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Basics of Neural Network Programming

Computation Graph

Computation Graph

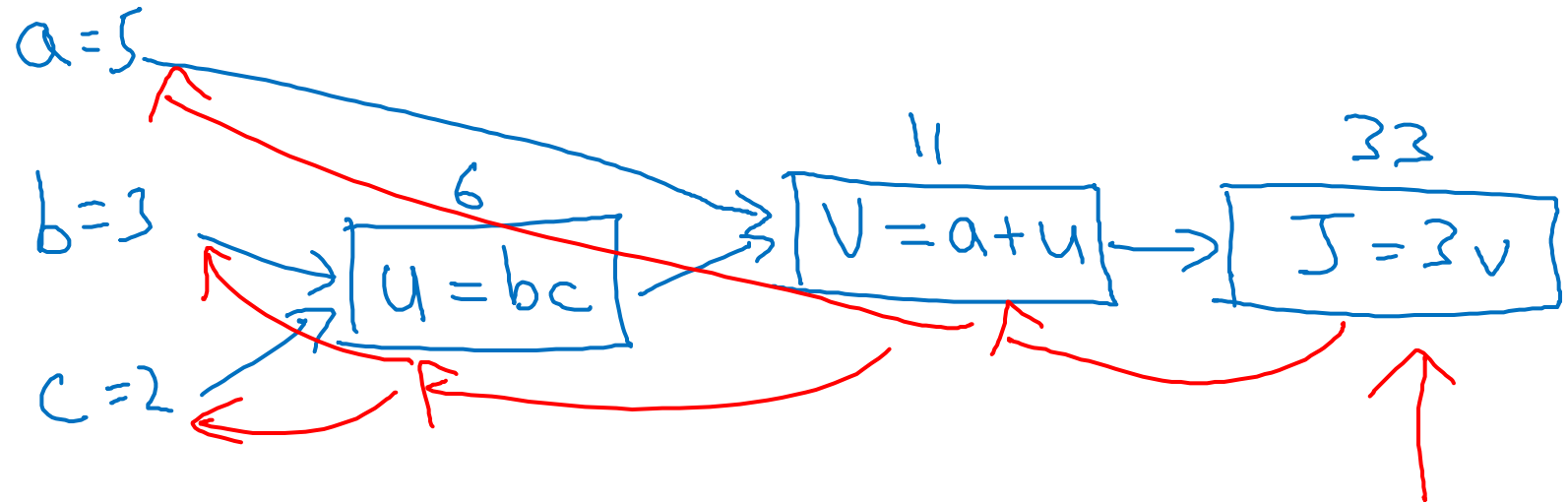
$$J(a,b,c) = 3(a + \underbrace{bc}_u) = 3(5 + 3 \times 2) = 33$$

$$\underbrace{\quad}_J$$

$$u = bc$$

$$V = a + u$$

$$J = 3V$$



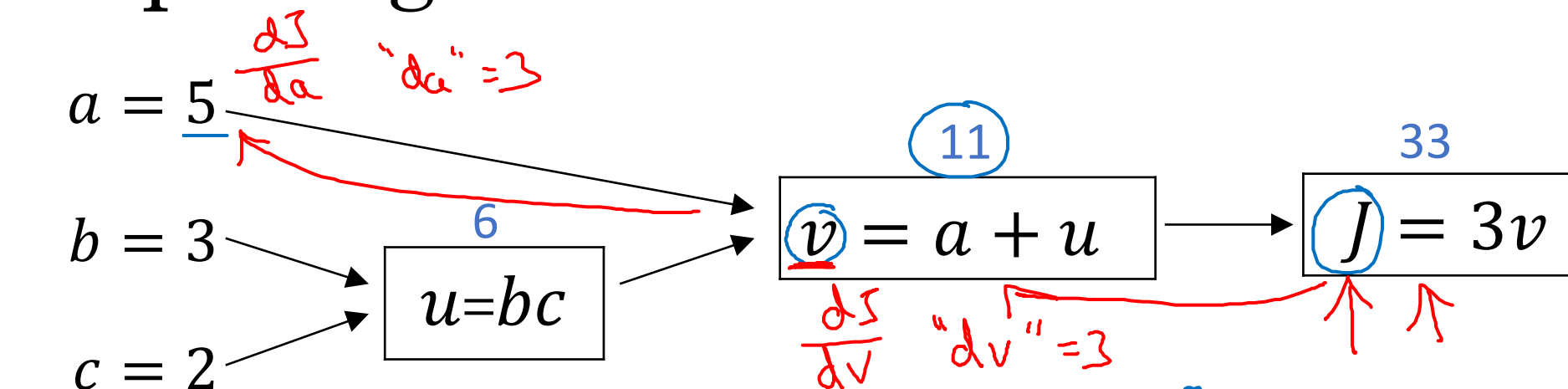


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Derivatives with a Computation Graph

Computing derivatives



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

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

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

3×1

$$a \rightarrow v \rightarrow J$$

$$J = 3v$$

$$v = 11 \rightarrow 11.001$$

$$J = 33 \rightarrow 33.003$$

$$a = 5 \rightarrow 5.001$$

$$\rightarrow v = 11 \rightarrow 11.001$$

$$J = 33 \rightarrow 33.003$$

$$\frac{d \text{ Final Output Var}}{d \text{ var}}$$

$\frac{dJ}{d \text{ var}}$
 "dvar"

$$f(a) = 3a$$

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

$$J = 3v$$

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

Computing derivatives

