



VIT[®]
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

BCSE101E - Computer Programming: Python

Practice Problem Set 1 (Module 1 to 3)

**School of Computer Science and Engineering
Vellore Institute of Technology
Vellore.**

BCSE101E - Computer Programming:Python

GENERAL INSTRUCTIONS

1. Computer Programming: Python has two **Course Outcomes** [CO] which are mentioned in each question as [CO1] or [CO2]
 - Classify various algorithmic approaches, categorize the appropriate data representation, and demonstrate various control constructs. [CO1]
 - Choose appropriate programming paradigms, interpret and handle data using files to propose solution through reusable modules; idealize the importance of modules and packages. [CO2]
2. Level of the questions is defined based on Bloom's taxonomy ([L1], [L2], [L3], [L4], [L5] and [L6]). It is a hierarchical classification of the different levels of thinking i.e., basic level to creating new solution level.
3. Students must practice cycle sheet programs in Moodle – Virtual Programming Lab(VPL) to do the assessments.
 - To login for the first time in Moodle:
(Reset the password using Registration number or VIT email id)
https://moovit.vit.ac.in/login/forgot_password.php
 - **Login URL:** <https://moovit.vit.ac.in/>
4. Malpractice in any form is not acceptable and it will be viewed seriously based on academic guidelines. Students are advised to adhere to the due dates set for each Assessment.
5. Programs given in Practice Problem Set can be used to attain basic knowledge. programs are only for practice. Students must explore and practice more programs which will help to attempt the exams. Challenging problems / Higher order Thinking [HoT] questions will be asked during Assessments.

[EASY]

1. A student will not be allowed to sit in exam if his/her attendance is less than 75%. Take following input from user such as Number of classes held, Number of classes attended and also student medical proof availability [1(for Yes)/0 (for No)]. Display percentage of class attended and eligibility detail (Allowed/ Not Allowed) for exam. If student is having less than 75% but having medical proof, he/she is 'Allowed' for exam, otherwise 'Not Allowed'.

Sample Input/ Output format

Input: Number of classes held Number of classes attended student medical proof availability (1/0)	Output: percentage of class attended Allowed for exam or not
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Test Cases

case=1 input= 25 20 0 output= 80 Allowed	case=2 input= 25 15 1 output= 60 Allowed	case=3 input= 25 15 0 output= 60 Not allowed
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[EASY]

2. Petrol is collected for Indian Oil Corporation for sales from nearest 'n' storage points to the Collection point. Given the amount of petrol from 'n' storage points in litres(L) and milli litres (mL), write a PAC chart, flowchart, algorithm and python code to compute the total quantity of oil in the collection point.

For example, if oil comes from 3 bunks in quantities 2 L 300 mL, 3 L 700 mL and 4 L 600 mL then the total quantity of oil in collection is 10 L 600 mL.

Sample Input/ Output format

Input: No. of Storage points L and mL quantities from storage point 1 L and mL quantities from storage point 2 . L and mL quantities from storage point N	Output: Total quantity both in L and mL of oil in collection point
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Test Cases

case=1 input= 2 2 300 3 600 output= 5 900	case=2 input= 3 1 100 2 200 3 300 output= 6 600	case=3 input= 2 1 600 1 600 output= 3 200
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[EASY]

3. Draw a flowchart and construct a python program to accept the monthly income of an employee and display the income tax to be paid at the end of the year according to the following criteria:

Annual income (in Rs)	Income Tax
> 1000000	4 %
> 500000 and <= 1000000	2 %
<= 500000	NIL

Sample Input/ Output format

Input: Annual income	Output: Tax
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Test Cases

case=1 input=95000 output=NIL	case=2 input=1000000 output=20000	case=3 input=1200000 output=480000
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[Medium]

4. Determine the height of the tower that can be reached by the ladder, given the length and angle in which the ladder has to be leaned on the tower. Write PAC, flowchart and python code for determining the height of the tower. Length of the ladder is given in feet and angle to lean the ladder is given in degrees. Display the height of the tower, with two decimal places.

Height of the tower = Length of the ladder * sine (Angle in radians).

Angle in radians = (Pi /180) * Angle in degrees.

