

Python Programming (Basic Level)

(100% Hands on Industry Ready Training)

S.No. Topic

1. Introduction
2. Variables
3. Selection Statement (Relational Operator)
4. Selection Statement (Logical Operator)
5. For Loop (Display problems)
6. For Loop (Counting Problems)
7. For Loop (Sum of series problems)
8. While loop (Bound control problems)
9. While loop (Number based problems)
10. Strings (Character iteration problems)
11. Strings (Character updation problems)
12. Strings (Word based problems)
13. List (one dimensional)
14. List (two dimensional)
15. Pattern problems
16. Tuple
17. Set
18. Dictionary
19. Functions
20. Projects

1. Introduction

1. Learning display Statement
2. Display a Leave Letter
3. Learning assignment statement and data types
4. Learning read Statement
5. Learning Operators
6. Learning Expressions

2. Problems on Variables (Class Work)

7. Addition of two numbers
8. Evaluate the expression $(a+b)*(c-d)$
9. Read 5 marks and find its total and average
10. Calculate area of rectangle.
11. Calculate simple interest.
12. Convert centimetres to meter.
13. Read a number and display its cube.
14. Find total second for given time x hours y minutes and z seconds.
15. Swapping of two numbers.

Test Programs

16. Evaluate the expression $2ba^2+3b^2+2ab^2$
17. Evaluate the expression $\frac{a^2-b^2}{(a+b)^2}$

18. Find number of seconds in a year.
19. In a right angled triangle (sum of 3 angles is 180) 2 sides angles are given find the angle of the 3rd side.
20. Convert the given temperature in celsius to fahrenheit. $(9/5)*(c+32)$
21. Convert the given number of days as year, month and days.
22. Convert the given time in seconds to hours, minutes and seconds.
23. Read number of years and find total no. of days, hours, minutes and seconds for given years.
24. Read a 2 digit number and reverse it (34 as 43)
25. Read a 6 digit number and display by splitting it into 3 two digit numbers.
26. Swap two numbers without using third variable.

Application Programs

27. The class strength is 'n' where boys strength is 'b'. Find percentage of boys and girls in the class.
28. A saree cost is Rs. N and is having X% discount. Calculate discount amount and saree cost after discount.
29. A person buy shirt at Rs.X and pant and Rs.Y. What is the total purchase cost when n% GST is included.
30. In a grocery shop a person buys products p1, p2 at the cost of x and y with m% gst and products p3 and p4 at the cost of x1 and y1 with n% gst. Calculate the total billing cost.
31. Read basic salary of an employee, his DA is 40% of basic salary and HRA is 20% of basic salary. Find his gross salary.
32. A person salary is Rs.'x' per day, he is fined Rs.'y' on his absence. Calculate his monthly income when he is present for 'm' days and absent for 'n' days.

3. Problems on Selection Structure (Relational operators)

33. Learning Selection Structure
34. Check the given mark is pass or fail.
35. Check whether a given number is Even or Odd
36. Check whether a given number is positive or negative
37. Find greatest of two numbers
38. Display digit (0 – 9) in words
39. Display grade of a student mark (else if ladder)
40. Display grade of a student mark (nested if)
41. Find greatest of 3 numbers (nested if)

Test Programs

42. Read 3 numbers and find its sum, if there is any duplicate number ignore it.
43. Read 2 numbers from user and check whether the first number is divisible by second number.
44. Check whether the area of rectangle ($l*b$) is greater than its perimeter $2*(l+b)$.
45. Create a menu to calculate area of circle or perimeter of the circle.

46. Read 3 angles of the triangle and check whether it is valid or not (valid when sum of 3 angles is 180 degree)
47. Read two numbers and an arithmetic operator, based on the operator perform its operation.
48. Check the person category based on the given age <13 (child), >=13 and <20 (teenager), >=20 adult.
49. Read an integer and display the last digit in words
50. Check the given number is perfect square or not.
51. Check the given number is sunny number or not.

