ECE-203 Programming for Engineers
Laboratory Experiment Week 6

Name: _____

Lab Assignments (Due end of this lab session)

(20 Points) The following code produces the first 10 integers in the Fibonacci sequence:

```
a = b = 1
fib_numbers = [a]
a,b = b, a + b
fib_numbers.append(a)
a,b = b, a + b
fib_numbers.append(a)
a,b = b, a + b
fib_numbers.append(a)
a,b = b, a + b
fib_numbers.append(a)
a,b = b, a + b
fib_numbers.append(a)
a,b = b, a + b
fib_numbers.append(a)
a,b = b, a + b
fib_numbers.append(a)
a,b = b, a + b
fib_numbers.append(a)
a,b = b, a + b
fib_numbers.append(a)

print fib_numbers
```

Output:

```
[1, 1, 2, 3, 5, 8, 13, 21, 34, 55]
```

Write a generator called `Fib` that produces Fibonacci numbers. Your generator should accept a parameter named `end` that specifies how many numbers will be produced before throwing a `StopIteration` exception.

Use your generator with a for-loop to print the first 20 numbers in the Fibonacci sequence to the screen. For example:

```
for i in Fib(20):
    print i
```

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(20 Points) In class we discussed list comprehensions, which take the form of:

```
new_list = [expression for name in list]
```

where `name` can be used in `expression`. It is also possible for `expression` to be another list comprehension!

Nesting two list comprehensions in this way results in the following form:

```
new_list = [[expression for name2 in list2] for name1 in list1]
```

where both `name1` and `name2` can be used in `expression`.

Write a nested list comprehension that transposes the following "matrix" `A`:
(Note: `A` is really just a list of lists).

```
A = [[10, 20, 30, 40, 50, 60],
     [11, 21, 31, 41, 51, 61],
     [12, 22, 32, 42, 52, 62],
     [13, 23, 33, 43, 53, 63],
     [14, 24, 34, 44, 54, 64],
     [15, 25, 35, 45, 55, 65],
     [16, 26, 36, 46, 56, 66]]
```

Here is a hint to get you started. The form of your list comprehension should look like this:

```
transpose = [[??????????????????] for i,_ in enumerate(A[0])]
```

Start by asking yourself, "What is `i` and how could it be useful?" Next, think about what the contents of each row of the resulting transposed matrix should be.

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