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

a) Flask is for smaller applications and Django and pyramid can be used for mid to large size applications.

b) Django includes an [ORM](http://en.wikipedia.org/wiki/Object-relational_mapping) out of the box, while Pyramid and Flask leave it to the developer to choose how (or if) they want their data stored.

c) Bootstrapping is easy for Django and pyramid compared to Flask.

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

3) Explain the output of the following piece of code-

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

>>> tuple\*=2

>>> tuple

Ans: (123, 'John', 123, 'John')

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

[append](https://docs.python.org/3/library/stdtypes.html#mutable-sequence-types): Appends object at the end.

x = [1, 2, 3]

x.append([4, 5])

print(x)

gives you: [1, 2, 3, [4, 5]]

[extend](https://docs.python.org/3/library/stdtypes.html#mutable-sequence-types): Extends list by appending elements from the iterable.

x = [1, 2, 3]

x.extend([4, 5])

print(x)

gives you: [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'

Use str.lstrip() to remove the leading space

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

grocery = ['bread', 'milk', 'butter']

enumerateGrocery = enumerate(grocery)

# converting to list

print(list(enumerateGrocery))

[(0, 'bread'), (1, 'milk'), (2, 'butter')]

1. Advantages of numpy array over list
2. consumes less memory.
3. fast as compared to the python List.
4. convenient to use.

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

Method may or may not returns the output to the caller. Constructor does not return any output.

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

**Generator:**

Implemented using a function.

Uses the yield keyword.

Iterator:

Implemented using class.

Does not use yield.

Example:

Generator:

def upto(n):

  for i in range(n+1):

    # The yield statement is what makes a function

    # a generator

    yield i

for number in upto(5):

  print(number)

0

1

2

3

4

5

Iterator example:

class UpTo:

    def \_\_init\_\_(self, max = 0):

        self.max = max

    def \_\_iter\_\_(self):

        self.n = 0

        return self

    def \_\_next\_\_(self):

        if self.n > self.max:

            raise StopIteration

        else:

            result = self.n

            self.n += 1

            return result

for number in UpTo(5):

    print(number)

0

1

2

3

4

5

Monkey Patching:

In Python, the term monkey patch refers to dynamic (or run-time) modifications of a class or module. In Python, we can actually change the behavior of code at run-time.

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)

1

4

9

16

25

36

49

Embedded Theory Questions

How I/O devices are classified for embedded system?

I/O devices are classified as either character-mode devices or block-mode devices. The classification refers to how the device handles data transfer with the system.

Character-mode devices allow for unstructured data transfers. The data transfers typically take place in serial fashion, one byte at a time. Character-mode devices are usually simple devices, such as the serial interface or the keypad. The driver buffers the data in cases where the transfer rate from system to the device is faster than what the device can handle.

Block-mode devices transfer data one block at time, for example, 1,024 bytes per data transfer. The underlying hardware imposes the block size. Some structure must be imposed on the data or some transfer protocol enforced. Otherwise an error is likely to occur. Therefore, sometimes it is necessary for the block-mode device driver to perform additional work for each read or write operation

1. 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.

What is a Watchdog Timer?

A watchdog timer (WDT) is a timer that monitors microcontroller (MCU) programs to see if they are out of control or have stopped operating

1. What are common errors in Embedded system?
2. Segmentation Fault :- A violation occurs in a program when there is an attempt to access a non-existing memory.
3. Memory Leak :- This happens due to the incorrect management of memory allocation such that the memory that is no longer required is not released.
4. Fragmentation or Memory corruption :- It happens because memory is altered without an explicit assignment.

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

Infinite loops are used to keep the embedded system functional. If infinite loop is not used, after executing the task once, the embedded system will come to hault which is not the desired condition.