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CM1101 Computational Thinking

LAB EXERCISE TWO

Introduction to Python

Attempt as many exercises as you can. If you do not manage to finish all the exercises in the lab, please continue doing them at the next lab or at home. If you find the first few exercises too easy — skip to the harder ones. Remember, the lab tutors are here to help. If you get stuck — do not be shy, raise your hand and ask for advice. It is also ok to discuss the solutions with your peers (these labs are not assessed!), however make sure you understand everything by yourself.

Good luck!

1 Write a Python program that prompts the user for a number and then prints "`Odd`" if the number is odd, or "`Even`" if the number is even.
Hints: Use the `input()` function to read a string from the user. Use the appropriate conversion functions, like `int()` or `float()`, to convert the user's input into numbers.

2 *(If you are intimidated a little bit by math, please skip this problem for now.)*
Write a Python program that prompts the user for their height (in centimetres) and mass (in kilograms) and computes and prints the approximate waist size (circumference) of the user in inches. Assume that humans are cylindrical.
Hints: The volume of a right cylinder is $V = \pi r^2 h$. The circumference of a circle is $C = 2\pi r$. Density $\rho = \frac{m}{V}$. Humans just barely float in water.

3 Write a program that reads three numbers and prints the largest one of the three. Please use the `if/else` constructs for this exercise instead of the built-in `max()` function.

4 Write a program that repeatedly reads numbers from the user until the user enters an empty string. The program should then print the average of these numbers. Make sure your program gracefully handles the case when the user enters no numbers.

5 The traditional song "99 Bottles of Beer" has very repetitive lyrics:

```
99 bottles of beer on the wall, 99 bottles of beer.
Take one down, pass it around, 98 bottles of beer on the wall.
...
```

This verse is repeated, each time with one fewer bottle, until the number of bottles reaches zero. Write a program that prints all the verses of the song.

Hint: The construct

```
for bottles in range(99, 0, -1):
```

will iterate for `bottles` from 99 down to 1.

6 Write a program that reads a string from the user and calculates the number of letters and digits in the string. For example, given the input

```
The 2nd chapter has 12 pages.
```

the output should be:

```
Letters: 20
Digits: 3
```

Hint: use the `isdigit()` and `isalpha()` methods to determine if a character is a digit or a letter respectively. Remember, the construct

```
for ch in string:
    ...
```

will iterate through the characters in the string.

7 Write a program that plays the "higher or lower" game with the user. The program should choose a random integer number between 1 and 10. The program should then repeatedly prompt the user to enter a guess of the number, until the user guesses correctly. After each attempt, the program should respond whether the guess was higher than, or less than the chosen number. An example game may look like this:

```
Your guess? 3
It is bigger.
Your guess? 8
It is smaller.
Your guess? 7
Correct!
```

Hint: you can generate random integer numbers as follows:

```
# Import the "random" module
import random
# A random integer between 1 (inclusive) and 11 (non-inclusive)
number = random.randrange(1, 11)
```

8 Some words, like "evitative" or "rotator", look the same written backwards; they are called palindromic words. Write a program that reads a word and checks whether it is a palindromic word.
Bonus task: modify your program to also recognise palindromic *sentences*, ignoring spaces.