DAILY ASSESSMENT FORMAT

Date:	25-05-2020	Name:	K Muthu
Course:	Digital Signal Processing	USN:	4al17ec038
Topic:	Fourier Series Fourier Transform Hilbert Transform	Semester & Section:	6 & 'A'
Github Repository:	K.Muthu-courses		

FORENOON SESSION DETAILS
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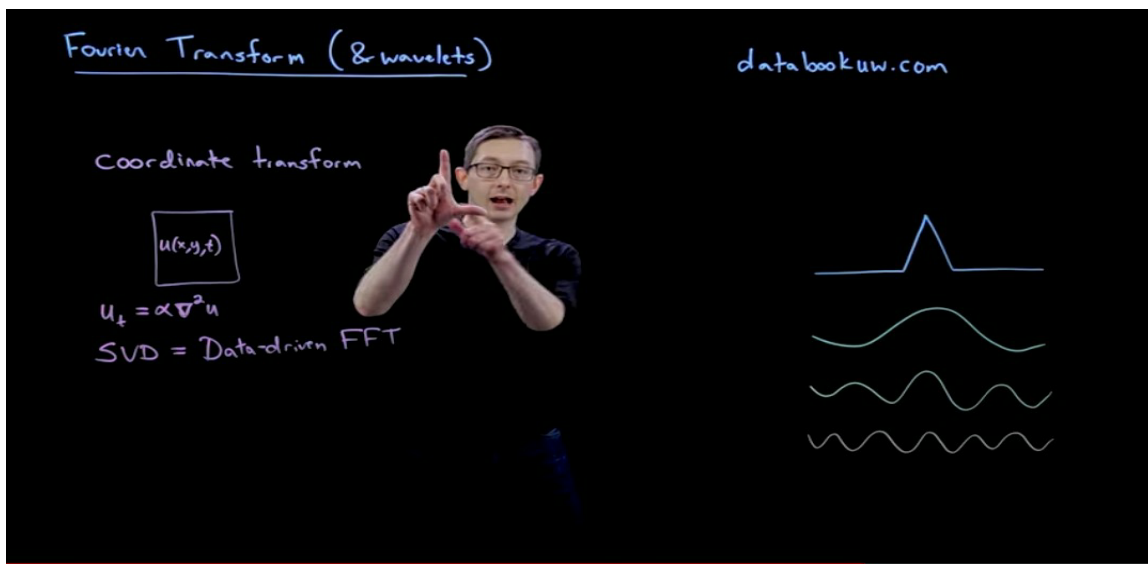
Fourier Analysis: Overview

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Fourier Series :

- A Fourier series is a representation of a function in terms of a summation of an infinite number of harmonically-related sinusoids with different amplitudes and phases.

- The amplitude and phase of a sinusoid can be combined into a single complex number, called a Fourier coefficient.

- The Fourier series of a periodic function f(x) of period T is,

$$f(x) = \frac{a_0}{2} + \sum_{k=1}^{\infty} a_k \cos \frac{2\pi k x}{T} + \sum_{k=1}^{\infty} b_k \sin \frac{2\pi k x}{T},$$

Fourier Transform :

- The Fourier transform is a mathematical formula that relates a signal sampled in time or space to the same signal sampled in frequency.

- In signal processing, the Fourier transform can reveal important characteristics of a signal, namely, its frequency components.

- Fourier Transform simple use is to characterize the magnitude and phase of a signal.

$$X(k) = \frac{1}{N} \sum_{n=0}^{N-1} x(n) \cdot e^{-j\frac{2\pi}{N}kn} \qquad\qquad x(n) = \sum_{k=0}^{N-1} X(k) \cdot e^{j\frac{2\pi}{N}kn}$$

Hilbert Transform :

- The Hilbert transform is used to generate a complex signal from a real signal.

- The Hilbert transform is characterized by the impulse response:

$$h(t) = \frac{1}{(\pi t)}$$

- The Hilbert Transform of a function x(t) is the convolution of x(t) with the function h(t)

Date:	25-05-2020	**Name:**	K Muthu
Course:	Python Bootcamp 2020 build 15 working applications and Games	**USN:**	4al17ec038
Topic:	Errors in python Complex problem	**Semester & Section:**	6 & 'A'

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AFTERNOON SESSION DETAILS

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Image of session

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Errors in python :

- There are plenty of built-in exceptions in Python that are raised when corresponding errors occur.

- Some of the commonly occuring errors are,

  ✓ Syntax error - a certain statement is not in accordance with the prescribed usage.

  ✓ IndexError - trying to access an item at an invalid index.

  ✓ TypeError - an operation or function is applied to an object of an inappropriate type.

  ✓ ZeroDivisionError - the second operator in the division is zero.

  ✓ NameError - an object could not be found.

  ✓ AttributeError - Raised on the attribute assignment or reference fails.

Complex problem :

Problem statement :

"Take an input string parameter and determine if exactly 3 question marks exist between every pair of numbers that add up to 10. If so, return true, otherwise return false"

Some examples test cases are below:

- "arrb6???4xxbl5???eee5" => true

- "acc?7??sss?3rr1??????5" => true

- "5??aaaaaaaaaaaaaaaaaa?5?5" => false

- "9???1???9???1???9" => true

- "aa6?9" => false

Code :

```python
import pandas as pd
#This function checks the two condition
def count(a,dig):
        # value_counts provides the frequency of each characters
        # Also the result is stored in dictionary for ease access
        a=dict(pd.Series(a).value_counts())
        if '?' in a.keys():
                # Checking both condition
                if a['?'] == 3 and dig == 10:
                        print("True")
                        return 1
                else:
                        return 0


# This function adds the two pair digits and stores the character between them
def check(n,dig):
        a=[]
        for x in s[n:]:
                if x.isdigit() is False:
                        a.append(x)
                        # a contains all the character between a pair of digits
                else:
                        dig+=int(x)
                        return count(a,dig)
```

```python
#This is the first function called
#This function check the presence of digit in the string
def find(s):
        flag=0
        # n variable points the index of element in string
        n=0
        for i in s:
                n+=1
                dig=0
                # Checks for digit in the string
                if i.isdigit():
                        dig=dig+int(i)
                        flag=check(n,dig)
                        if flag == 1:
                                break
                        else:
                                continue
        if flag != 1:
                print("False")


s=input("Enter the string : ")
find(s)
```