Note：

期中／期末 考试

平时 10% ／ 大作业 30% ／ 期中 20% ／ 期末 40%

Introduction

> Information retrieval（Wikipedia)

> Information retrieval (IR) is the activity of obtaining information resources relevant to an information need from a collection of information resources. Searches can be based on full-text or other content-based indexing.

广义：满足人们对信息需求的学问

狭义：信息搜索技术

Main Task

1. 搜索（**Ad-hoc Search**）
2. 过滤（Filtering）
3. 分类
4. 问题回答

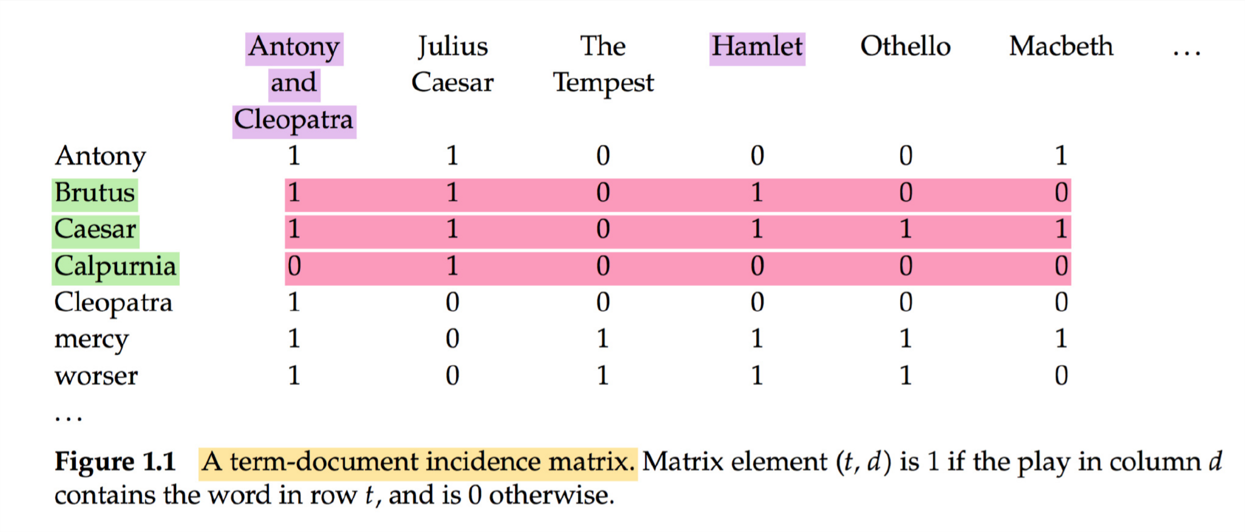
Basic Problems

- 相关性问题
- 性能问题
- 测试问题（如何衡量准确性）
- 人机交互问题

Boolean Retrieval

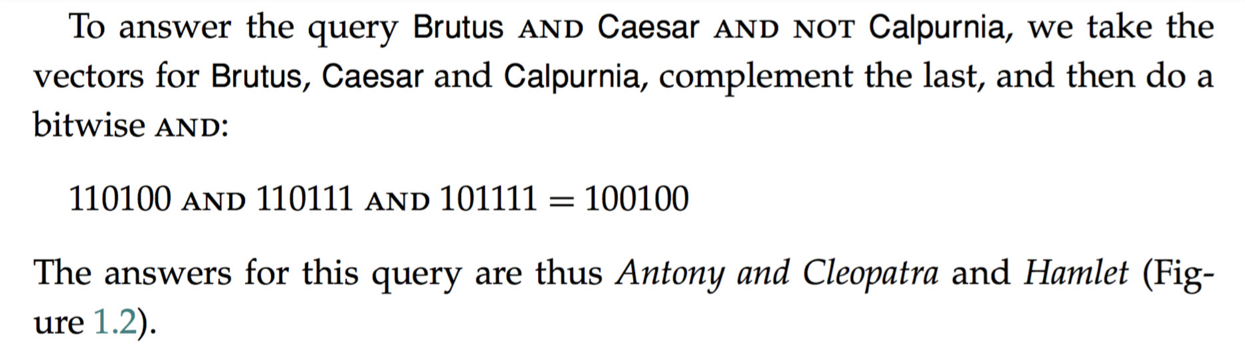
用户的信息需求通过词和布尔代数表示

Example



	Antony and Cleopatra	Julius Caesar	The Tempest	Hamlet	Othello	Macbeth	…
Antony	1	1	0	0	0	1	
Brutus	1	1	0	1	0	0	
Caesar	1	1	0	1	1	1	
Calpurnia	0	1	0	0	0	0	
Cleopatra	1	0	0	0	0	0	
mercy	1	0	1	1	1	1	
worser	1	0	1	1	1	0	
…							

Figure 1.1 A term-document incidence matrix. Matrix element (t, d) is 1 if the play in column d contains the word in row t, and is 0 otherwise.



