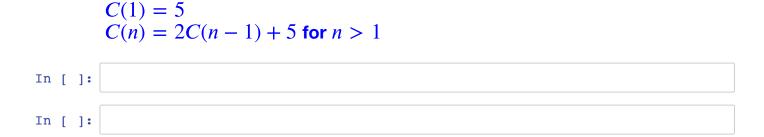
```
In [1]: ### CSCI-3080 Discrete Structure
    ### OLA 3: Chapter 3 -- Recursive Definitions, Recurrence Relations
    ### Name:
    ### Student ID:
    ### Date:
```

Exercise 1: Write the first 5 values in the sequence:



Exercise 2: Write the first 5 values in the sequence:

```
A(1) = 2
A(n) = nA(n-1) + n \text{ for } n > 1
In [ ]:
```

Exercise 3: An amount of \$500 is invested in an account paying 1.2% interest compounded annually (meaning they don't add interest until the end of the year, so the start of the next year you have the money plus interest)

(a) Please write a recursive definition for P(n), the amount in the account at the begining of the n_{th} year.

```
Hint: P(1) = 500
```

For n > 1, to calculate the amount in the n_{th} year, you need to use (1+0.012) times the amount in the $(n-1)_{th}$ year.

```
In [ ]:
```

(b) After how many years will the account balance exceed \$570? (You

can write a python program to calculate)

In []:

Exercise 4: Please write the python code of a recursive function to compute the sequence

 $1, 2, 4, 7, 11, 16, 22, \dots$

Begin by defining the recursive definition

$$S(1) = 1$$

 $S(n) = S(n-1) + n - 1$ for $n > 1$

In []:

Exercise 5: Please find the closed form solution for the recurrence relation subject to the basis step.

Hint: Please use the linear, first-order, constant coefficient formula.

$$B(1) = 5$$

 $B(n) = 3B(n-1)$ for $n > 1$

In []:

In []:

Exercise 6: In an account that pays 3% annually (i.e. interest is added at the end of the year to be available at the beginning of the next year), \$1000 is deposited. At the end of each year, and additional 100 dollars is deposited into the account.

A. Please write a recurrence relation for the amount in the account at the beginning of year n

Hint: P(1) = 1000

For n > 1, to calculate the amount in the n_{th} year, you need to use (1+0.03) times the amount in the $(n-1)_{th}$ year and plus additional 100 dollars.

In []:

B. Please find the closed-form solution of the recurrence relation (note it is linear, first order, constant coefficient)

In []:	
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C. What is the account worth at the begining of the $8_{\it th}$ year?

In []: