**Python Assessment**

Guidlines:

*Use each question as an opportunity to showcase your python skills. Describe in the way you think can best explain the question and concept behind it. Use diagram or code snippet examples wherever possible. Don’t spend more than 45 to 60 minutes on below 15 questions.*

1. Explain in brief, difference between Django, Pyramid and Flask

**Answer :- > Django, Pyramid & Flask are Web development frameworks in Python**

**Django ->**

1. Django is free and open source high-level Python web framework that encourages rapid development and clean, pragmatic design.
2. Django is a [Full Stack](https://www.guru99.com/full-stack-developer.html) Web Framework
3. Django doesn't have any support for API.
4. The best features of Django are Rapid development, Open source

**Pyramid ->**

1. Pyramid is a general, open source, web application development framework built in python

2. It is the fastest known Python web framework which supports small and large projects **Flask ->**

1. Flask is WSGI Web Server Gateway Interface framework.
2. Flask provides support for API.
3. Flask allows you to use multiple types of databases.
4. Best features of the flask is it is lightweight, open source, and offer minimal coding for developing an application
5. If a list is nums=[0,1,2,3,4], what is nums[-1]?

**Answer :- 4 comment – List Start index start with 0 while we start with reveres the index is -1**

1. Explain the output of the following piece of code-

>>> tuple=(123,'John')

>>> tuple\*=2

>>> tuple

**Answer :- It will print tuple item twicely – (**123,'John', 123,'John'**)**

1. Differentiate between the append() and extend() methods of a list with an example.

**append() –** Used to adds a single element at end of a list.

L1= [1,2,3,4]

L1.add(5)

L1

Output :-> [1,2,3,4,5]

**extend() –** Used to adds a multiple element at end of a list.

L1= [1,2,3,4]

L1.extend([5,6,7,8])

L1

Output :-> [1,2,3,4,5,6,7,8]

1. How do you remove the leading whitespace in a string? For example, leading whitespace in a string is the whitespace in a string before the first non-whitespace character. Eg. ' Maersk'

**Answer :->**

**strip() -** to remove both trailing and leading whitespace

**lstrip() -** to remove leading whitespace

**rstrip()** - to remove trailing whitespace

**s1= ' Maersk'**

**s1.lstrip()**

**O/p – ‘Maersk'**

1. What is the enumerate () function in Python? Explain with an example.

**enumerate** () - >

The enumerate() function takes a collection (e.g. a tuple) and returns it as an enumerate object.

Syntax - enumerate(iterable, start)

iterable -> An iterable object

start -> Number

x = ('apple', 'banana', 'cherry')

y = enumerate(x)

print(list(y))

**Output** -> [(0, 'apple'), (1, 'banana'), (2, 'cherry')]

1. Explain atleast three advantages of NumPy Array over the list in python.

Numpy arrays have a fixed size at creation, unlike python lists (which can grow dynamically). Changing the size of ndarray will create a new array and delete the original.

The elements in a Numpy array are all required to be of the same data type (we can have the heterogeneous type as well but that will not gonna permit you mathematical operations) and thus will be the same size in memory

Numpy arrays are facilitated advances mathematical and other types of operations on large numbers of data. Typically such operations are executed more efficiently and with less code than is possible using pythons build in sequences

1. List out all the possible differences between method and constructor in Python.

A Constructor is a block of code that initializes a newly created object.

A Method is a collection of statements which returns a value upon its execution.

A Constructor can be used to initialize an object.

A Method consists of Java code to be executed.

A Constructor is invoked when a object is created using the keyword new.

A Method is invoked through method calls.

A Constructor doesn’t have a return type.

A Method must have a return type.

A Constructor’s name must be same as the name of the class.

A Method’s name can be anything.

1. Define generator and iterator with an example in Python.What is Monkey Patching?

A python generator function lends us a sequence of values to python iterate on. The following is an example of generators in python.

>>> def even(x):

while(x!=0):

if x%2==0:

yield x

x-=1

>>> for i in even(8):

print(i)

8

6

4

2

A Python iterator returns us an iterator object- one value at a time. Let’s take an example of an iterator in python.

