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# Machine Learning Workshop 1 – CSE 2793

## MINOR ASSIGNMENT-6: RECURSION, FILES AND EXCEPTIONS

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- Q 01 Write function **fib\_rec(n)** that recursively computes Fibonacci numbers.
- Q 02 Calculate the sum of the digits of a number recursively. Write recursive function **calc\_sum\_of\_digits(value)** for this purpose.
- Q 03 Write function **gcd(a, b)** that computes the greatest common divisor (GCD) recursively.
- Q 04 Write function **lcm(a, b)** that computes the lowest common multiplier (LCM) recursively.
- Q 05 Write recursive function **reverse\_string(text)** that flips the letters of the text passed in.
- Q 06 Write function **to\_binary(n)** that recursively converts the given positive integer into a textual binary representation. No call to **int(x, base)** may be used.
- Q 07 Write conversions to octal and hexadecimal numbers by implementing the corresponding functions **to\_octal(n)** and **to\_hex(n)**. Again, no call to **int(x, base)** may be used.
- Q 08 Write recursive function **power\_of(value, exponent)** that exponentiates the given positive integer with the positive number specified as second parameter.  
For example, the call **power\_of(4, 2)** should return the square of 4, so it computes  $4^2 = 16$ . You may not use the built-in functionality **pow()** or the operator **\*\***.
- Q 09 A palindrome is a word that reads the same from the front and the back. You can extend this definition to the digits of a number. Write recursive function **is\_number\_palindrome(number)** but without converting the number into a string and then using string functionalities like **[::-1]**.
- Q 10 Write a recursive function **harmonic\_sum(n)** to calculate the harmonic sum of first n terms.  
Note: The harmonic sum is the sum of reciprocals of the positive integers. For example, if  $n = 4$ , the output should be  $(1 + 1/2 + 1/3 + 1/4) = 2.0833$
- Q 11 Write a Python function that takes two file names, file1 and file2 as input. The function should read the contents of the file file1 line by line and should write them to another file file2 after adding a newline at the end of each line.
- Q 12 Write a Python function that reads a file file1 and displays the number of words and the number of vowels in the file.

Q 13 Write a Python function that takes two files of equal size as input from the user. The first file contains weights of items, and the second file contains corresponding prices. Create another file that should contain price per unit weight for each item.

Q 14 What will be the output produced on executing function `inverse1` when the following input is entered as the value of variable `num`:

- (a)5                      (b)0                      (c)2.0                      (d)x                      (e)None

```
Def inverse1():
    try:
        num = input('Enter the number: ')
        num = float(num)
        inverse = 1.0 / num
    except ValueError:
        print('ValueError')
    except TypeError:
        print('TypeError')
    except ZeroDivisionError:
        print('ZeroDivisionError')
    except:
        print('Any other Error')
    else:
        print(inverse)
    finally:
        print('Function inverse completed')
```

Q 15 Examine the following function `percentage`:  
Determine the output for the following function calls:

(a) `percentage(150.0, 200.0)`  
(b) `percentage(150.0, 0.0)`  
(c) `percentage('150.0', '200.0')`

```
def percentage(marks, total):
    try:
        percent = (marks / total) * 100
    except ValueError:
        print('ValueError')
    except TypeError:
        print('TypeError')
    except ZeroDivisionError:
        print('ZeroDivisionError')
    except:
        print('Any other Error')
    else:
        print(percent)
    finally:
        print('Function percentage completed')
```