Application Programs

52. The cost price of an item is x and selling price of an item is y. Find profit amount or loss amount of the item.
53. Read name and age of a person and display whether he is eligible for applying driving license.
54. Read number of items to purchase and calculate total cost as per given information.
 - Item cost is 120 if no. of items is between 1-50
 - Item cost is 100 if no. of items is between 51-100
 - Item cost is 80 if no. of items is above 100
55. Display worker efficiency for completing a particular job based on time in minutes.
 - Efficient – Completed between 2-4 hours
 - Good – Completed between 4-6 hours
 - Satisfactory - Completed between 6-8 hours
 - Can be lay off – More than 8 hours
56. Simple Arithmetic Calculator.
57. Generate a sales bill for the purchase of sarees, read no. of sarees and cost per saree from user as per given information.
 - 10% discount when purchase cost is above 500
 - 15% discount when purchase cost is above 1000
 - 20% discount when purchase cost is above 2000
 - No discount applicable if purchase cost is below 500
58. Calculate EB cost for given unit of utilization. Slab rates are as follows.
 - 0 to 100 units – free of cost
 - 101 to 200 units Rs.2.25 per unit,
 - 201 to 400 units Rs.4.5 per unit,
 - 401 and above Rs.6 per unit.
59. Read distance to be travelled and calculate the bus fare as
 - First 5km – Rs.10
 - Next 10km – Rs.5 per km
 - More than 15km - Rs 3 per km

4. Problems on Selection Structure (Logical operators)

60. Read a character and check it is upper or lower case or digit or special character
61. Check the given year is leap year or not (the year number must be divisible by four – except for end-of-century years, which must be divisible by 400)
62. Find greatest of 3 distinct numbers.

Test Problems

63. Read 3 numbers and display them in ascending order.

Application Programs

64. A certain grade of steel is graded according to the following conditions:
 - Hardness must be greater than 50
 - Carbon content must be less than 0.7
 - Tensile strength must be greater than 5600

The grades are as follows:

- Grade is 10 if all three conditions are met
- Grade is 9 if conditions (i) and (ii) are met
- Grade is 8 if conditions (ii) and (iii) are met
- Grade is 7 if conditions (i) and (iii) are met
- Grade is 6 if only one condition is met
- Grade is 5 if none of the conditions are met

5. Problems on variables (Looping - Display)

65. Learning For loop
66. Display first n natural numbers
67. Display squares of first n natural numbers.
68. Display multiplication table
69. Display all odd numbers in a particular range
70. Display numbers divisible by n in a particular range
71. Display all divisors of a given number
72. Learning Iteration table (Manual generation)

Test Programs

73. Display square multiplication table
1 2 3
2 4 6
3 6 9
74. Display a table having two columns for meter and kilometre for a particular range.
75. Display cubes of first n natural numbers
76. Display all 3 digit numbers which are divisible by n.
77. Display first n multiples of a given number. (gn=5 & n=4) Ans: 5 10 15 20.
78. Display the following sequence for the given limit 5, -10, 15, -20, 25, -30.
79. Display the following series 1 3 7 15 31.... for n numbers.
80. Display numbers in a range which are not divisible by x or y.

81. Display numbers which are divisible by x and multiples of y in some given range and also display it is odd or even.

Application Programs

82. Display first n pronic numbers.
83. In an office n employees are working, read all n employees name and age and display name of minimum and maximum ages of employee.

6. Problems on Variables (Looping - Counting)

84. Find how many divisors for the given number
85. Check the given number is prime or not
86. Find how many even numbers in a particular range
87. Display all prime numbers in a particular range
88. Find how many prime numbers are there in a particular range.
89. Find how many numbers are divisible by n in a particular range

Test Programs

90. Check the square root of a number is prime or not.
91. Display all numbers from n1 to n2 with their divisors and also display it is prime or composite.
92. Find how many divisors for each numbers in a particular range.

