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Expt. No. 1 Page No. 01

Aim:- Write a program to demonstrate basic data type in python...

Program:-

```
a = 5
print(a, "is of type", type(a))
a = 2.0
print(a, "is of type", type(a))
a = 1+2j
print(a, "is complex number?", isinstance(1+2j, complex))
```

Output:-

```
5 is of type <class 'int'>
2.0 is of type <class 'float'>
(1+2j) is complex number? True.
```

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Expt. No. 2 Page No. 02

Aim:- Write a program to compute distance between two points taking input from the user (Pythagorean theorem)

Description:-

The pythagorean theorem is the basis for computing distance between two points. Let (x_1, y_1) & (x_2, y_2) be the co-ordinates of the points on xy-plane. From pythagorean theorem, the distance between two points is calculated using the formula:

$$d = \sqrt{(\Delta x)^2 + (\Delta y)^2}$$
$$= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

To find the distance we need to use the method Sqrt(). This method is not accessible directly so we need to import math module & then we need to call this method using math static object.

To find the power of a number, we need to use ** operator.

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Expt. No. 2 Page No. 03

Algorithm:-

Input:- x_1, y_1, x_2 & y_2

Output:- Distance between two points...

Step-1 - Start

Step-2 Import Math Module

Step-3 Read the values of x_1, y_1, x_2 & y_2.

Step-4 Calculate the distance using the formula Math.sqrt(x2-x1)** 2 + (y2-y1)** 2 & store the result in distance.

Step-5 - Print distance.

Step-6 - Stop.

For example:-

Enter x_1 value : 5
Enter y_1 value : 18
Enter x_2 value : 7
Enter y_2 value : 9
Distance between two point is: 92195....
>>>

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Expt. No. 3 Page No. 04

Aim:- Using for loop, write a program that prints out the decimal equivalent of $1+\frac{1}{2}+\frac{1}{3}\cdots\frac{1}{10}$.

Description:-

A loop statement allows us to ~~create~~ excute a Statement of a group of a Statement multiple times. We can use for loop to calculate the decimal equivalents of given set of numbers for loop statement.

It has the ability to iterate over the items of any sequence, such as a list or a String. Iterating over a Sequence is called Trains Traversal. The general form of loop Statement is as follows:

for iterating-Var in Sequence:

Statements (s):-

To find the decimal equivalents, we need to use the method powu. This Method is not accessible directly, so we need to import Math Module & then we need to call this Method using Math Static Object.

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Expt. No. '3' Page No. 05

Algorithm:-

Output:- Decimal equivalent of $1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{5}+\frac{1}{6}+\frac{1}{7}+\frac{1}{8}+\frac{1}{9}+\frac{1}{10}$.

Step 1 : Start
Step 2 : Import Math Module
Step 3 : Initialize i=2
Step 4 : Repeat steps 5, 6, Until i=11
Step 5 : Print Math.pow(i,-1)
Step 6 : Increment i by 1.
Step 7 : Stop.

For example:-

1/2 = 0.5
1/3 = 0.33
1/4 = 0.25
1/5 = 0.20
1/6 = 0.16
1/7 = 0.14
1/8 = 0.125
1/9 = 0.11
1/10 = 0.1

Adding this all values is:- 2.915.

>>>

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Expt. No. 4 (a) Page No. 06

Aim :- Write a Python Program to Find First n prime numbers...

Algorithm :-

1. Read the value of n.
2. for num in range (0, n+1), perform the following
3. if num % i is 0 then break
   else print the value of num
4. Repeat step 3 for i in range (2, num)

Program :-

```
n = int(input("Enter the upper limit :"))
print("Prime numbers are")
for num in range(0, n+1):
    # prime numbers are greater than 1
    if num > 1:
        for i in range(2, num):
            if (num % i) == 0
                break
            else:
                print(num).
```

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Expt. No. 4'a'

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Sample Output:-

$python main.py

Enter the ~~u~~'Upper limit' 20

Prime numbers are:

2
3
5
7
11
13
17
19.

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Expt. No. 4 'b'

Page No. 08

Aim:~ A program to demonstrate list & tuple in python.

