K1 = K

c) flag = 14;

d) print(p, q, r, sep = "ln")

A = 915, B = 12 m, Q = 3 m²

$$X = 9 - 40; S = 10.0$$

$$Y = 4 \cdot 9 - 12 / (6)(1) = 7.0$$

$$Z = 9 - (12 / (6)) - 1$$

$$= 9 - 2 - 1 = 6$$

$$X = 10.0$$

$$Y = 7.0$$

$$Z = 4.0$$

* Ch-8 → Flow Of Control

Q/A:

Q.2 What is the importance of three programming constructs?

Ans 2 The [sequence construct] means the statements are being executed sequentially. This represents the default flow of statement.

The [selection construct] means the execution of statements depending upon a condition test. If a condition evaluates to True, a course of action is followed, otherwise, another course of action is followed.

The [iteration construct] means repetition of a set of statements depending on a condition test.

Q.3 What is empty statement? What is its need?

Ans 3 The [pass] statement of Python is a do nothing statement, i.e., empty statement or null operation statement.

It is useful in those instances where the syntax of the language requires the presence of a statement but where the logic of the program does not.

Q.10 What is the difference between else clause of if-else and else clause of Python loops?

Ans 10 The [else clause of a if statement] is executed when the condition of the if statement results into false.

The [else clause of a loop] is executed when the loop is

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terminating normally, i.e., when its test-condition has gone false for a while loop or when the for loop has executed for the last value in the sequence.

Q.13 How and when are named conditions useful?

Ans 13 Sometimes the conditions being used in the code are complex and repetitive. In such cases, to make your program more readable, you can use named conditions, i.e., you can store conditions in a name and then use that named condition in the if statement.

Q.14 What are endless loops? Why do such loops occur?

Ans 14 An infinite loop is the one whose terminating condition is either missing or not reachable.

Thus, the body of the loop keeps repeating endlessly in an infinite loop.

Q.15 How is break statement different from continue?

Ans 15 When the [break statement] gets executed, it terminates its loop completely and the control reaches to the statement immediately following the loop.

The [continue statement], terminates only the current iteration of the loop by skipping the rest of the statements in the body of the loop. The control resumes the next iteration of the loop after the continue statement.

* A/B/Qs

Q. A. - - - cost.

Q.25

\rightarrow n = int(input("Enter number of items:"))
for i in range(1, n+1):
 if i <= 10:
 cost = 120
 elif 10 <= i <= 99:
 cost = 100
 else:
 cost = 70
 print("The cost is:", cost)

Q.25 (a) A (b) 2 good start in

AB

44

? A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

8 88 8

(i) comment to beginning of [function declared] : If no JJJ 21st

\rightarrow while True: some function call here, probably user input

input with print after, continue with print

print("1. To print pattern (a)")

print("2. To print pattern (b)") what you want to do?

print("3. To print?") will print it, just print out for

print for output, then all comments function int, print out for

ch = int(input("Enter your choice:")) if not int:

if ch == 1:

l = int(input("Enter number of lines:"))

ord = 65

for i in range(1, l+1):
 for j in range(65, ord+i):
 print(chr(j), end="")
 print()
 ord += 1

else: ord = 65
 print("Please enter a valid number between 1 and 100")

elif ch == 2:
 l = int(input("Enter number of lines:"))
 n = 2 * l - 1
 for i in range(1, l+1):
 for j in range(1, i+1):
 print(n, end="")
 print()
 print("Please enter a valid number between 1 and 100")

else:
 print("Please enter a valid number between 1 and 100")

else:
 print("Please enter a valid number between 1 and 100")

else:
 print("Please enter a valid number between 1 and 100")

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else:
 print("Please enter a valid number between 1 and 100")

* Ch - 9 → String Manipulation

Q 1A

Q. 1 What would the following expressions return?

Ans1 Q s = "Hello World"

- s.upper().lower() → "HelloWorld"
- s.find("wor", 1, 6) → -1
- s.lower().upper() → "HELLO WORLD"
- s.find("wor") → -1
- s.find("wor") → -1
- s.isalpha() → False
- s.isalnum() → False
- "1234".isdigit() → True
- "123FGH".isdigit() → False

Q. 2 Which functions would you choose to remove leading and trailing white spaces from a given string?

Ans2 The strip() function can be used to remove the leading and trailing white spaces from a given string.