Sample Input/ Output format

Input: Length of the ladder in feet Angle in degrees	Output: Height of the tower
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Test Cases

case=1	case=2	case=3
input=12	input=40	input=100
30	60	80
Output:0.11	Output:0.73	Output:2.44

[MEDIUM]

5. Write a PAC chart, flowchart, algorithm and python code.
Calculate the toll charge, by considering kilometers travelled by vehicle. Display the toll charge of the two-wheeler to be paid as per chart below.

kilometers travelled	Charge
KmTr <=1000KM	0
1000KM < KmTr <= 10000	50
1000KM < KmTr <= 20000	150
2000KM < KmTr <= 40000	250
4000KM < KmTr <= 60000	350
KmTr > 60000	500

Sample Input/ Output format

Input: kilometers travelled	Output: Toll charge
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Test Case

case=1 input=25000 output=250	case=2 input=500 output=0
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[MEDIUM]

6. Write a PAC Chart, algorithm, and flowchart for converting the given two-digit number into its corresponding Roman numeral

Sample Input/ Output format

Input: Two digit number	Output: Roman numeral
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Test Cases

case=1 input=20 output=XX	case=2 input=21 output=XXI	case=3 input=25 output=XXV
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[MEDIUM]

7. Write a PAC chart, flowchart, algorithm and python code for the question given below.

An online educational platform offers three courses: Programming Courses, Robotics Courses and Academic Writing Courses : The vendor gives a discount of 10% on orders for programming based courses if the order is for more than Rs. 1000. On orders of more than Rs. 750 for Robotics Courses, a discount of 5% is given, and a discount of 10% is given on orders for academic writing courses of value more than Rs. 500. Assume that the numeric codes 1,2 and 3 are used for Programming, Robotics and Academic Writing Courses respectively. Write a program that reads the product code and the order amount and prints out the net amount that the learner is required to pay after the discount.

Sample Input/ Output format

Input: product code order amount	Output: Net amount
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Test Cases

case=1	case=2	case=3
input=	input=	input=
1	2	3
2000	1575	750
output=1800.00	output=1496.25	output=675.00

[Hard]

8. Earthquake Research Institute of Japan has recorded earthquake occurred in the year 2021 using Richter scale. Develop PAC, Algorithm, Flowchart and write a Python program to get the 'n' (number of times) the earthquake has occurred and print the number of times in which the magnitude was low, medium and high. The magnitude value is given in microns. If the value is less than 5.4(inclusive) in microns then it is low, 5.4 to 7.0 (inclusive) it is medium and more than 7.0 it is high.

Also, if the number of times recorded is Zero, display as “No earthquake predicted” and if the number of times recorded is negative, display as “Invalid Input”

Sample Input and output

Input:	Output:
Number of times (n) the earthquake has occurred	Count of low, medium and high
Magnitude in microns for each earthquake occurred	

Test Cases

case=1	case=2	case=3	case=4
input=	input=	input=	input=
7	5	0	-3
4.3	9.1		
6.6	8.1		
8.1	8.3		
2.1	2.3		
3.3	7.3		
7.5			
7.6			

output= 3 1 3	output= 1 0 4	output= No earthquake predicted	output= Invalid Input
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[Hard]

9. Get a DOB from the user which is an 8 digit number. Check whether it is a Lucky number or not by following the steps below:

Step-1: Calculate the sum of the digits in the odd-numbered positions (the first, third, fifth and seventh digits) and multiply this sum by 3.

Step-2: Calculate the sum of the digits in the even-numbered positions (the second, fourth, sixth and eighth digits) and add this to the previous result (got in step 1).

Given Date of Birth is declared as a lucky number, only if the last digit of the result from step 2 is 0.

Develop an algorithm and write a python program to read the Date of Birth, if the number of digits is not 8 then print “Cannot be processed” and terminate program. If the number of digits is 8 and if the DOB is a lucky number, output the DOB with the message “Lucky Number.” If the number of digits is 8 and if the DOB is not a lucky number, output the DOB with the message “Not a Lucky Number.”

For example the DOB is 12032003,

the result from step 1 is 9,

the result from step 2 is 17

The output is 12032003, “Not a Lucky Number”.

For example the DOB is 13101978,

the result from step 1 is 30,

the result from step 2 is 50,

The output is 13101978, “Lucky Number.”

For example if the DOB is 1110197,

The output is “Invalid Input”

Sample Input/ Output format

Input: Enter the Date of Birth	Output: DOB, Lucky Number DOB, Not a Lucky Number Invalid Input
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Test Cases

case=1	case=2	case=3	case=4
input= 12032003	input= 13101978	input= 1110197	input= 20122027
output= 12032003, Not a Lucky Number	output= 12032003, Lucky Number	output= Invalid Input	output= 20122027, Lucky Number

[Hard]

10. Given a number 'n', write PAC, Algorithm, Flowchart and Python program to print the digits of 'n' that divides 'n'. Print the digits in reverse order of their appearance in the number 'n'. For example, if n is 122 then print 2, 2, 1. Use only conditional and iterative statements to write the code. If none of the digits divide the number, then print 'No factors'

Sample Input and output

Input: Number (n)	Output: Digits of the number 'n' that is a factor of 'n' displayed in reverse order
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Test Cases

case=1	case=2	case=3	case=3
input= 122	input= 322	input= 1223	input= 1328
output= 2 2 1	output= 2 2	output= 1	output= 8 2 1