Algorithm:~

```
# Python program to create a list of tuples
# from given list having number &
    its cube in each tuple.

# Creating list
list1 = [4, 2, 5, 6]

# Using list comprehensions to iterate each values
in list & create a tuple as specified
res = [(val, pow(val, 3)) for val in list1]

# print the result
print (res).
```

Output:~

[(1, 1), (2, 8), (5, 125), (6, 216)].

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Expt. No. 5 'a' Page No. 09

Aim:- Write a program using for loop that loops over a Sequences.

Description:- A sequence is the generic form for an ordered set. There are several types of sequences in python. The following 3 are most important.

Lists:- There are the most versatile sequence type. The elements of a list can be any object & lists are mutable.

Tuples:- There are like lists, But Tuples are immutable.

Strings:- There are a special type of sequence that can store only characters & having special notations.

Algorithm:-

Output:-

Elements of Sequence (list)

Step 1 = Start
Step 2 = Initalize the list named a as ["Ram"=19,85]
Step 3 = Repeat Step 4 until the last element in the list is reached.

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Step 4 : Print i th element
Step 5 : Stop.

Output :

```
>>>
Ram
19
85.75
>>>
```

x

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Expt. No. 5'b' Page No. 11

Aim:- Write a program using a while loop that asks the user for a number, & prints a countdown from that number to zero.

Description:-

A loop statement allows us to excute a statement or group of statements multiple times, Here we are using while loops.

While loop statement:-

It repeatedly executes a target statement as long as the given condition is true. The general form while statement is as follows:-

```
While expressions:
Statement (s);
```

Here the statement(s) may be a single a statement of a block of statement. The condition may be any expression & is true for any non-zero value. The loop iterates while the conditions is true. When the conditions becomes false, program control passes to the line immediately following the loop.

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Expt. No. 5'b' Page No. 12

Algorithm:-

Input:- A number.

Output:- Print the values from given number to zero.

Step 1 = Start
Step 2 = Read num
Step 3 = Repeat steps 4 & 5 while num >=0
Step 4 = Display num
Step 5 = Decrement num by 1.
Step 6 = Stop

- For example:-

```
Enter a number:7
7
6
5
4
3
2
1
0
>>>
```

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Expt. No. 6 Page No. 13

Aim:-

To write a python program to multiply matrices.

Algorithm:-

1. Define two matrices X & Y.
2. Create a resultant matrix named 'result'.
3. for i in range (len(x)):
   for j in range (len(Y[0])):
   a) for K in ~~rang~~ range (len(Y))
   b) result [i][j] += X[i][K] * Y[K][j]
4. for r in result, print the value of r.

Program:-

```
X = [[1,2,7,3],
     [4,5,6]
     [7,8,9]

Y = [[5,8,1,2]]
     [6,7,3,0]
     [4,5,9,1]]
```

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Expt. No. 6 Page No. 14

```
result = [[0,0,0,0],
          [0,0,0,0]
          [0,0,0,0]].

for i in range(len(X)):
    for j in range(len(Y[0])):
        for K in range(len(Y)):

result[i][j] += X[i][K] * Y[K][j].
for r in result:
    print(r).
```

Sample output:-

```
[114, 160, 60, 27]
[ 74, 97, 73, 14]
[119, 157, 112, 23]
```

X

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Expt. No. 07 Page No. 15

Aim:- Write a program for linear Search....

Algorithm:

1. Read n elements into the list.
2. Read the element to be Searched
3. If alist[pos] == item, then print the position of the item.
4. else increment the position & repeat step 3 until pos reaches the length of the list.

Program:-

```
items = [5,7,10,12,15]
print("lists of items is", items)
x = int(input("enter item to Search"))

i = flag = 0
while i < len(items):
    if items[i] == x:
        flag = 1
        break
```

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```
    i = i+1
if flag == 1
        print ("item found at position:", i+1)
else:
        print ("items not found")
```

Sample Output:-

```
$python main.py
(lists of items is: [5,7,10,12,15]
 enter item to search: 7
(item found at position; 2).
```

—X—

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