Q. 3 Suggest appropriate functions for the following tasks:

- .isdigit()
- find() or index()
- capitalize()
- upper()
- isupper()
- rstrip()
- lstrip()

* Programs

Q. 13 Write a program that inputs a line of text and prints out the count of vowels in it.

Ans s = input("Enter a line of text : ")

c = 0

for ch in s:

 if ch in "aeiouAEIOU":

 c += 1

print("The count of vowels is:", c)

Q. 14 W.A.P to input a line of text and create a new line of text where each word of input line is reversed.

Ans s = input("Enter a line of text : ")

ns =

s[::-1]

for f

print(ns)

s = input("Enter a line of string : ")

ns = "

for ele in s:

 ns += ele[::-1]

print(ns)

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HW Ch-10 → List Manipulation

Q.1 Discuss the utility and significance of lists, briefly.

Ans1 Python lists are containers that can store an ordered list of values of same or different data types together in a single variable. The fact that elements of a list need not be homogeneous, makes them highly adaptable and powerful data structure in Python. Lists provide fast access to its elements using index numbers. Python lists are mutable which makes them memory efficient.

Q.3 Start with the list [8, 9, 10]. Do the following list functions.

(a) Set the 2nd entry to 17.

↳ L[1] = 17

(b) Add 4, 5, 6 to end of list.

↳ L.extend([4, 5, 6])

(c) Remove the first entry

↳ L.pop(0)

(d) Sort the list

↳ L.sort()

(e) Double the list.

↳ L *= 2

Q.6 Tell how are statements $lst = lst + 3$ and $lst += [3]$ different? Explain.

Ans6 → The statement $lst = lst + 3$ will give an error as the '+' operator is used to add operands of same datatype together. Here one operand is a list and other is an integer. ∴, Python will give type error.

The statement $lst += [3]$ will add entry [3] to the list. Here the '+' operator acts as the concatenation operator.

Q.9 What does each of the following expressions evaluate to?

(1) ['are', 'few'] ✓

(2) True ✓

(3) ['These', 'are', 'a', 'few', 'words'] ✓

(4) ['that', 'will'] ✓

(5) True. ✓

Q.15 What is the difference between appending a list & extending a list?

Appending

↳ .append() function is used.

↳ adds single element to end of list. ↳ can add multiple elements to a list.

Extending

↳ .extend() function is used.

↳ Length of list will increase by 1

↳ Length of list will increase by length of list given in argument.

Q.17 What is the difference between sort() and sorted()

Ans17 sort()

↳ It works on a list and modifies it.

↳ It doesn't return anything (no return value)

↳ It doesn't modify the list.

↳ It returns newly created list.

Coding que →

['apple', 'orange', 'banana'] (1)
Date: 29/10/24

sort() (s)

print(['apple', 'orange', 'banana', 'apple']) (2)

['apple', 'apple', 'banana', 'orange'] (3)

sort() (2)

print(s)

print(tup)

cw Ch - 11 → TUPLES

* Coding Questions

Q.13 import statistics as s

t = eval(input("Enter tuple elements: "))

m = statistics.s.mode()
print(m)

for i in t:

cnt = t.count(i)

if cnt == t.count(m):

print(i, "is the mode & max occurring element.")

break

Q.15 import statistics as s

tup1 = ((1, 2), (3, 4, 15, 5, 15), (7, 8, 12, 15))

t = tuple()

for i in tup1:

m = s.mean(i)

t += (m,)

print("Mean: ", m)

print("Mean of means: ", s.mean(t))

* Q/A:

Q.9 How can you add an extra element to a tuple?

