deeplearning.ai

Basics of Neural Network Programming

Computation Graph

Computation Graph

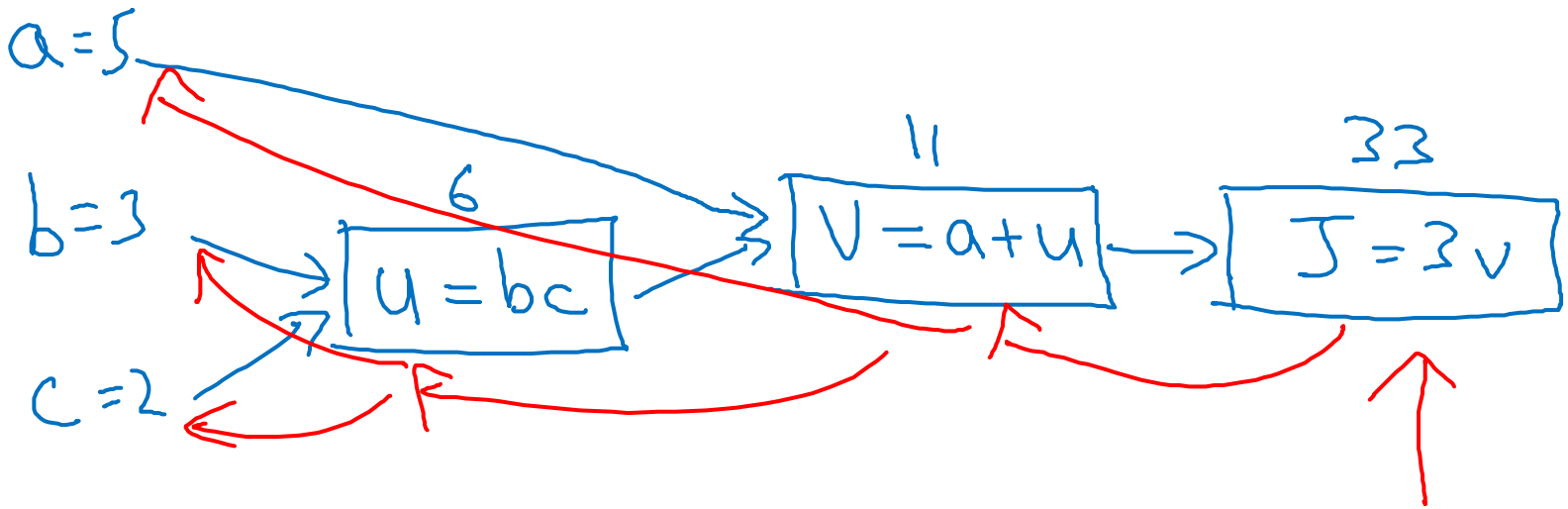
$J(a,b,c) = 3(a+bc) = 3(5+3\times 2) = 33$

