Example 1

1. S(1) = 2
2. S(n) = 2S(n-1)

In [11]:
```
## recursive algorithm:
def S_recur(n):
    if n == 1:
        return 2
    else:
        return 2*S_recur(n-1)
```

In [10]:
```
for i in range(1,6):
    print("i: ", i, " = ", S_recur(i))
```

```
i:  1  =  2
i:  2  =  4
i:  3  =  8
i:  4  =  16
i:  5  =  32
```

In [18]:
```
## iterative algorithm:

def S_ite(n):
    if n == 1:
        return 2
    else:
        S = 2
        for i in range(2,n+1):
            S = 2*S
        return S
```

In [17]:
```
for i in range(1,6):
    print("i: ", i, " = ", S_ite(i))
```

```
i:  1  =  2
i:  2  =  4
i:  3  =  8
i:  4  =  16
i:  5  =  32
```

```
##############################
```

Example 2

1. F(1) = 1
2. F(2) = 1
3. F(n) = F(n-2) + F(n-1) for n > 2

In [20]:
```
def F_recur(n):
    if n == 1 or n == 2:
        return 1
    else:
        return F_recur(n-2) + F_recur(n-1)
```

In [25]:
```
for i in range(1,11):
    print("i: ", i, " = ", F_recur(i))
```

```
i:  1  =  1
i:  2  =  1
i:  3  =  2
i:  4  =  3
i:  5  =  5
i:  6  =  8
i:  7  =  13
i:  8  =  21
i:  9  =  34
i:  10  =  55
```

In [28]:
```
## iterative algorithm:

def F_ite(n):
    if n == 1 or n == 2:
        return 1
    else:
        F1 = 1
        F2 = 1
        for i in range(3,n+1):
            Fn = F1 + F2
            F1 = F2
            F2 = Fn
        return Fn
```

In [29]:
```
for i in range(1,11):
    print("i: ", i, " = ", F_ite(i))
```

```
i:  1  =  1
i:  2  =  1
i:  3  =  2
i:  4  =  3
i:  5  =  5
i:  6  =  8
i:  7  =  13
i:  8  =  21
i:  9  =  34
i:  10  =  55
```

In [ ]: