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

**Ans 1. Django is Full Stack Web Framework, Flask is Microframework and Pyramid similar to Django used for large applications but unlike Django which separates project into individual applications, pyramid expect project to be a single application.**

1. If a list is nums=[0,1,2,3,4], what is nums[-1]?

**Ans 2.** **nums[-1] will be ‘4’**

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

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

>>> tuple\*=2

>>> tuple

**Ans 3.** **It is calling \_\_imul\_\_ function of tuple and reassigning back so output will be (123, 'John', 123, 'John')**

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

**Ans 4. Python append() method adds an element to a list, and the extend() method concatenates the first list with another list (or another iterable).**

**For example: x =[1,2,3]**

**x.append([4,5])**

**print(x)**

**output: [1,2,3,[4,5]]**

**x =[1,2,3]**

**x.extend([4,5])**

**print(x)**

**output: [1,2,3,4,5]**

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'

**Ans 5. Using lstrip() function we can remove all leading whitespace in a string.**

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

**Ans 6. The enumerate() method adds counter to an iterable and returns it(the enumerate object).**

**Example: items = Items = ['Chocolate', 'Ice cream', 'Cookie']**

**enumerateItems = enumerate(Items)**

**print(type(enumerateItems))**

**print(list(enumerateItems))**

**enumerateItems = enumerate(Items, 10)**

**print(list(enumerateItems))**

**output: <class 'enumerate'>**

**[(0, 'Chocolate'), (1, 'Ice cream'), (2, 'Cookie')]**

**[(10, 'Chocolate'), (11, 'Ice cream'), (12, 'Cookie')]**

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

**Ans 7. Size - Numpy data structures take up less space, Performance - they have a need for speed and are faster than lists, Functionality - SciPy and NumPy have optimized functions such as linear algebra operations built in.**

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

**Ans 8.**

|  |  |
| --- | --- |
| **Constructors** | **Methods** |
| **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 is invoked implicitly by the system.** | **A Method is invoked by the programmer.** |
| **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.** |
| **A Constructor cannot be inherited by subclasses.** | **A Method can be inherited by subclasses.** |
| **A class can have many Constructors but must not have the same parameters.** | **A class can have many methods but must not have the same parameters.** |
| **A Constructor initializes a object that doesn’t exist.** | **A Method does operations on an already created object.** |

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

**Ans 9. A python generator function lends us a sequence of values to python iterate on.**

**Example**: **def even(x):**

**while(x!=0):**

**if x%2==0:**

**yield x**

**x-=1**

**for i in even(8):**

**print(i)**

**output:**

**8**

**6**

**4**

**2**

**A Python iterator returns us an iterator object- one value at a time.**

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

**next(iter\_obj)**

**3**

**next(iter\_obj)**

**4**

**next(iter\_obj)**

**5**

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)

**Ans 10. Output will be the squares till 7.**

**1**

**4**

**9**

**16**

**25**

**36**

**49**

**Embedded Theory Questions**

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

**Ans 1. I/O devices are classified as serial or parallel**

**Serial Synchronous example- Audio/Video Signal, and Asynchronous example- keypad/mouse/modem.**

**Parallel Single bit example Input: rotation Threshold sensors, output: pulses to external circuit.**

**Multibit example Input: vp from ADC, sensors, output: LCD, printer.**

1. What is the difference between Microprocessor and Microcontroller?

**Ans 2. Microprocessor is managers of the resources (I/O, memory) which lie outside of its architecture  
Microcontroller have I/O, memory, etc. built into it and specifically designed for control.**

1. What is a Watchdog Timer?

**Ans 3. A watchdog timer is an electronic device or electronic card that execute specific operation after certain time period if something goes wrong with an electronic system.**

1. What are common errors in Embedded system?

Ans 4. **Some of the commonly found errors in embedded systems are**

* **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?

**Ans 5. 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, etc.**

**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*