OLLSCOIL NA hÉIREANN
THE NATIONAL UNIVERSITY OF IRELAND, CORK

COLÁISTE NA hOLLSCOILE, CORCAIGH
UNIVERSITY COLLEGE, CORK

Examination Session and Year	Winter Examinations– 2019-2020
Module Code	CS1068
Module Title	Introduction to Python
Paper Number	1
External Examiner	Professor Omer Rana
Head of Department	Professor Cormac Sreenan
Internal Examiners	Dr Kieran Herley
Instructions to Candidates	Answer All Questions. Total marks 100%.
Duration of paper	1.5 Hours
Special Requirements	None

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THEN ENSURE THAT YOU HAVE THE CORRECT EXAM PAPER

Question 1 *[25%]*

(i) The Python program shown on the left is intended to produce the 9×9 multiplication table shown on the right. However it contains a number of programming errors. Identify and correct the errors so that the program functions as intended. *(8%)*

```
LIMIT = 9

for row in range(1, LIMIT)
    for col in range(1, LIMIT)
        product = row * col
        if prodoct < 10
            print(" ", end = "")
        print(product, " " end = "")
    print()
```

```
1  2  3  4  5  6  7  8  9
2  4  6  8 10 12 14 16 18
3  6  9 12 15 18 21 24 27
4  8 12 16 20 24 28 32 36
5 10 15 20 25 30 35 40 45
6 12 18 24 30 36 42 48 54
7 14 21 28 35 42 49 56 63
8 16 24 32 40 48 56 64 72
9 18 27 36 45 54 63 72 81
```

(ii) What output is produced when the following program is executed? Be precise.*(8%)*

```
def strange(x):
    if x % 2 == 0:
        return x // 2
    else:
        return 3*x + 1

current = 5
print(current, ": ", end = "")
while current != 1:
    current = strange(current)
    print(current, " ", end = "")
print()
```

(iii) Give a suitable header comment for the following function that describes succinctly and accurately what the function does. *(9%)*

```
def mystery(lst, k):
    x = []
    y = []
    for elem in lst :
        if elem <= k:
            x = x + [elem]
        else:
            y = y + [elem]

    return x, y
```

Question 2 *[25%]*

(i) Write a complete Python program that (a) prompts the user to enter a number representing a volume in gallons, (b) converts the volume into the equivalent in litres and (c) prints the litre amount to the screen. (Assume that one gallon is 4.55 litres.) *(8%)*

(ii) Write a complete Python program that reads in a series of integer values (terminated by -1) and that outputs the average of the values (not including the -1.) *(8%)*

(iii) Write a Python function `all_equal(s)` that takes a single sequence parameter `s` and that returns True if all elements in sequence `s` the same as one another and False otherwise. If a sequence is empty or has only a single element, then this condition is always satisfied, since there are no two elements which differ. *(9%)*

Question 3 *[25%]*

Write a Python function named `most_popular` that takes a parameter representing a list of the names of individuals (first names only) and that prints the most popular name(s) i.e. the name (or names) those with the greatest number of appearances in the list. (In the event of a tie, all names with the greatest number of occurrences should be listed.)

Question 4 *[25%]*

Write a complete Python program that takes a passage of English-language text from a text file (named `sometext.txt`) and that prints a "translation" of the text into Pig Latin (explained below).

Pig Latin is a based on a children's game in which English words are transformed into "foreign sounding" words according to some simple rules. For words that begin with a vowel (letters 'a', 'e', 'i', 'o' and 'u') just add "way" at the end. For example, "eat" $\rightarrow$ "eatway"; "omelet" $\rightarrow$ "omeletway"; "are" $\rightarrow$ "areway".

For words like "pig" that begin with a consonant (non-vowels), all letters before the first vowel are placed at the end of the word and then "ay" added at the end (the give "igpay" for "pig"). Other examples include: "banana" $\rightarrow$ "ananabay"; "trash" $\rightarrow$ "ashtray"; "happy" $\rightarrow$ "appyhay"; "duck" $\rightarrow$ "uckday"; "glove" $\rightarrow$ "oveglay".

For full marks try to preserve the punctuation of the original and its capitalization (i.e. words capitalized in the original should be capitalized in the "translation"), though partial credit will be given for solutions that neglect these aspects. Shown below is a translation of a well known festive song.

Jingle bells, jingle bells!	Inglejay ellsbay, inglejay ellsbay!
Jingle all the way!!	Inglejay allway ethay ayway!!
Oh, what fun it is to ride	Ohway, atwhay unfay itway isway otay ideray
In a one horse open sleigh.	Inway away oneway orsehay openway eighslay.