Application Programs

93. Read n employees ages and count the employees age with respect to following age group.
 1. 26-35
 2. 36-45
 3. 46-60
94. In a class, read maths mark for n students and find how many students got above 60 marks.
95. In an organization n employees are working, read salary of each employee and find how many employees are getting salary above 10000

7. Problems on Variables (Looping - Series)

96. Find sum of first n natural numbers
97. Find sum of squares of n natural numbers.
98. Find sum of all prime numbers from n1 to n2.
99. Find factorial of a number
100. Find sum of the series $n+(n-1)+(n-2)+\dots+0$.
101. Find whether the given number is perfect number or not
102. Check the given number is amicable number or not

Test Programs

103. Find sum of all numbers from n1 to n2 which are divisible by x or y.
104. Find mean, median and mode of all prime numbers from n1 to n2.
105. Find sum of the series for n terms $(1*2)+(2*3)+(3*4)+\dots$
106. Find sum of even numbers and odd numbers from n1 to n2
107. Find sum of the series $n^n + (n-1)^{n-1} + \dots + 1$.
108. Find sum of the series $1 + (1+2) + (1+2+3) + \dots + (1+2+\dots+n)$

109. Find sum of the series $x + x^2/2! + x^3/3! + x^4/4! + \dots + x^n/n!$
110. Check the given number is abundant number or not
111. Check the given numbers are friendly pair or not. $186\ 868\ n1/n2 == dsum1/dsum2$

Application Programs

112. Read n subject marks of a student and find his total and average.
113. Read n products price and find total cost, also if x% discount is applicable what the payable amount is?

8. Problems on Looping (While loops – Bound control)

114. Learning while loop.
115. Display natural numbers from n1 to n2.
116. Display first n odd numbers.
117. Display n even numbers from x.
118. Display first n prime numbers.
119. Display fibonacci series upto n^{th} term.
120. Find sum of first n perfect numbers

Test Programs

121. Display first n even numbers
122. Read a number and check it is prime or not. If it is not prime find the next prime number.
123. Check the given number is a Fibonacci number.
124. Find n^{th} prime number.

9. Problems on Looping (While loops – Number)

125. Find how many digits in a given number.
126. Find sum of the digits.
127. Find product of all even digits in the given number
128. Find smallest digit in the given number.
129. Read a number and display its first and last digit.
130. Display the given number in reverse order
131. Check whether the given number is palindrome or not
132. Display the given number in Words.
133. Find whether the given number is strong number or not.
134. Find whether the given number is armstrong number or not.
135. Display all numbers from n1 to n2 where the number should not have any zero at any position.

Test Programs

136. Read a two digit number and check it is special two digit number. $59\ 5+9 = 14, 5*9=45, 14+45 = 59$
137. Read a number and check it is duck number or not. (if there is any zero in the number then it is duck number)
138. Display all numbers from n1 to n2 where the number should not have any zero at any position.
139. Check the given number is evil number or not.

140. Check the given number is multiple harshad number or not (6804)
141. Display all special two digit numbers.
142. Find product of all odd digit's successor in the given number.
143. Check the given number is automorphic number or not
144. Check if a number is a perfect square having all its digits as a perfect square
145. Check the given number is magic number or not ($1729 \ 1+7+2+9 = 19$ reverse $91 \ 19*91 = 1729$)
146. Check the given number is neon number – $n = 9 \text{ sqr} = 9*9 = 81$ sumdigit $8+1 = 9$
147. Check the given number is spy number(sum of digits and product of digits should be same 123)
148. Check the given number is disarium number (sum of digits power position 135)
149. Check the given number is trimorphic number or not (given number is cubed and the cubed number ends with given number $5**3 = 125$)
150. Check the given number is happy number or not
151. Check the given number is power of 2

10. Problems on String (Character Iteration)

152. Learning String
153. Methods in string
154. Display all vowels in the given string.
155. Find number of consonants and vowels in the given string.
156. Check the given string contains all vowels in it.
157. Check the given string contains any special or numerical character.
158. Check the given string is binary string or not.
159. Find number of numerical digits from alpha numerical string.
160. Find all positions of given character in the string.
161. Display the given string in reverse order.

Test Programs

162. Check the given string is palindrome or not.
163. Display duplicate characters in the string
164. Display all non-repeating characters from the string
165. Read a string and find how many uppercase, lowercase, digit and special symbol in it
166. Read a string and display ASCII character of each letter in the string.
167. Read a string and a character and display next n characters when the given character is found
168. Count the number of matching characters in a pair of string

11. Problems on Strings (Character Updating)

169. Replace all vowels in the given string with '#'
170. Read a string and encrypt by replacing each character with its adjacent character.