Ans9 We can add an element to an existing tuple by using concatenation.

$$\text{Ex: } t = (1, 2, 3, 4, 5)$$

$$t + = (6,)$$

$$\text{print}(t) \rightarrow (1, 2, 3, 4, 5, 6)$$

Q.10 When would you prefer tuples over lists?

Ans10 The tuples should be preferred over lists when we have data which we want to ensure that it is not accidentally changed as tuples being immutable do not allow any changes in its data.

Q.11 What is the difference between (30) and (30,)?

Ans11 (30) is computed as an integer datatype, whereas (30,) is computed as a single element tuple by python.

Q.12 When would sum() not work for tuples?

Ans12 Tuples containing any other datatype than integers or floating point numbers will give an error if sum() function is used upon them.

Q.13 min(), max() always work for tuples?

Ans13 No. For tuples containing mixed datatypes and for nested tuples, min() & max() will not work.

Q.15 How are in operator and index() similar or different?

Ans15 Similarity: Both in operator and index() help us determine the presence of an object inside a given sequence.

Difference: In in operator always results in a Boolean expression (True or False) whereas, index() returns the location of an object in a sequence, in integer form.

* Type B: (ABCD)

Q.2 (a) ["Are", "few"]

(b) True

(c) Type Error

(d) ("that", "will")

(e) True

Q.3 (a) Index Error

(b) Error, Tuples are immutable.

(c) Type Error

(d) (3, 4, 5, 6)

(e) Error → subtraction not supported with tuples

(f) Type Error → Tuples can't be multiplied with each other

(g) Type Error → Tuples and lists can't be concatenated together

(h) Name Error → Identifiers can't start with digit.

(i) Name Error → string (no space, no dot)

(j) No error

(k) Value Error → No. of objects for unpacking exceeds length of tuple.

Q.6 Here, the ~~tup1~~ tup1 has datatype of string.

('Mega') * 3 is computed as "MegaMegaMega" by Python.

Thus, ' ' missing ' ' resulted in improper output

Correction → tup1 = ("Mega",) * 3

Q.8

2

2

False

3

3

55

→ (1, 2, 1)

Ch-12: Dictionaries

* Theoretical Q/A:

Q.1 Why is a dictionary termed as an unordered collection of objects?

Ans1 A dictionary is based on an unordered set of key: value pairs. Its values can contain references to any type of object. You cannot tell the order or position of a key: value pair in a dictionary as there is no indexing associated.

Q.2 What all type of values can you store in:

(a) dictionary values? → Any datatype can be stored as a dictionary value.

(b) dictionary keys? → Only immutable datatypes such as string, integers, tuples can be stored.

Q.3 How is clear() function different from del <dict> statement?

→ The clear() function removes all the elements of a dictionary and makes it an empty dictionary while the del statement completely removes the dictionary object.

Q.4 What does fromkeys() method do?

→ The fromkeys() method is used to create a new dictionary from a sequence containing all the keys.

and a common value which is assigned to all keys.

Q.12 How is pop() different from popitem()?

Ans12 pop() can delete an item with a chosen key while popitem() will remove only the last entered item from the dictionary.

You can also specify return message in pop() if the given key is not found. However popitem() has no such provision and will raise an error.

Q.17 What is use of copy() function?

Ans17 The copy() method creates a shallow copy of a dictionary where only keys are duplicated and same values are referenced by the two copied. If the values are immutable, changes are not reflected in the copies but if the values are mutable, changes are reflected in the copies.

* Type B

Q.8 Dictionary contents

5: number a: string (1,2) / tuple

5: number number number

a: string string string string

(1,2): tuple tuple tuple tuple

Q.15 1,0
'1', 4

Q.16 d = { 'a': 1, 'b': 2, 'c': 3 }

print(d)

fd = {}

for key, value in d.items():

 fd[value] = key

print(fd)

* Type C : Programming

Q.9 d1 = eval(input("Enter d1:"))

d2 = eval(input("Enter d2:"))

l = []

for i in d1:

 if i in d2:
 l.append(i)

print("List of overlapping keys:", l)

