Directions: The exam is 50 minutes long. Please read each question
carefully.

EACH QUESTION IS WORTH 20 POINTS When asked to write code, you
should write working Python code that has correct syntax.
Use the backs of the pages if needed.

Last Name: _____

First Name: _____

Student ID #: _____

Question	Points	Score
1	20	
2	20	
3	20	
4	20	
5	20	
Total:	100	

1. (20 points) Write down the output of the following programs.

1.
```
i = 97
while i >= 0:
    print(i)
    i -= 10
print(i)
```

2.
```
def f(n):
    count = 0
    while n >= 1
        n == n // 2
        count += 1
    return count

print(f(127), f(128), f(1024))
```

3.
```
def g(n):
    if n = 0:
        return []
    return [n % 10] + g(n // 10)

print(g(5120))
```

2. (20 points) Produce the following lists without using for or while loops.

    1. `[1,2,3,4,5,11,12,13,14,15,21,22,23,24,25,31,32,33,34,35]`

    2. `[9,99,999,9999,99999,999999,9999999]`

    3. `[1,3,5,7,1,3,5,7,1,3,5,7]`

3. (20 points) Write down the output of the following code:

   1. (10 pts)
   ```
   reduce(lambda x, y: x*y, [2 for i in range(10)])
   ```

   2. (10 pts) (very hard question, attempt only after finishing everything else)
   ```
   funco = lambda n,f,x : reduce((lambda y, g : g(y)),([x] + n*[f]))


   z = funco(4, lambda x: x*3, 3)
   print(z)
   ```

4. (20 points) Write down a Python function `seco(xs)` that will return the second largest element of a list `xs`. (do not use the built-in `sort()` function)

5. (20 points) Write down a Python function `from_binary(num)` that will convert a number in binary to its base 10 equivalent. (e.g. `from_binary(1101)` should return 13)