Programming and Scripting

Lab Topic 04-Flow control

## Introduction.

I would suggest that you create another folder in labs called Topic04-flow, remember to push your code to GitHub

You can save the programs you create in this lab in there.

## Strings and Numbers:

1. Write a program (lab04.01-grade.py) that reads in a students percentage mark and prints out corresponding the grade (the program should check that the percentage is valid:
   * Under 40% => Fail
   * Between 40% and 49% => Pass
   * Between 50% and 59% => Merit 2
   * Between 60% and 69% => Merit 1
   * Over 70% => Distinction

Answer

# This program reads in

# a students percentage

# and prints out the

# corresponding grade

percentage = float(input("Enter the percentage: "))

#print (percentage)

if percentage < 0 or percentage > 100:

# Later we will show you error handling

# This should really throw an error

print ("Please enter a number between 0 and 100")

elif percentage < 40: # we know it is greater than 0

print ("Fail")

elif percentage < 50: # between 40 and 49

print ("Pass")

elif percentage < 60: # between 50 and 59

print ("Merit1")

elif percentage < 70: # between 60 and 69

print ("Merit2")

else: # the only option left is betwen 70 and 100

print ("Distinction")

Enter the percentage: 67

Merit2

1. In practice the percentages are rounded ie 69.5 gets rounded to 70 so is equal to a Distinction.

How would you modify the program in 1 to deal with this?

I see two ways.

1. Write a program (lab04.03-average.py) that keeps reading numbers until the user enters a 0.

The program should then print out each of the numbers entered and the average of them. (Use a list)

Answer

# This program reads in numbers until

# the user enters 0

# it will them print back out again

# and their average

numbers = []

# first number then we check if it is 0 in the while loop

number = int(input("enter number (0 to quit): "))

while number != 0:

numbers.append(number)

# read the next number and check if 0

number = int(input("enter another (0 to quit): "))

for value in numbers:

print (value)

# I want average to be a float

average = float(sum(numbers)) / len(numbers)

print ("The average is {}".format(average))

enter number (0 to quit): 33

enter another (0 to quit): 34

enter another (0 to quit): 0

33

34

The average is 33.5

1. Write a program (lab04.04-student.py) that reads in students until the user enters blank in they students first name. The program should then print out all the students entered in a neat way.

Answer

enter firstname (blank to quit): joe

enter lastname: burke

enter firstname of next (blank to quit): mary

enter lastname: walsh

enter firstname of next (blank to quit):

here are the students you entered:

joe burke

mary walsh

# A Program that reads in students

# until the user enters a blank

# and then prints them all out again

students = []

firstname = input("enter firstname (blank to quit): ").strip()

while firstname != "":

student = {}

student["firstname"] = firstname

lastname = input("enter lastname: ").strip()

student["lastname"] = lastname

students.append(student)

# next student

firstname = input("enter firstname of next (blank to quit): ").strip()

print ("here are the students you entered:")

for currentStudent in students:

print ("{} {}".format(currentStudent["firstname"], currentStudent["lastname"]))

1. Write a program (lab04.05-topthree.py) generates 10 random numbers (0-100) , prints them out then prints out the top three.

10 random numbers [34, 70, 48, 17, 77, 55, 68, 93, 36, 67]

The top 3 are [93, 77, 70]

Answer

# This program generates 10 random numbers.

# prints them out, then

# prints out the top 3

# I will use a list to store and

# manipulate the numbers

import random

# I programming the general case

howMany = 10

topHowMany = 3

rangeFrom = 0

rangeto = 100

numbers = []

for i in range(0,10):

numbers.append(random.randint(rangeFrom,rangeto))

print ("{} random numbers\t {}".format(howMany,numbers))

# I am keeping the original list maybe I don't need to

# I got the idea to sort and split the list from stackover flow

# <https://stackoverflow.com/q/32296887>

topOnes = numbers.copy()

topOnes.sort(reverse = True)

print ("The top {} are \t\t {} ".format(topHowMany,topOnes[0:topHowMany]))