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* Data Representation

Ans1 (c) 10101111

$$\hookrightarrow 1 \times 2 + 0 = 2$$

$$2 \times 2 + 1 = 5$$

$$5 \times 2 + 0 = 10$$

$$10 \times 2 + 1 = 21$$

$$21 \times 2 + 1 = 43$$

$$43 \times 2 + 1 = 87$$

$$87 \times 2 + 1 = 175$$

$$175 \times 2 + 1 = 351$$

Ans6 TARY

~~16³ 16² 16¹ 16⁰~~

~~$7 \times 16^3 + 10 \times 16^2 + 11 \times 16 + 4$~~

~~$= 4096 + 2560 + 176 + 4$~~

~~$\underline{= 6836}$~~

Ans2 (c) 11011100

$$\rightarrow 1 \times 2 + 1 = 3$$

$$3 \times 2 + 0 = 6$$

$$6 \times 2 + 1 = 13$$

$$13 \times 2 + 1 = 27$$

$$27 \times 2 + 1 = 55$$

$$55 \times 2 + 0 = 110$$

$$110 \times 2 + 0 = \underline{\underline{220}}$$

* Repeated Division & Multiplication

Integral Decimal
Repeated Repeated
Division Multiplication

By base of
no. system

$$\text{Eq} \quad (123.75)_{10} = (?)_2$$

Quotient Remainder

$$\begin{array}{r|rr} 2 & 1 & 2 & 3 \\ \hline 2 & & & \end{array}$$

$$\begin{array}{r|rr} 2 & 6 & 1 \\ \hline 2 & & \end{array}$$

$$\begin{array}{r|rr} 2 & 3 & 0 \\ \hline 2 & & \end{array}$$

$$\begin{array}{r|rr} 2 & 1 & 5 \\ \hline 2 & & \end{array}$$

$$\begin{array}{r|rr} 2 & 7 & 1 \\ \hline 2 & & \end{array}$$

$$\begin{array}{r|rr} 2 & 3 & 1 \\ \hline 2 & & \end{array}$$

$$\begin{array}{r|rr} 2 & 1 & 1 \\ \hline 2 & & \end{array}$$

$$\begin{array}{r|rr} & 0 & 1 \\ \hline & & \end{array}$$

Now take remainders
bottom to top.

$$\therefore (123)_{10} = (111011)_2$$

fill ↴
zero ↵

$$\star (0.75)_{10} = (?)_2$$

$\hookrightarrow 0.75 \times 2 = \frac{1.5}{0.5 \times 2 = \frac{1.0}{\text{continue process till fractional part is zero.}}}$

\downarrow Top to bottom

$(0.75)_{10} = 110101_2$

$$(123.75)_{10} = (111011.11)_2$$

$$Q.3 (c) 145$$

2	145	
2	72	1
2	36	0
2	18	6
2	9	0
2	4	1
2	2	0
2	1	0
0	1	1

Least significant digit

Highest significant digit

Most significant digit

Least significant digit

Highest significant digit

Most significant digit

Least significant digit

Highest significant digit

Most significant digit

Least significant digit

Highest significant digit

Most significant digit

Least significant digit

$$(d) 0.675$$

$$\begin{aligned} \hookrightarrow 0.675 \times 8 &= 5.400 \\ &= 0.4 \times 8 \\ &= 0.2 \times 8 \\ \therefore 0.531 & \end{aligned}$$

$$\begin{array}{r} 64 \\ 56 \times 8 \\ \hline 5400 \end{array}$$

$$Q.14(d) 3619$$

16	3619	.	.
16	226	3	
16	14	2	
0	14	E	

$$\begin{array}{r} 3619 \\ -326 \\ \hline 326 \\ -326 \\ \hline 0 \end{array}$$

$$F.23$$

Hexadecimal \Rightarrow Convert 10 onwards to letter

\star Binary to octal (group into 3 bits)

$$\text{Eg } (010101101)_2 = (?)_8$$

$$\therefore 255$$

$$\cancel{0} \star (10101101)$$

Add 0 to start to make group of 3.

