CS 104 - Homework 07

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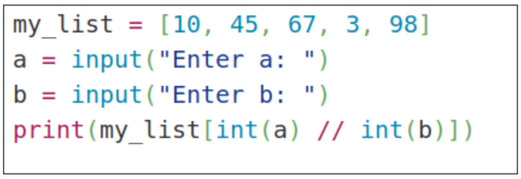
The deadline for this homework is Tuesday, 14th of December, 23:59 (midnight). Please name your solution files as solution1.py, solution2.py, solution3.py, solution4.py. Once you're finished with the homework, upload the files to LMS in order to complete the assignment. The assignment can and must be solved with the content we have covered during the first eleven weeks.

1. (25 pts) Please check the Python code given below. List down three things that can go wrong. Then, modify the code so that it can handle those errors and keeps on asking for the proper inputs until submitted.



```
my_list = [10, 45, 67, 3, 98]
a = input("Enter a: ")
b = input("Enter b: ")
print(my_list[int(a) // int(b)])
```

2. (25 pts) Implement a <u>recursive function</u> for exponentiation, called *pow*. It should accept two integers as parameters: base and exponent; and it should return the base raised to that exponent. Example: pow(3, 4) should returns 81. Again, the function should calculate the result recursively.

3. (25 pts) Implement a <u>recursive function</u> that takes a list as an input and sums its content. Example: sum_recursively([19, 5, 6]) returns 30. Again, the function should calculate the result recursively.

4. (25 pts) Please check the implementation of Luhn algorithm given below. Please add proper 10 assertions that assess the following functions and special cases (for description of Luhn algorithm, you can check: https://en.wikipedia.org/wiki/Luhn_algorithm).

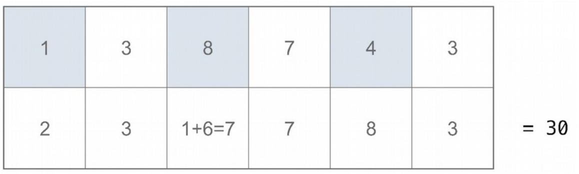
```
def luhn_sum_double(n):
  #Return the Luhn sum of n, doubling the last digit.
  all_but_last, last = split(n)
  luhn_digit = sum_digits(2 * last)
  if n < 10:
    return luhn_digit
  else:
    return luhn_sum(all_but_last) + luhn_digit

def luhn_sum(n):
  #Return the digit sum of n computed by the Luhn algorithm
  if n < 10:
    return n
  else:
    all_but_last, last = split(n)
    return luhn_sum_double(all_but_last) + last
```

The essence of Luhn Algorithm:

First: From the rightmost digit, which is the check digit, moving left, double the value of every second digit; if product of this doubling operation is greater than 9 (e.g., 7 * 2 = 14), then sum the digits of the products (e.g., 10: 1 + 0 = 1, 14: 1 + 4 = 5)

Second: Take the sum of all the digits

- The Luhn sum of a valid credit card number is a multiple of 10



1	3	8	7	4	3	
2	3	1+6=7	7	8	3	= 30