- 171. Remove i-th character from a string
- 172. Remove all occurrences of the given character from the string
- 173. Replace character with given character in the string
- 174. Remove repeating characters in the given string
- 175. Find character frequency from the given string.

Test Programs

- 176. Replace substring with given substring in the string
- 177. Remove space from the string.
- 178. Remove all characters from the string except alphabets.
- 179. Find the Least Frequent Character in String
- 180. Find the Maximum frequency character in String
- 181. Check whether the string is Symmetrical or not when string length is even.

12. Strings (Words)

- 182. Read a sentence and find longest word in the sentence and display it.
- 183. Read a sentence and reverse each word of the sentence.
- 184. Display even length words in a string.
- 185. Display unique words in a given string.
- 186. Removing stop words from the given string.
- 187. Display duplicate words in the given string
- 188. Remove duplicate words from the given string.
- 189. Finding frequency of each word in a given string.
- 190. Read a sentence and display all special words in it. (WINDOW) First and last letter of the word should be same.

Test Programs

- 191. Read a word and check it is unique or not. Eg: COMPUTER
- 192. Read a sentence and convert first letters of each word in upper case.
- 193. Display words which are greater than given length n.
- 194. Display uncommon words from two Strings
- 195. Read a sentence and display all words which are palindrome.
- 196. Read a sentence and display the word which contains more number of vowels
- 197. Read a sentence and display all words containing double letter sequences.
- 198. Convert Snake case to Pascal case
- 199. Check the two given strings are anagram or not.

Applications on Strings

- 200. Validate Email ID
- 201. Validate mobile number
- 202. Generate 10 alpha numeric id generation with 3 alphabets (xyz) and 3 numbers (001 – 010).
- 203. Generating random strings until a given string is generated

String – Array

- 204. Convert the given string into collection of words.

205. Read n names in a string and display all names which starts with consonant and end with vowel.
206. Read n names and display all names starting with the given letter.

13. Pattern Problems

207. Display Right angled triangle pattern using special symbol
208. Display full pyramid using special symbol
209. Display diamond shaped pattern using symbols

Test programs

210. Display inverse right angled triangle pattern using special symbol.
211. Display inverted full pyramid using symbol
212. Display horizontal number table

14. Problems on Collections -List

213. Learning List.
214. Methods in list
215. Reading and displaying list elements.
216. Copying list elements in reverse order.
217. Read 2 list elements and concatenate them.
218. Display all odd numbers in a given list.
219. Display all positive numbers in a list.
220. Find sum of all even numbers in the given list.
221. Find how many odd and even numbers in the given list
222. Read n marks in a list and find its total and average.
223. Read n measurements of pipe in meter in a list and generate a new list after converting them in cm.
224. Read n numbers and display all negative numbers only when it is followed by a positive number.
225. Generate a list by finding sum of digits for each element in the given list.
226. Searching an element in a given list.
227. Read 2 list and compare them for a match.
228. Finding largest and smallest element in the given list.
229. Find second largest element in a list.
230. Display all duplicate elements in the given list.
231. Remove all duplicate elements in the given list
232. Find occurrences each element in the given list
233. Swap first and last element in the given list.
234. Swap any two given elements in a given array
235. Rotate list cyclically by one position
236. Insert an element at given position in the given list.
237. Delete an element at kth position in a list.
238. Delete given element in a list.

