

## # Text

Batman is an American superhero. The secret identity of Batman is Bruce Wayne, an American billionaire from Gotham City. The Joker is a supervillain that embodies the ideas of anarchy and chaos. The Joker and Batman fight the battle for Gotham's soul.

# Target : *Batman, wayne, joker*

dot product

# <u>vector</u>	(1) Batman	(2) Wayne	(3) Joker	(1)·(2)	(1)·(3)
Batman	0	1	1	2	1
be	2	1	1	1	
american	1	0			
superhero	1	0			
secret	1	0			
identity	1	1		1	
Bruce	1	0			
Wayne	1	1		1	
billionaire	0	1			
Gotham	1				
supervill.	0	0	1		
embodiy	0	0	1		
Joker	1	0			
fight	1	0	1		
battle	1	0	1		



	<u>Total</u> <sup>1</sup> Batman	<sup>2</sup> Wayne	<sup>3</sup> Joker	1.2	1.3
	12	6	6	5	2
pow2	14	6	6		

# cosine similarity

$$\text{sim}(\text{Batman}, \text{Wayne})$$

$$= \frac{5}{\sqrt{14} \sqrt{6}} = 0.5455$$

$$\text{sim}(\text{Joker}, \text{Wayne})$$

$$= \frac{2}{\sqrt{6} \sqrt{6}} = 0.33$$