Task 1

Subtask A:

is → [1]

nice → [1 → 3 → 9]

sun → [2 → 3 → 6 → 7 → 8]

water → [1 → 2 → 4 → 5 → 9]

Subtask B:

is → [1]

nice → [1 → 3 → 9]

sun → [2 → 3 → 6 → 7 → 8]

water → [1 → 2 → 4 → 5 → 9]

Example query: mice water → nice AND water
result set: {1, 9}
The skip pointer saved one step in the „water" postings list. When the pointers where at (nice: 9) and (water: 4) the pointer at the smaller value could proceed directly to (water: 9) via the skip pointer.

Task 2

Pseudo code:

```
1 terms = sortFromLowToHighfrequency([t1, t2, ..., tn])
2 queue = enqueueALL(terms)
3 result = dequeue(queue)
4 while queue not empty:
5 do
6     postingslist = dequeue(queue)
7     result = intersect(result, postingslist)
8 return result
```

Example: $t_1=[1,3,4,7,8,9]$, $t_2=[2,3,4,9,11,12,13]$, $t_3=[1,2,3,4,5]$

1) terms = $[t_3, t_1, t_2]$
2) queue = $\overrightarrow{t_2, t_1, t_3}$
3) result = t_3
4) $\overline{t_2, t_1}$ not empty:
5) do
6) postingslist = t_1
7) result = $t_3 \cap t_1 = [1,3,4]$
4) $\overline{t_2}$ not empty:
5) do
6) postingslist = t_2
7) result = $[1,3,4] \cap t_2$ $= [3,4]$
4) $\overline{}$ is empty
8) return $[3,4]$

Task 3

Gates[4] -> [1⟨3⟩, 2⟨6⟩, 3⟨2,17⟩, 4⟨1⟩]

Microsoft[4] -> [1⟨1⟩, 2⟨1,21⟩, 3⟨3⟩, 5⟨16,22,51⟩]

Comparisons:
We step through the inverted index postings lists as usually, comparing the ids.
Additionally, if the ids match we compare the positions of the ~~respective do~~ words in the respective documents.

Result: (not including the query words)
document ids = [1, 3]

Task 4

		c	i	o	n
	0	1	2	3	4
c	1	0	1	2	3
o	2	1	1	1	2
i	3	2	1	(1)	2
n	4	3	2	2	(1)

Steps:

1. $D_{i-1,j-1} + 0$
2. $D_{i,j-1} + 1$
3. $D_{i,j-1} + 1$
4. $D_{i,j-1} + 1$
5. $D_{i-1,j} + 1$
6. $D_{i-1,j-1} + 1$
7. $D_{i-1,j-1} + 0$
8. $D_{i,j-1} + 1$
9. $D_{i-1,j} + 1$
10. $D_{i-1,j-1} + 0$
11. $D_{i-2,j-2} + 1$
12. $D_{i,j-1} + 1$
13. $D_{i-1,j} + 1$
14. $D_{i-1,j} + 1$
15. $D_{i-1,j} + 1$
16. $D_{i-1,j-1} + 0$

With the operation number 11 at i=3, j=3 the transpose rule was applied which causes the whole transformation to be done in one single operation: