# Python
# Lesson Plan: Class 08 / PRG / 01 / 10

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|---|---|
| **Overall goal of the lesson** | **Children will learn about the Python programming language** |
| **Prior knowledge required** | Mathematical logic and Mathematical Formula. |

**MODULE 1:** **Module time:** 1 Week

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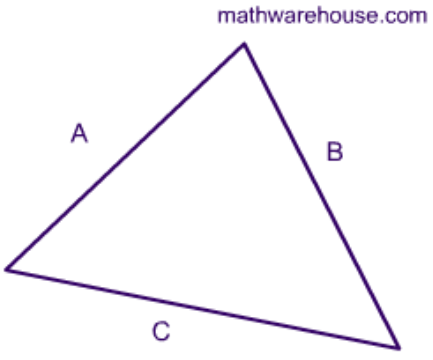
|---|---|
| **Goal:** | Children to learn about the basic level of Python programming language |
| **Description:** | Python is an interpreted high-level programming language for general-purpose programming created by Guido van Rossum. Python is a superb language for teaching programming at introductory level to children without talking about many of the nuances in real computer science implementations. This document lists the problems that the children would develop as part of the learning of Python language. |
| **Material required:** | **Physical: None.**<br>**Electronic: Python installed on the machines**<br>**Editor : Sublime text editor is preferred.** |
| **Procedure Summary:** | Request to follow the steps mentioned below for getting the students acquainted with Python. All steps to be performed by the teacher and students to follow the same. Students to perform later projects by themselves. |
| **Procedure Details:-** | A. **First explain that Python is a programming language using which you can create your own interactive software's, which can help them in solving daily life problems quickly and precisely like making a calculator of own.**<br>B. **Motivate students to solve below questions to make them feel comfortable in Python. Questions have been divided into three sections, 1) Easy 2) Normal 3) Hard. Each Section has been further divided into two subsections one is Normal questions and another Code Chef questions with link.**<br>C. **Students should firstly be able to solve 50 % of easy level questions before moving to Medium level. Hard level questions should only be approached after completely solving medium level questions.**<br>**<u>Easy</u>**:<br>1. Write a program to accept the radius of a circle and print its area and perimeter.<br>2. Write a program to accept 3 sides of a triangle and use the Heron's Formula to calculate area of a triangle.<br>Heron's Formula<br>$S = \frac{A + B + C}{2}$<br>  |

3. Write a program to accept two numbers in two variables and print them by swapping their values without using a third variable.
4. Write a program that inputs 3 numbers from the user and prints the maximum of 3 numbers. Can we do it with just 2 conditions?
5. What is the difference between these two statements?
    a. if a%2==0:
       print("EVEN")
    b. if a%2==0:
           print("EVEN")
6. Write a program to input 3 sides of a triangle say a,b,c and check if the sides make a valid triangle or not.
   For the sides to form a valid triangle, it needs to satisfy the following 3 conditions: a+b>c, a+c>b and c+b>a.
7. Write a program to input 3 sides of triangle. Check if the triangle is equilateral, isosceles or scalene. Use logical operators as required.
8. What will be the outcome of these Boolean statements? Answer in True or False.

| **STATEMENT** | **True or False** |
|---|---|
| 5 > 9 | False |
| (3 * 4) == (1 * 12) | |
| (5 x 7) IS NOT > (6 x 4) + 11 | |
| 24 * 5 < 36 * 2 | |
| (9 * 11) != (100 - 4) | |
| '1000' > '110' | |

9. Write a code to print sum of first n numbers.
10. Write a code to multiply first n numbers.
11. Write a program to take input of 5 numbers and print its average.
12. Does your program in question 11, give correct output for the input: 3.2, 4, 1.2, 15, 8? If not, modify the program to handle this input.
13. Write a python program which will take all the three angles of a triangle as input and will check whether the given triangle is valid or not using if else.

**Input Format**

The first line contains a float value, 1st angle of the triangle.
The Second line contains a float value, 2nd angle of triangle.
The Third line contains a float value, 3rd angle of triangle.

**Output Format**

Print **Valid triangle** or **Invalid triangle**.

**Sample Input**

a) 97.60
62.40
20
b) 70
50.50
70.50

**Sample Output**

a) Valid triangle
b) Invalid triangle

14. Make a program which takes three numbers A, B and C from the user and prints the minimum and maximum among them.

**Input Format**

The first line contains an Integer value, A.
The Second line contains a float value, B.
The Third line contains a float value, C.