To answer the query Brutus AND Caesar AND NOT Calpurnia, we take the vectors for Brutus, Caesar and Calpurnia, complement the last, and then do a bitwise AND:

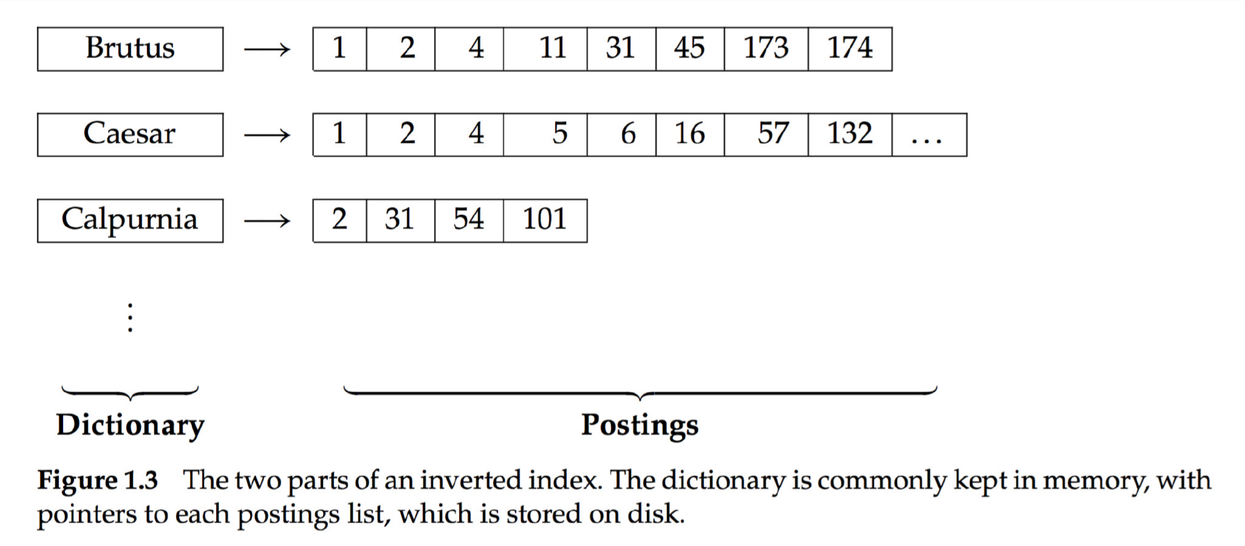
110100 AND 110111 AND 101111 = 100100

The answers for this query are thus *Antony and Cleopatra* and *Hamlet* (Figure 1.2).