$$010101101$$

$$\text{Eg } (255)_{10} \underbrace{101100}_3$$

$$\underline{\underline{255.54}}$$

\star Octal to binary

$$\hookrightarrow (127.5)_8 = (?)_2$$

not significant

$$1 \rightarrow 001$$

$$2 \rightarrow 010$$

$$7 \rightarrow 111$$

$$5 \rightarrow 101$$

$$\rightarrow \underline{\underline{00101011101}}$$

$$\therefore \text{Ans} \rightarrow (1010111, 101)_2$$

Q1 Hex to Binary

$$\hookrightarrow (AB.6.F3)_{16} = (?)_2$$

$$\rightarrow 101010110110.11110011$$

$$A = 1010$$

$$B = 1011$$

$$6 = 0110$$

$$F = 1111$$

$$3 = 0011$$

* Octal to Hex

$$(375.26)_8 = (?)_{16}$$

$$3 \rightarrow 011$$

$$7 \rightarrow 111$$

$$5 \rightarrow 101$$

$$2 \rightarrow 010$$

$$6 \rightarrow 110$$

in binary

$$\rightarrow 011111101010110$$

Now group in 4 bits

Q1
23111101

1011011011

Q1 2200

group of 4 bits

100 ←

010 ← 3

111 ← 5

111 ← 7

Ch-2 : Data Representation

Q.2 What is the use of hexadecimal number system on computers?

- Ans2 It is used to specify memory addresses in computers.
- It is used to represent colour codes.

Eg # xrggbb

QUESTION

- It is also used in memory dumps & debugging codes.

Q.3 What does radix or base signify?

Ans3 It denotes the no. of symbols in a number system.

Q.10 What is unicode? What is its significance?

Ans10 It is an encoding scheme that uses universal character set to represent each character in memory irrespective of platform, language & program.

Q.12 What are ASCII and ISCII? Why are they used?

Ans12 ASCII stands for American Standard Code for Information Interchange.

It was mostly used in microcomputers & minicomputers and in mainframes. It is a 7-bit code, so it has $2^7 = 128$ possible code groups.

It was later converted to 8-bit Extended ASCII to represent more characters (256 characters).

ISCII stands for Indian Scripts Code for Information Exchange.

It is an 8-bit code capable of coding 256 characters. It retains all ASCII characters and offers coding for Indian Scripts also.

Q. What are UTF-8 & UTF-32 encoding schemes?

↳ UTF-8 is a variable width encoding that can represent every character in Unicode character set, i.e., it can encode all of 1114111_2 code points.

The code unit of UTF-8 is 8 bits, called octet. It can use maximum of 6 octets to represent code points.

UTF-32 is a fixed length encoding scheme that uses exactly 4 bytes to represent Unicode code points. It directly stores the binary code in 4 bytes.

Ch-3 = BOOLEAN ALGEBRA

$$\text{L.H.S} \rightarrow \text{Prove: } XY + Y'Z + YZ = XY + Z$$

$$\rightarrow XY + Z \cdot 1 = XY + Z$$

Prove:

$$\rightarrow (A' + B')(A + B) = A'B + AB'$$

By Distributive

$$\rightarrow \cancel{A'A} + A'B + B'A + \cancel{B'B}$$

By property of zero

$$\rightarrow \underline{\underline{A'B + B'A}} = \text{RHS}$$

$$\text{Q. Prove: } XY' + Y'Z = XY'Z + X'Y'Z + X'Y'Z$$

$$\text{L.H.S} \Rightarrow Y'(X + Z) \quad \text{L.H.S} \Rightarrow XY'(Z + \bar{Z}) + Y'Z(X + \bar{Z})$$

$$\rightarrow Y'(X + \bar{X}Z) \rightarrow XY'Z + Y'Z + X'Y'Z + X'Y'Z$$

Indempotence

$$= XY'Z + X'Y'Z + X'Y'Z = \text{RHS}$$

$$\text{Q. Prove: } ① XY + X'Z + YZ = X.Y + X'Z$$

$$\text{② } X'Y'Z + YZ + XZ = Z$$

$$\text{③ } (A + B' + C')(A + B' + C)(A + B + C') = A + B'C'$$

Duality Operator Law \rightarrow L^* ,
which is true, its dual will also hold true.