u, v, J

$u = bc$

$v = a+u$

$J = 3v$

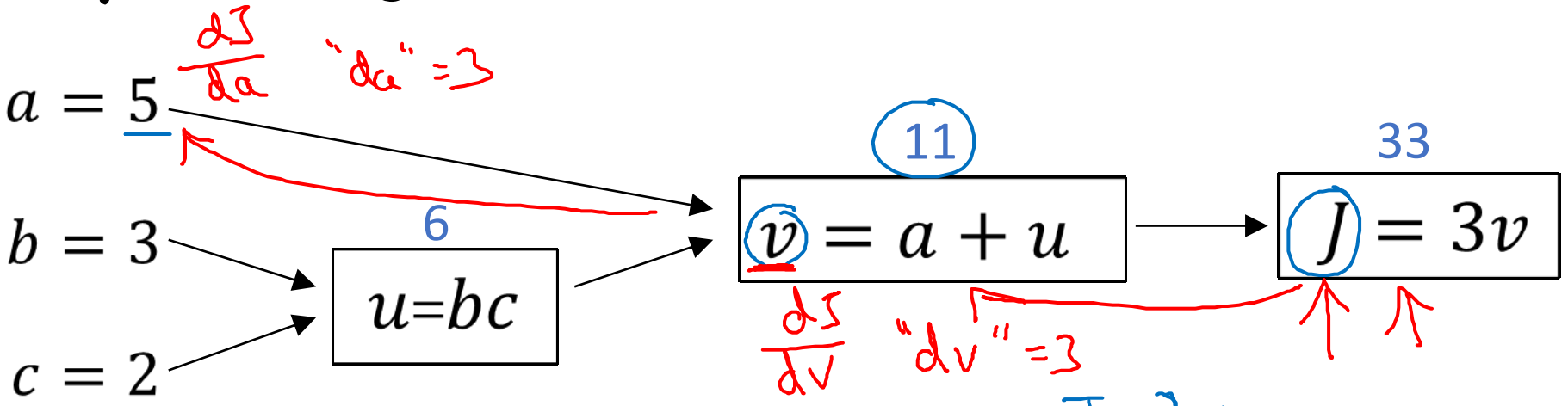


deeplearning.ai

Basics of Neural Network Programming

Derivatives with a Computation Graph

Computing derivatives



$\frac{dJ}{dv} = ? = 3$

$\frac{dJ}{da} = 3 = \frac{dJ}{dv}\frac{dv}{da}$

3×1

$\frac{dv}{da} = 1$

$a \to v \to J$

$J = 3v$

$v = 11 \to 11.001$

$J = 33 \to 33.003$

$a = 5 \to 5.001$

$\to v = 11 \to 11.001$

$J = 33 \to 33.003$

$\frac{d\,\text{FinalOutputVar}}{d\,\text{var}}$ → "dvar"

$f(a) = 3a$

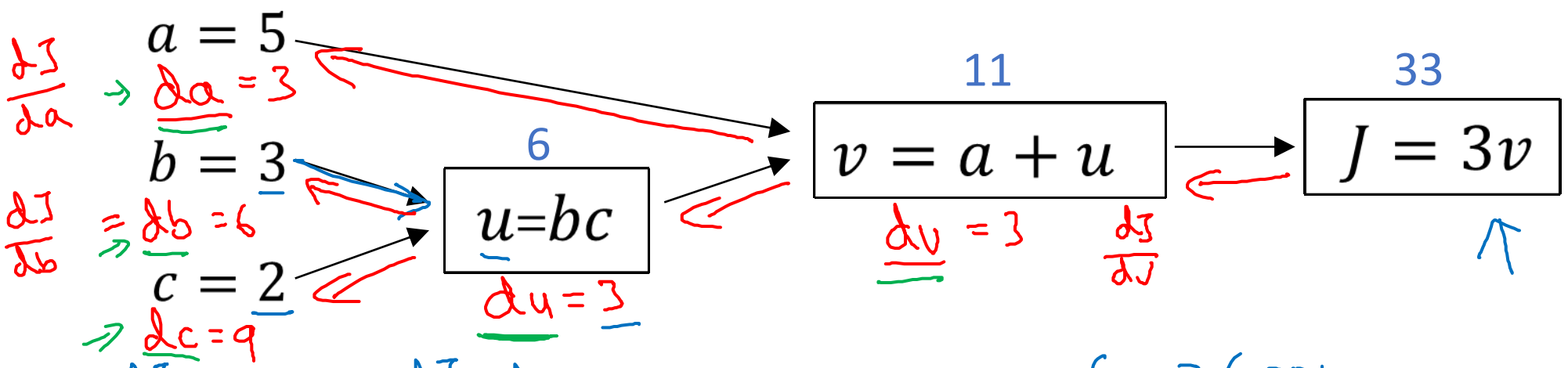
$\frac{df(a)}{da} = \frac{df}{da} = 3$

$J = 3v$

$\frac{dJ}{dv} = 3$

Andrew Ng

Computing derivatives



$$\frac{dJ}{du} = 3 = \frac{dJ}{dv}\frac{dv}{du}$$

$$\frac{dJ}{db} = \frac{dJ}{du}\frac{du}{db} = 6$$

$$\frac{dJ}{da} = \frac{dJ}{du}\cdot\frac{du}{da} = 9$$

$u = 6 \rightarrow 6.001$
$v = 11 \rightarrow 11.001$
$J = 33 \rightarrow 33.003$

$b = 3 \rightarrow 3.001$
$u = b \cdot c = 6 \rightarrow 6.002$
$J = 33.006$

$c = 2$
$.006$

$V = 11.002$
$J = 3V$

Andrew Ng