**Output Format**

Print minimum and maximum among them.

**Sample Input**

40
50
30

**Sample Output**

Minimum = 30
Maximum = 50

15. Write a python program which take User_Name ,Python_Score and Math_Score as inputs and print the below statement.

" Hi User_Name, your total score is (Python_Score+Math_Score) ".

**Input Format**

The first line contains a single string, User_Name.
The Second line contains an integer, Python_Score, where Python_Score <=100.
The Third line contains an integer, Math_Score, where Math_Score <=100.

**Output Format**

Print "Hi User_Name, your total score is (Python_Score+Math_Score)"

**Sample_Input**

Ram
90
95

**Sample_Output**

Hi Ram, your total score is 185.

**CodeChef Problems:**

**1. Find Remainder**

**Problem Statement**

Write a program to find the remainder when two given numbers are divided.

**Input**

The first line contains an integer T, total number of test cases. Then follow T lines, each line contains two Integers A and B.

**Output**

Find remainder when A is divided by B.

**Sample Input**

3

1 2

100 200

10 40

**Sample Output**

1

100

10

Source: https://www.codechef.com/problems/FLOW002

**Medium:**

1. **Challenge Problem:** Write a program to input a 2-digit number and print its reverse. Eg. Input: 59 Output: 95
2. Write a program to input 3 numbers from a user and find the second maximum of the three. Do it without using any logical operator.
3. Write a program to input a number from the user, print "Fizz" and "Buzz" when the input is divisible by 3 or 5 respectively. Print "Fizz-Buzz" in case the number is divisible by both and the number itself if the number is divisible by none. Use comments in the program to explain.
4. Find max of N numbers.
5. Given 2 numbers - find the HCF
6. Check Reverse of a number.
7. Check for a Palindrome
8. Accept a number, print all of its factors.
9. Accept a number, check if it is a prime number.
10. Find second max out of N numbers.
11. Go through below two codes. There are four multiple choice questions given in the comment sections i.e. after '#'. You need to answer them.

**Note: -Assume below codes have been executed on python 3**

```
1)My_int = 10 + 5
  Print(My_int)                          # What will be output?  A)10+5  B)15  C)error
  My_int="Value changed to string"
  Print(My_int)                          # What will be output? A)10+5  B) 15
                                                C) Value changed to string D) error
```

2)My_int = Input( " Enter the number " ) **# Assume user entered 10+5**

```
Print(My_Int)                          # What will be output? A)10+5  B)15  C)
      error
My_int="Value changed to string"
Print(My_int)                          # What will be output? A)10+5  B)15
                                         C)Value changed to string D) error
```

12. Suppose Dominos manager asked you to develop an Interactive software for them which will do following tasks –
    It will ask for the three variable from the user one by one. Variables will be
    a) Rate of pizza
    b) Discount percentage
    c) GST percentage

    Your software should return net amount customer need to pay to Dominos.

**Input Format**

The first line contains a float value, Pizza rate.
The Second line contains a float value, Discount percentage.
The Third line contains a float value, GST percentage.

**Output Format**

Print net amount customer need to pay to Dominos.

**Sample Input**

500.00
12.5
5

**Sample Output**

459.375

**Explanation**

Price after discount = 500 – (500 *12.5/100) = 437.50
Adding GST to above price =437.50+(437.50*5/100) = 459.375

13. Suppose you visited a bank. When Branch Manager came to know about your coding profile, he asked you to develop an interactive software which will ask for the **amount** as the input and it will return minimum number of notes (of lower denomination) bank should give in exchange of the amount.

**Note: - Allowed denominations are 1,2,5,10,20,50,100,500,2000**.

**Input Format**

An Integer, amount, where amount >0.

**Output Format**

Print Minimum no of notes bank should give in exchange of amount.

**Sample Input**

3337

**Sample Output**

10

**Explanation**

| Denomination | Notes |
|---|---|
| 2000 | 1 |
| 500 | 2 |
| 100 | 3 |

| | |
|---|---|
| 50 | 0 |
| 20 | 1 |
| 10 | 1 |
| 5 | 1 |
| 2 | 1 |
| 1 | 0 |
| Total | 10 |

So in the above case your software should return total number of notes = 10

14. Predict the output of following python program.

```
i=1
while (i < 10) :
    print(i**i, end= ' ')
            if(i%4==0):
               break;
    i=i+1
print(i)
```

15. Write the outputs of following print functions. **In case of any error in print statement write "ERROR".**
    a. print( " Hello , \n  I love Python \\n Maths)
    b. print(3>5)
    c. print('3>5 and 6>4')
    d. print(3>5 or 6>4)
    e. print("33"*4)
    f. print("42"+22)

16. Given a natural number N, can you write a python program which will print the sum of squares of First N natural numbers.

