

Basics

Q1 Write a program to convert a given temperature from $^{\circ}\text{C}$ to $^{\circ}\text{F}$. Run the program for given temperature 40°C .

Q2 Write a module to find simple and compound interest. Calculate simple and compound interest for principal amount=10000, interest rate=10% and time=5 years.

Q3 Write a program to check whether given integer m is divisible by integer n or not. Run the program for m=5, n=2 and m=6, n=3.

Q4 Write a program to check whether given integer is odd or even. Run the program for 20 and 11.

Q5 Write a program to solve the equation $x = e^{-x}$ by using the Newton-Raphson method. Run 10 iterations and take initial value $x = -6$.

Q6 Write a program to solve the equation $\cos x = 2x$ by using the Newton-Raphson method. Run 10 iterations and take initial value $x=0.5$.

Q7 Write a program to create and print a new dictionary by concatenating following dictionaries:

- $\text{dic1}=\{1:10, 2:20\}$, $\text{dic2}=\{3:30, 4:40\}$ and $\text{dic3}=\{5:50, 6:60\}$
- $\text{dic1}=\{'a':1, 'b':2\}$, $\text{dic2}=\{'c':3, 'd':4\}$ and $\text{dic3}=\{'e':5, 'f':6\}$.

Q8 Write a program to generate and print first n=10 Fibonacci numbers.

Q9 Write a user defined function to find and print the intersection and union of two sets. Run the function for two sets $A=\{a, b, c, d\}$ and $B=\{b, c, e\}$.

Q10 Write a program to calculate and print sum and sum of square of first n=10 natural numbers.

Q11 Write a program to calculate and print sum and sum of square of first n=10 odd numbers.

Q12 Write a program that will read a given value of x and obtain following function.

$$y = \begin{cases} x^2 + 4 & \text{if } x > 0 \\ 4 & \text{if } x = 0 \\ -(x^2 + 4) & \text{if } x < 0 \end{cases}$$

$$y = \begin{cases} x & \text{if } x > 0 \\ 0 & \text{if } x = 0 \\ -x & \text{if } x < 0 \end{cases}$$

Q13 Write a program to find and print roots of a quadratic equation $x^2 + 2x - 2 = 0$.

Q14 Write a program to calculate and print sum and sum of square of first n=10 even numbers.

Q15 Write a program to calculate and print sum and sum of square of given numbers:

20, 12, 15, 1, 7, 10, 5, 1, 15, 5

Q16 Write a program to solve simultaneous linear equations in two variables.

$$4x - 3y = 11 \text{ and } 6x + 5y = 7$$

Strings

Q17] Write a program to calculate the length of a given string. Run the program for string: "Statistics".

Q18] Write a program to check whether a given word is palindrome or not. Run the program for 'MADAM' and 'START'.

Q19] Write a program to calculate the frequency distribution of characters in a string: "Statistics".

Q20] Write a program to check whether given character is alphabet or not. Run the program for 'b' and '*'.

Q21] Write a program to identify the smallest word from the list of words and print the smallest word with its length. Run for list of words: Statistics, Stat, Mathematics, Math

Q22] Write a program to check whether given character is consonant or vowel. Run the program for 'a', 'f' and 'man'.

Data Visualization

Q23] Plot the simple line plot for the following data.

Year	2015	2016	2017	2018	2019	2020
No. of Students	700	1200	900	800	950	1000

Q24] Draw a rod plot for the following data:

X	1	2	3	4	5	6
f	1	2	2	8	9	1

	4	2	7	0	3	1
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Q25] Draw a Pie Chart for the following data.

Section	A	B	C	D	E
No. of Workers	20	36	16	5	49
	0	7	0	0	0

Subject	Chemistry	Electronics	Mathematics	Physics	Statistics
No. of Students (%)	23.17	13.51	17.37	18.92	27.03

Q26] Draw a subdivided bar diagram for the data given below:

Year	No. of Students	
	Arts	Commerce
2017-18	750	1450
2018-19	725	1625
2019-20	850	1750

Q27] Draw a multiple bar diagram for the data given below:

Year	2016	2017	2018	2019	2020
Turnover (lakhs)	6.5	6.7	6.9	7	8
Profit (lakhs)	1.2	1.7	1.8	1.9	2

Q28]
histogram
following

Life (in hrs.)	400-450	450-500	500-550	550-600	600-700
No. of Bulbs	12	42	39	17	03

Draw
for the
frequency

distribution.

Q29] Draw boxplot of following observations:

15, 17, 29, 37, 5, 12, 45, 16, 29, 32, 18, 22, 24, 7, 13

Generate 200 random numbers from Exp(2) distribution and draw the histogram.

Q30] Draw a scatter plot for the following data and interpret it.

X	2	5	7	8	9	11	13
Y	8	13	18	20	21	25	30

Q31] Generate 60 random numbers based on X random variable, where X follows U(0,1) distribution and calculates $Y=-0.8X$. Using this simulated data, draw a scatter plot and interpret it.

Q32] Generate 50 random numbers based on X random variable, where X follows N(10,5) distribution and calculates $Y=2+0.5X$. Using this simulated data, draw a scatter plot and interpret it.

Q33] Draw a simple bar diagram using following data.

