(a) Recursively compute H_t for t=2, then use $H_{t=2}$ to compute $Z_{t=2}$
See below recursion algorithm, which computes $H_{t=2}$ = 0.125

```
In [1]: wh = 0.5
        t = 2
        w0 = 0.6

        def compute_H(wh, t):
            if t == -1:
                Ht = 1
            else:
                Ht = wh*compute_H(wh, t-1)
            return Ht

        compute_H(wh,t)

Out[1]: 0.125
```

```
In [2]: def compute_Z(w0,wh,t):
            Z = w0*compute_H(wh,t)
            return Z

        compute_Z(w0,wh,t)

Out[2]: 0.075
```

$\boldsymbol{Z_{t=2}}$ **= 0.075**

(b) From the equation we know that $Z_2 = w_0 \times H_2$, then we have $\frac{\partial Z_2}{\partial W_0} = H_2$
From part (a) I have already computed H_2 = 0.125, so:
$\boldsymbol{\frac{\partial Z_2}{\partial W_0} = 0.125}$

(c) Expand the equation to express Z_2 as function of w_h
$Z_2 = w_0 \times H_2 = w_0 \times w_h \times H_1$
Then we have $\frac{\partial Z_2}{\partial W_h} = w_0 \times H_1$
Compute $H_{t=1}$ using the same recursion algorithm (change t to 1) then multiply by constant w_0:

```
In [3]: wh = 0.5
        t = 1
        w0 = 0.6
        compute_H(wh,t)

Out[3]: 0.25
```

```
In [4]: compute_H(wh,t)*w0

Out[4]: 0.15
```

$\boldsymbol{\frac{\partial Z_2}{\partial W_h} = 0.15}$