**Input Format**

A natural number ***N***, Where ***N***<=1000.

**Output Format**

Print the sum of squares of first ***N*** natural numbers.

**Sample Input**

4

**Sample Output**

30

**Explanation**

We print the sum of square of first 4 natural numbers, which is $1^2 +2^2+3^2+4^2=30$.

**CodeChef Ptoblems**

1. **ATM**

   **Problem Statement**

Pooja would like to withdraw X $US from an ATM. The cash machine will only accept the transaction if X is a multiple of 5, and Pooja's account balance has enough cash to perform the withdrawal transaction (including bank charges). For each successful withdrawal the bank charges 0.50 $US. Calculate Pooja's account balance after an attempted transaction.

**Input**

Positive integer 0 < X <= 2000 - the amount of cash which Pooja wishes to withdraw.
Nonnegative number 0<= Y <= 2000 with two digits of precision - Pooja's initial account balance.

**Output**

Output the account balance after the attempted transaction, given as a number with two digits of precision. If there is not enough money in the account to complete the transaction, output the current bank balance.

Example 1 - Successful Transaction

**Sample Input**

30 120.00

**Sample Output**

89.50

Example 2 - Incorrect Withdrawal Amount (not multiple of 5)

**Sample Input**

42 120.00

**Sample Output**

120.00

Example 3 - Insufficient Funds

**Sample Input**

300 120.00

**Sample Output**

120.00

Source: https://www.codechef.com/problems/HS08TEST

2. **Sum of First and Last digit**

**Problem Statement**

If given an integer N. Write a program to obtain the sum of the first and last digit of this number.

**Input**

The first line contains an integer T, total number of test cases. Then follow T lines, each line contains an integer N.

**Output**

Display the sum of first and last digit of N.

**Sample Input**

3

1234

124894

242323

Sample Output

5

5

5

Source: https://www.codechef.com/problems/FLOW004

3. **Sum of digits**

**Problem Statement**

You're given an integer N. Write a program to calculate the sum of all the digits of N.

**Input**

The first line contains an integer T, total number of testcases. Then follow T lines, each line contains an integer N.

**Output**

Calculate the sum of digits of N.

**Sample Input**

3

12345

31203

2123

**Sample Output**

15

9

8

Source: https://www.codechef.com/problems/FLOW006

4. **Life, the Universe, and Everything**

**Problem Statement**

Your program is to use the brute-force approach in order to find the Answer to Life, the Universe, and Everything. More precisely... rewrite small numbers from input to output. Stop processing input after reading in the number 42. All numbers at input are integers of one or two digits.

**Sample Input:**

1

2

88

42

99

**Sample Output:**

1

2

88

Source: https://www.codechef.com/problems/TEST

**Hard:**

1. Write a code to print the following pattern. Take input from the user to print number of rows he wants to print.

**2.** Write a program to print the following pattern. Take input from the user to print number of rows he wants to print.

1

12

123

1234

12345

.....

3. Write a program to print the following pattern. Take input from the user to print number of rows he wants to print.

1

121

12321

1234321

123454321

.....

4. Write a Python code which will print below pattern. **Use while or for loop**.

1

2 4 6

3 6 9 12 15

4 8 12 16 20 24 28

5 10 15 20 25 30 35 40 45

**CodeChef Ptoblems**

1. **Reverse the number**

**Problem statement**

If an Integer N, write a program to reverse the given number.

**Input**

The first line contains an integer T, total number of testcases. Then follow T lines, each line contains an integer N.

**Output**

Display the reverse of the given number N.

**Sample input**

3

12345

31203

2123

**Sample Output**

54321

30213

3212

Source: https://www.codechef.com/problems/FLOW007

2. **GCD and LCM**

**Problem Statement**

Two integers A and B are the inputs. Write a program to find GCD and LCM of and B.

**Input**

The first line contains an integer T, total number of testcases. Then follow T lines, each line contains an integer A and B.

**Output**

Display the GCD and LCM of A and B separated by space respectively.

**Sample Input**

3

120 11

10213 312

10 3

**Sample Output**

1 1320

1 3186456

1 30

Source: https://www.codechef.com/problems/FLOW016