Test Programs

239. A teacher asked her students in a class to solve area of rectangle and she enters all their answers. Write a program to calculate how many students answered it correctly.
240. Read n students name and m subject marks of each student and display a consolidated mark report as follows student name mark 1 mark 2.. mark m, Result, Total (if pass) Average (if pass).
241. Read n students name and m subject marks of each student and display a consolidated grade report. Instead of mark grade should be reported.
242. Read n students name, roll no and m subject marks of each student. Display a student name and marks of a student rollno when it is entered by user.
243. Split the given list into 2 part and add the first part to the end.
244. Display first n odd numbers in descending order.
245. Read ages of n employees and check how many employees in each category i. 25-35 ii. 36 – 45 iii. 46-55 iv. others
246. Read a divisor n and find remainder for the product of given list elements.
247. Read list elements and generate prime number list and composite number list from it.
248. Find sum of digits of all elements in the given list.
249. Generate a list by finding cumulative sum of given list elements.
250. Find sum of all duplicate elements in the given list
251. Rotate list elements by k positions cyclically.
252. Rearrange the given list elements as per given ranking of another list.

15. Problems on collections (2D List)

253. Learning 2D list
254. Read and display two dimensional lists.
255. Matrix Arithmetic Operations
256. Find sum of list of lists
257. Read 2D list and find sum of each row and column
258. Read 2D list and find minimum and maximum element in it
259. Transpose of a matrix

Test Programs

260. Read a 2D list and find sum of all odd numbers and product of all even numbers.
261. A businessman had m shops and in each shop he have n stores, monthly sales of all counters stored in a 2d list. Find sum of each shop sales and each store sales
262. A hotel had 3 floors and 3 rooms in each floor. Room numbers should be assigned with floor number followed with room number. There are 9 visitors came for accommodation. Read all visitor names and allot them each room. Display all visitors name and their room numbers.
263. Read MxM matrix and find sum of right diagonal and left diagonal elements.

16. Problems on collections (Tuples)

- 264. Learning Tuples
- 265. Methods in tuples
- 266. Reading and displaying tuples
- 267. Read n numbers in a tuple also find maximum and minimum number in it.

Test Programs

- 268. Create a tuple for storing first n Fibonacci series
- 269. Create a tuple to store roll number, name and marks of a student.
- 270. Create a tuple to store n marks for m students also find total and average mark of each student.

17. Problems on collections (Set).

- 271. Learning Sets
- 272. Methods in set
- 273. Reading and displaying set.
- 274. Find subset of a set.

Test Programs

- 275. Create 2 set elements and find union and intersection of them.
- 276. Find symmetric difference for the given 2 sets

18. Problems on collection (Dictionary)

- 277. Learning Dictionary
- 278. Methods in dictionary
- 279. Reading and displaying dictionary.
- 280. Create a dictionary for a leap year month names as key and number of days as value. Do the following
 - i. Read a month to display number of days.
 - ii. Display all months having 31 days.
- 281. Create a dictionary for state name with capital and write a program to search for capital by giving state name.
- 282. Read a dictionary and an element, find the key of an element if it is present.
- 283. Create a dictionary to find the frequency of list elements in a list.
- 284. Read employee id and salary and store it in a dictionary.
- 285. Create a phone dictionary to store all yours friends name and mobile number

Test Programs

- 286. Create a dictionary to find the frequency of list elements in a list.
- 287. Create a student marks dictionary for one student having subject names with marks.
- 288. Create a student marks dictionary for a class having subject names with marks (nested dictionary).
- 289. Create a dictionary to read product name and its price. Generate bill for a customer who purchases few products from the store.

290. Create a dictionary containing employee name and their age display all employees of same age as entered by user.

19. Functions

- 291. Function No Argument No Return
- 292. Function No Argument With Return
- 293. Function With Argument No Return
- 294. Function With Argument With Return
- 295. Find sum of n natural numbers using all 4 function types
- 296. Find greatest of 2 numbers using all 4 function types
- 297. Find how many odd numbers in the given list using 4 function types
- 298. Display all even numbers in the given list using 4 function types
- 299. Built in functions
- 300. Generate 6 digit OTP number using randint method.
- 301. Function new takeaways.
- 302. Learning recursion function
- 303. Sum of first n natural numbers using recursion
- 304. Find factorial of a number using recursion

Test Programs

- 305. Make a simple calculator
- 306. Display fibbanoci series using recursion
- 307. Find sum of the digits using recursion

Application Programs

- 308. Guess the number game (number of guesses have to be counted)

20. Mini Projects

- 309. Dice Game