Using Matlab to solve ODEs
Suppose we want to solve the ODE $\frac{dw(t)}{dt} = 7.5 - 0.25w(t)$ with the initial condition of $w(0) = 38$. The finite difference approximation of the ODE is

$$w(t + \Delta t) = w(t) + \Delta t(7.5 - 0.25w(t)).$$

We will take $\Delta t = 1$. Thus, we want to compute a sequence

$$w(k + 1) = w(k) + 1 \times (7.5 - 0.25w(k)).$$

We can do this with Matlab as follows.

```matlab
w=38;
for k=1:200
    w(k+1) = w(k) + 7.5 - 0.25*w(k);
end
plot(w)
```

Now suppose we want to compute a slightly different ODE, $\frac{dw(t)}{dt} = \delta(t) - 0.25w(t)$, with

$$\delta(t) = \begin{cases} 
9.5 & \text{for } t < 60 \\
7.5 & \text{for } t \geq 60 
\end{cases}.$$ 

The Matlab code for this is

```matlab
w=38;
for k=1:200
    if (k<60)
        delta = 9.5;
    else
        delta = 7.5;
    end
    w(k+1) = w(k) + delta - 0.25*w(k);
end
plot(w)
```