Year	2015	2016	2017	2018	2019
Annual Sales (in lakh Rs.)	12.5	13.4	7.5	20.1	16.5

Q34] Draw spike plot of the following data:

X	1	4	5	7	9
f	8	12	13	5	8

Q35] Generate 100 random numbers from B(20, 0.3) distribution and draw the boxplot.

Q36] Generate 100 random numbers from N(0,1) distribution and draw the histogram.

Functions

Q37] Develop a user defined function to evaluate the finite series: $1 + x + x^2 + \dots + x^n$ for $x = 0.2$ and $n=100$.

Q38] Develop a user defined function to calculate area of a triangle when sides are given. Find the area of triangle whose three sides are $a=5\text{cm}$, $b=7\text{cm}$ and $c=10\text{cm}$.

Q39] Write a user defined function to find the value of X^n , where n is integer. Find this value for $X=2$ and $n=5$.

Q40] Develop a user defined function to calculate area and circumference of a circle and calculate these two values for radius= 0.5 m .

Q41] Write a user defined function to find and print the A-B and B-A of two sets A and B. Run the function for two sets A={a, b, c, d} and B={b, c, e}.

Modules

Q42] Create a module to find area and circumference of a circle. Run the module for radius (r)=50 cm and print the output.

Q43] Create a module to find minimum and maximum numbers between n numbers. Find the minimum and maximum temperature (in Celsius) from the following data.

15, 20, 48, 10, 40, 42, 35, 30, 37, 25

Q44] Write a module to calculate area a triangle when base and height of a triangle are given. Find the area of triangle whose base=10 cm and height=5cm.

Q45] Write a module to compute minimum and maximum numbers between three numbers. Find the minimum and maximum numbers between three numbers: 20, 7, 10

Q46] Write a module to find the mean, mode, standard deviation and coefficient of variation of n observations. Hence find and print the three values for the following set of observations.

3.1, 2.5, 7.9, 3.4, 5.8, 1.9, 2.4, 3.2, 9.1, 2.1

Q47] Write a module to calculate addition, multiplication and subtraction of two matrices. Find A+B and A-B for matrices A and B:

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 6 & 7 \\ 5 & 6 & 7 \end{bmatrix} \text{ and } B = \begin{bmatrix} 1 & 4 & 9 \\ 4 & 9 & 6 \\ 8 & 9 & 4 \end{bmatrix}$$

Q48] Write a module to find mean, mode, range of n observations. Find these two values for the given data: 7, 5, 5, 9, 1, 9, 4, 8, 6, 5.

Q49] Write a module to find factorial value (n!), combinations (nC_r) and permutation (nP_r) value. Find these values for n=5 and r=2.

Q50] Write a module to calculate the sum of digits and reverse the order of digits of a positive integer number. Run the program for 1234 and 4527.

Q51] Write a module to find Euclidean and Manhattan distance between two points in the p-dimensional space. Find Euclidean and Manhattan distance between two points (1, 3, 4, 6, 7) and (6, 8, 1, 4, 3)

Q52] Write a module to find Minkowski and Chebyshev distance between two points in the p-dimensional space. Find Euclidean and Manhattan distance between two points (2, 4, 4, 3, 8) and (1, 5, 3, 4, 3).

Q53] Write a module to find A.M., G.M. and H.M. of given n observations. Find these three values for the given data: 1, 9, 2, 14, 6, 8, 9, 7, 5, 10

Q54] Write a module to find A.M., G.M., H.M. and mode of the frequency distribution. Find these values for the following data:

Temperature (in $^{\circ}\text{C}$)	25.2	22.4	30.1	32.0	28.1
Number of days	2	4	3	7	10

Q55] Write a module to find area rectangle and circle. Find area of rectangle for length=5cm and width=7cm, and area of circle for radius=2cm.

Descriptive Statistics and Probability Distributions

Q56] Write a program to calculate PMF and CDF of Poisson distribution with mean=2

Q57] Write a program to calculate PMF and CDF of Binomial distribution with parameters $n=10$, $p=0.5$.

Q58] Write a program to calculate PMF and CDF of Geometric distribution with parameter $p=0.5$.

Q58] Write a program to calculate and print the mean, median, mode, variance and coefficient of variation of the following frequency distribution.

x	1	2	3	4	5
f	10	20	40	21	9

Q60] Write a program to find the mean, variance and coefficient of variation of n observations. Hence find and print the three values for the following set of observations.

30.1, 23.5, 27.9, 13.4, 15.8, 14.9, 32.4, 35.2, 29.1, 20.1

Q61] The lengths and weights of a sample of six articles manufactured by a factor are given here.

Length (X)	3	5	6	7	10	11	4	12	13	14
Weight (Y)	8	12	11	14	16	17	10	18	20	21

Q62] Write a program to find regression equation of Y on X, correlation coefficient and coefficient of determination between n pairs of values of variables X and Y.

Q63] Write a program to arrange a set of n observations in ascending order and find the median. Hence arrange the following observations in ascending order and find the median.

26.86, 33.33, 55.82, 10.61, 51.93, 75.94, 61.67, 15.01, 49.17, 76.78

Q64] Write a program to arrange a set of n observations in ascending order and find the median. Hence arrange the following observations in ascending order and find the median.

18.11, 95.34, 81.31, 36.66, 10.15, 71.81, 3.16, 66.73, 49.03, 79.94