1. $U_i^* = U_i^N - \frac{k}{h}\left(f(U_{i+1}^N) - f(U_i^N)\right)$

$$U_i^{N+1} = \frac{\left[U_i^N - \frac{k}{h}\left(f(U_{i+1}^N) - f(U_i^N)\right)\right] + U_i^N}{2} - \frac{k}{2h}\left[f(U_i^*) - f(U_{i-1}^*)\right]$$

$$U_i^{N+1} = U_i^N - \frac{k}{2h}\left(f(U_{i+1}^N) - f(U_i^N) + f(U_i^*) - f(U_{i-1}^*)\right)$$

$$F_i^L = \left[f(U_{i-1}^*) + f(U_i^N)\right]$$

$$F_i^R = \left[f(U_{i+1}^N) + f(U_i^*)\right]$$

$$\boxed{U_i^{N+1} = U_i^N - \frac{k}{2h}\left[F_i^R - F_i^L\right]}$$

This method is conservative because it finds the solution at the next time step, (U^{N+1}), using the solution from the previous step, (U^N), combined with the difference of the numerical flux terms around the point $[F_i^R - F_i^L]$.