o Demorgan's Principle

's Principle Change $0 \rightarrow 1$

$$S + V X = S + V X \quad \begin{matrix} \rightarrow + \\ \leftarrow - \end{matrix}$$

$$x = 1.5 \cancel{+} x$$

360

$$z^A + \bar{z}^A = (z_1 + \bar{z}_1) / (z_2 + \bar{z}_2) \in \mathbb{C}$$

$$g^2 + g^1 + g^0 + g^{-1}$$

$$3N_2 = \frac{A^{\dagger}B + B^{\dagger}A}{2}$$

Wet - thick box - sand

$$= \frac{1}{2} \ln(1 - x^2) + C = \frac{1}{2} \ln(1 - x^2) + C_1$$

~~ANSWER~~ ~~ANSWER~~

7

$$x \times 1 = x$$

$$x + ex = ex + ex + ex \quad | : ex$$

$$S = S(X) + S(Y) + S^2(X)Y$$

$$x^2 + 4x^3 + 6x^4 + 4x^5 + x^6$$

e: YOUVA

1878

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* Type A

Q.1 What is meant by tautology & fallacy? Prove that $1+Y$ is a tautology and $O.Y$ is a fallacy.

Awsl Tautology: If the result of any logical statement or expression is always TRUE or 1 for all input combinations it is called ~~false~~ Tautology.

Fallacy: If the result of any logical statement or expression is always False or 0, it is called fallacy.

$$x = x_1 - \delta \quad \checkmark \quad = x_1 + \dots + 1 \quad \text{for example}$$

$$\begin{array}{ccc} 0 & 1 & 0 \\ 1 & 1 & 0 \end{array}$$

Tautology Fallacy

... - 87 -

Q. 2 What is a truth table? What is its significance? (3)

Ans.2. A truth table is a table which represents all the possible values of logical variable / statements along with all the possible results of the given combinations of values.

Q.3 What is a duality principle? What is its usage in boolean algebra?

This is a very important principle used in boolean logic.
This states that every Boolean expression has a dual
expression which cannot be derived by:

RJ
rs1313131
1. Changing each OR ~~and~~ (+) to an AND sign (.)

1. Changing each OR sign (\cup) to AND sign (\wedge)
2. changing each AND sign (\wedge) to OR sign (\cup)

3. replacing each 0 by 1 & 1 by 0.

f. What are the basic postulates of boolean algebra?

Ans 1) Properties of zero: $0+x = x$ & $x+0 = 0+x = x$

Properties of 1 : $1+x = x$ & $1 \cdot x = x$

3) Indempotence Law: $x+x = x$ & $x \cdot x = x$

$$4) \text{ Involution : } \bar{\bar{x}} = x$$

parallel opposite

$$5) \text{Complementarity Law: } x + \bar{x} = 1 \quad \& \quad x \cdot \bar{x} = 0$$

6) Commutative Law: $x+y=y+x$ & $x \cdot y = y \cdot x$

7) Associative law: $x + (y + z) = (x + y) + z$ & $x \cdot (yz) = xyz$

$$8) \text{ Distributive law: } x(y+z) = xy + xz, \text{ and } x + yz = (x+y)z$$

$$9) \text{ Absorption Law : } x + x \cdot y = x \quad \& \quad x \cdot (x + y) = x$$

10) Other : $x + \bar{x} y = x + y$ (Example)