缺陷

关系矩阵稀疏造成空间浪费

改进



Brutus ⟶ 1 | 2 | 4 | 11 | 31 | 45 | 173 | 174

Caesar ⟶ 1 | 2 | 4 | 5 | 6 | 16 | 57 | 132 | …

Calpurnia ⟶ 2 | 31 | 54 | 101

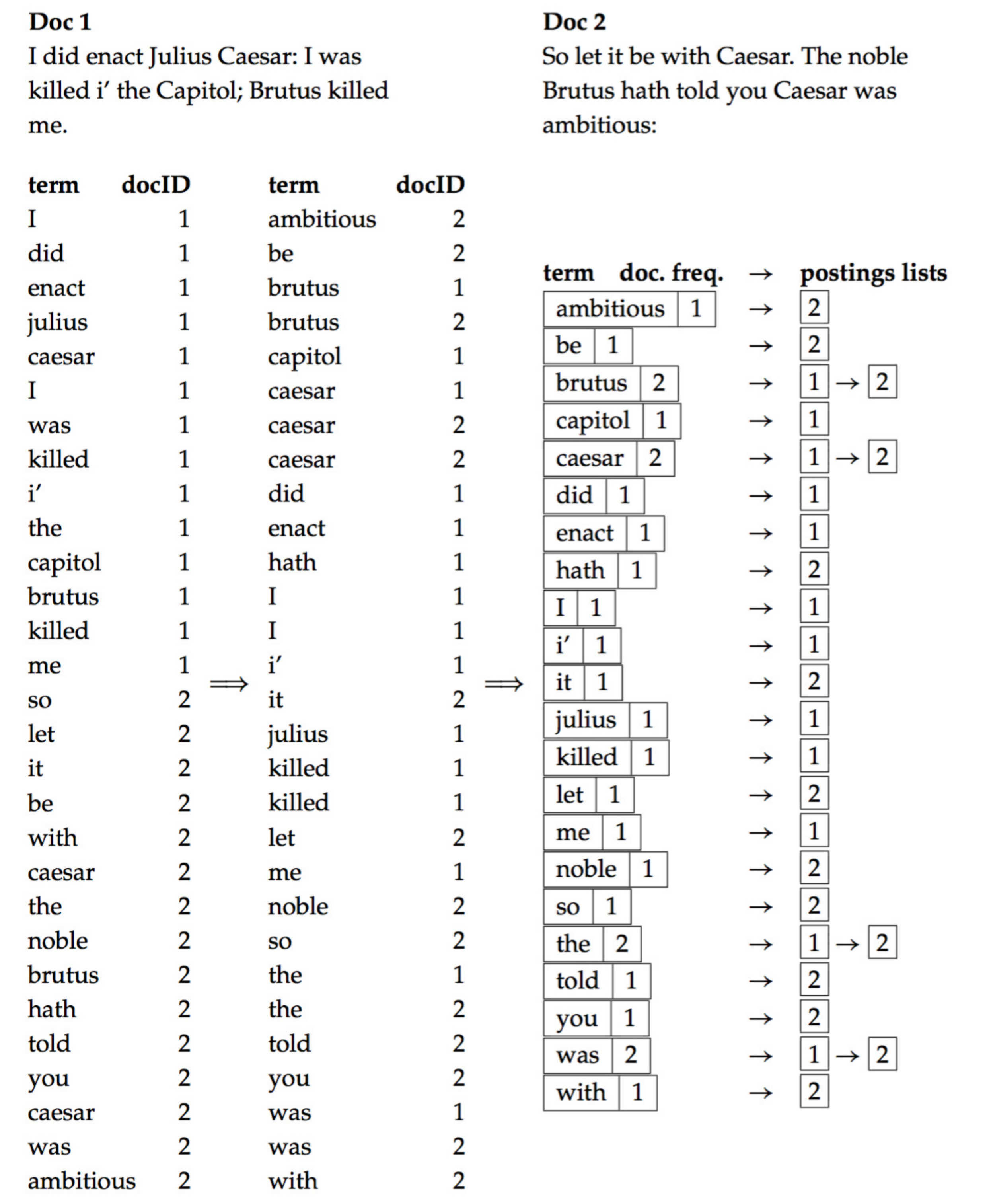
⋮

Figure 1.3 The two parts of an inverted index. The dictionary is commonly kept in memory, with pointers to each postings list, which is stored on disk.

在此基础上进行集合运算以进行文档检索

> PS：取交集过程－－边遍历边合并［多个Postings的时候，先取长度短的相互扫描］

倒排索引的创建



Doc 1
I did enact Julius Caesar: I was killed i' the Capitol; Brutus killed me.

Doc 2
So let it be with Caesar. The noble Brutus hath told you Caesar was ambitious:

term	docID
I	1
did	1
enact	1
julius	1
caesar	1
I	1
was	1
killed	1
i'	1
the	1
capitol	1
brutus	1
killed	1
me	1
so	2
let	2
it	2
be	2
with	2
caesar	2
the	2
noble	2
brutus	2
hath	2
told	2
you	2
caesar	2
was	2
ambitious	2

⟹

term	docID
ambitious	2
be	2
brutus	1
brutus	2
capitol	1
caesar	1
caesar	2
caesar	2
did	1
enact	1
hath	1
I	1
I	1
i'	1
it	2
julius	1
killed	1
killed	1
let	2
me	1
noble	2
so	2
the	1
the	2
told	2
you	2
was	1
was	2
with	2

⟹

term	doc. freq.	→	postings lists
ambitious	1	→	2
be	1	→	2
brutus	2	→	1 → 2
capitol	1	→	1
caesar	2	→	1 → 2
did	1	→	1
enact	1	→	1
hath	1	→	2
I	1	→	1
i'	1	→	1
it	1	→	2
julius	1	→	1
killed	1	→	1
let	1	→	2
me	1	→	1
noble	1	→	2
so	1	→	2
the	2	→	1 → 2
told	1	→	2
you	1	→	2
was	2	→	1 → 2
with	1	→	2