

(1) Sol:

$$\text{inner-product}(q, d) = \sum_{i=1}^V (q_i \times d_i)$$

$$\text{So } D_1 = D_3 = D_5 = 1 \times 1 = 1$$

$$D_2 = D_4 = D_6 = D_7 = D_8 = 0$$

$$(2) \text{ Sol: } \text{Cos Sim}(q, d) = \frac{\sum_{i=1}^V (q_i \times d_i)}{\sqrt{\sum_{i=1}^V q_i^2} \sqrt{\sum_{i=1}^V d_i^2}}$$

$$\text{So } D_1 = \frac{1}{1} = D_3 = D_5$$

$$D_2 = D_4 = D_6 = D_7 = D_8 = 0$$

pt:

(3) Because the length of D_1, D_3, D_5 are identical as well as they only have 1 word as same as that in query.

And the others are worth of 0 because they don't contain the word in query.

(4) Sol: eg: query "Jack And jill".

(5) Sol: For D_1 :

	tf	idf	tf-idf
"jack"	$\frac{1}{7}$	$\log(8/1)$	$\frac{1}{7} \log 8$
"and"	$\frac{1}{7}$	$\log(8/5)$	$\frac{1}{7} \log \frac{8}{5}$
"jill"	$\frac{1}{7}$	$\log(8/2)$	$\frac{1}{7} \log 4$
"went"	$\frac{1}{7}$	$\log(8/1)$	$\frac{1}{7} \log 8$
"up"	$\frac{1}{7}$	$\log 8/2$	$\frac{1}{7} \log 4$
"the"	$\frac{1}{7}$	$\log 8$	$\frac{1}{7} \log 8$
"hill"	$\frac{1}{7}$	$\log \frac{8}{2}$	$\frac{1}{7} \log 4$