Type B (AN - at - AN in terms made with Trans) P. 3

d.1 Give the dual of the boolean expression: $(x+y) \cdot (\bar{x}+z) \cdot (y+z)$

$$\rightarrow (x \cdot y) + (\bar{x} \cdot \bar{z}) + (y \cdot z)$$

Q.2 Using truth table prove that $AB + BC + CA = AB + C\bar{A}$

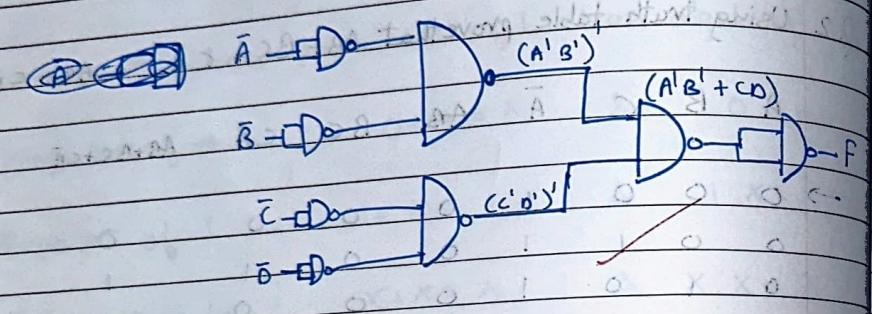
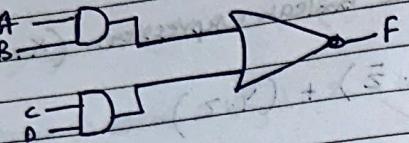
A	B	C	\bar{A}	AB	BC	$C\bar{A}$	$AB+AC+C\bar{A}$	$AB+C\bar{A}$
→ 0	0	0	1	0	0	0	0	0
0	0	1	1	0	0	1	1	1
0	1	0	1	0	0	0	0	0
0	1	1	1	0	1	1	1	1
1	0	1	0	0	0	0	0	0
1	1	0	0	1	0	0	1	1
1	1	1	0	1	1	0	1	1

Since both columns of $AB + BC + CA$ are identical
Hence proved.

Q.3 Use duality theorem to derive : $A + \bar{A} B = A + B$

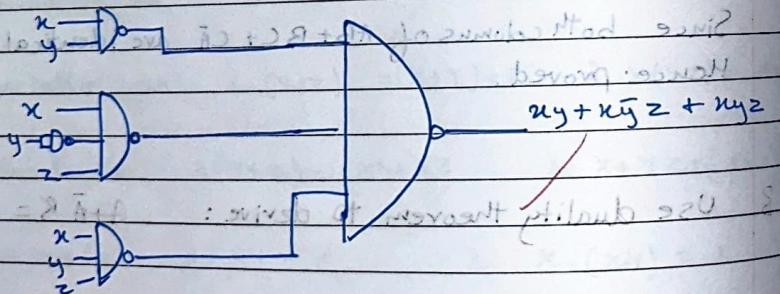
$$A \cdot \bar{A} + B = A \cdot B$$

Q.4 Convert the above circuit in NAND-to-NAND logic circuit.

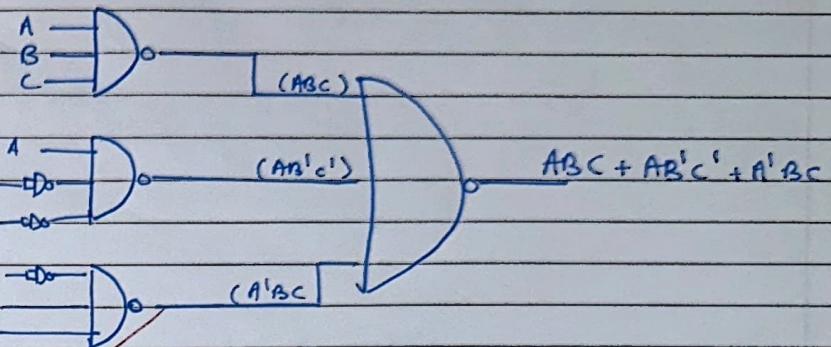


Q.5 Draw the logical circuits for the following using NAND gates only:

$$(i) x + \bar{x}\bar{y} = x\bar{y}z + \bar{x}yz$$



$$(ii) ABC + AB'C' + A'BC$$



Q
18/12/24