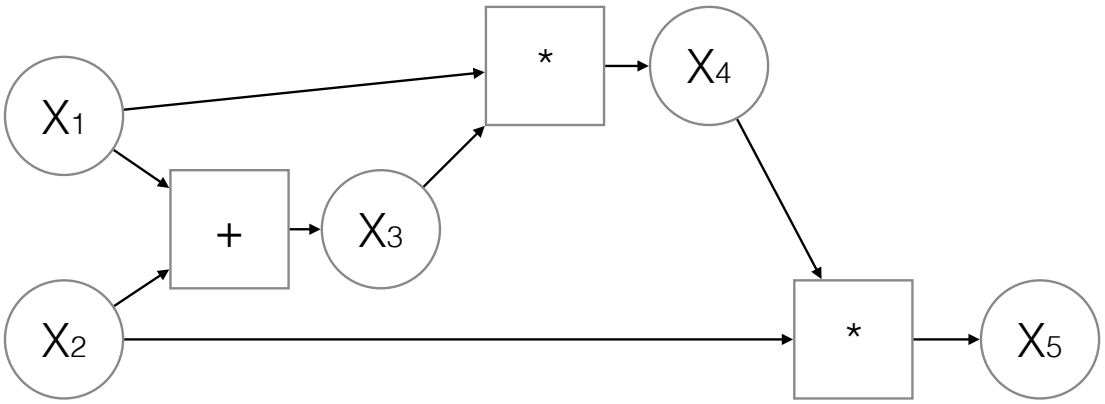
CS589: Machine Learning - Fall 2017

Autodiff Template

Example Problem
In this problem, you will perform automatic differentiation on the function

$$f(x_1, x_2)$$

defined by the following expression graph. Thus, f takes x_1 and x_2 as inputs, and returns x_5.



Given an input of $x_1 = 0.5$ and $x_2 = 1.5$ what does the network evaluate to during forward propagation? In this part, you must give an exact numerical answer.

- $x_3 =$
- $x_4 =$
- $x_5 =$

Now, what does the network evaluate to during back propagation? In this part, you may give "unevaluated expressions" as long as they evaluate to a specific number. That is, you may write "0.5 * 2.0 + 3" rather than writing "4". But you may not write "$x_1 * 3$".

- $\frac{df}{dx_5} =$
- $\frac{df}{dx_4} =$
- $\frac{df}{dx_3} =$
- $\frac{df}{dx_2} =$
- $\frac{df}{dx_1} =$