>>> iter\_obj=iter([3,4,5])

>>> next(iter\_obj)

3

1. What will the output of the following code snippet:

>>> def squares(n):

i=1

while(i<=n):

yield i\*\*2

i+=1

>>> for i in squares(7):

print(i)

**Answer :-> 1,4,9,16,25,36,49**

**Embedded Theory Questions**

1. How I/O devices are classified for embedded system?

* **The above figure shows the block diagram of I/O processor.**
* **The Input Output Processor is a specialized processor which loads and stores data into memory along with the execution of I/O instructions. It acts as an interface between system and devices.**
* **It involves a sequence of events to executing I/O operations and then store the results into the memory.**
* **Input and output devices allow the computer system to interact with the outside world by moving data into and out of the system. An input device is used to bring data into the system.**

**Some input devices are:-**

1. **Keyboard**
2. **Mouse**
3. **Microphone**
4. **Bar code reader**
5. **Graphics tablet**

* **An output device is used to send data out of the system.**

**Some output devices are:-**

1. **Monitor**
2. **Printer**
3. **Speaker**
4. What is the difference between Microprocessor and Microcontroller?

**Microprocessor consists of only a Central Processing Unit, whereas Micro Controller contains a CPU, Memory, I/O all integrated into one chip.**

**Microprocessor is used in Personal Computers whereas Micro Controller is used in an embedded system.**

**Microprocessor uses an external bus to interface to RAM, ROM, and other peripherals, on the other hand, Microcontroller uses an internal controlling bus.**

**Microprocessors are based on Von Neumann model Micro controllers are based on Harvard architecture**

**Microprocessor is complicated and expensive, with a large number of instructions to process but Microcontroller is inexpensive and straightforward with fewer instructions to process.**

1. What is a Watchdog Timer?

**Watchdog timer is a piece of hardware in micro-controller. Watchdog timer is used to generates system reset if system gets**

**stuck somewhere i.e. if system goes into endless loop of execution watchdog timer will reset the system to come out of endless loop.**

**Watchdog is safety mechanism in embedded system which makes your system reliable, but it depends on how you make use of watchdog timer.**

1. What are common errors in Embedded system?

* **Damage of memory devices static discharges and transient current**
* **Address line malfunctioning due to a short in circuit**
* **Data lines malfunctioning**
* **Due to garbage or errors some memory locations being inaccessible in storage**
* **Inappropriate insertion of memory devices into the memory slots**
* **Wrong control signals**

1. What is the need for an infinite loop sometimes in embedded systems?

**Embedded systems require infinite loops for repeatedly processing or monitoring the state of the program.  For instance, the case of a program state continuously being verified for any exceptional errors that might just happen during run-time such as memory outage or divide by zero.**

**Assessment for Machine Learning**

*Generic guidelines*

*Should be written in Python or C.*

*Use Object Oriented Programming approach to solve the problem.*

*Use DRY (Don’t Repeat Yourself) Principle and Clean code practices.*

*Commit your code to your Git repo.*

*Commits should be incremental with adequate and descriptive comments.*

*Don’t spend more than 1.5 hours to 2 hours of time on coding assessments.*

**Problem Statement 1**

*Define a ML technique that you would use for the fake news detection.*

*Build a Machine learning Model to detect the Fake new detection.*

*We could use online Jupyter Lab or similar environment to build, train and test the model*

*You could use your choice of dataset for the training and testing this model or any*

*dataset from* [*https://www.kaggle.com/datasets?search=Fake+news*](https://www.kaggle.com/datasets?search=Fake+news)

*Based on the Test data set you should also be able to identify the accuracy of the Model*

**Problem Statement 2**

*Create an Image Analytics script to detect License Number plate in the images.*

*You could use OpenCV or Libraries of your choice. The application should draw a bounding box around the License plate and blur the license plate.*

*We could use online Jupyter Lab or similar environment to build this.*

*Hint: you could use OpenCV cascade Classifier for this exercise*

*https://github.com/opencv/opencv/blob/master/data/haarcascades/haarcascade\_russian\_plate\_number.xml*