

Linear Hashing Youtube 教程

笔记本: CS 562

创建时间: 1/28/2020 10:43 AM

更新时间: 2/15/2020 4:59 PM

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Example: insert

| | |
|-------------------|---|
| N= | 4 |
| Level= | 0 |
| Split by Overflow | |
| Next-> | 0 |

Next →

| h_0 | | | | |
|-------|----------------|----------------|----------------|---------------|
| 00 | 32 (100000) | 44 (101100) | 36 (100100) | |
| 01 | 9 (1001) | 25 (11001) | 5 (0101) | |
| 10 | 14 (1110) | 18 (10010) | 10 (1010) | 30 (11110) |
| 11 | 31 (11111) | 35 (100011) | 7 (0111) | 11 (1011) |

Example: insert

| | |
|-------------------|----|
| N= | 4 |
| Level= | 0 |
| Split by Overflow | |
| Next-> | 0 |
| Insert | 43 |

Next →

| h_0 | | | | |
|-------|----------------|----------------|----------------|----------------|
| 00 | 32 (100000) | 44 (101100) | 36 (100100) | |
| 01 | 9 (1001) | 25 (11001) | 5 (0101) | 37 (100101) |
| 10 | 14 (1110) | 18 (10010) | 10 (1010) | 30 (11110) |
| 11 | 31 (11111) | 35 (100011) | 7 (0111) | 11 (1011) |

Size level = 0

$h_0(43)=101011$

$d_i = d_0 = 2$

We only need to look at
last 2 bit of $H(43) = 11$

Example: insert

| | |
|-------------------|----|
| N= | 4 |
| Level= | 0 |
| Split by Overflow | |
| Next-> | 0 |
| Insert | 43 |

Size level = 0
 $h_0(43)=101011$
 $d_i = d_0 = 2$
 We only need to look at
 last 2 bit of $H(43) = 11$

Next →

| h_0 | | | | | Overflow |
|-------|----------------|----------------|----------------|----------------|----------------|
| 00 | 32 (100000) | 44 (101100) | 36 (100100) | | |
| 01 | 9 (1001) | 25 (11001) | 5 (0101) | 37 (100101) | |
| 10 | 14 (1110) | 18 (10010) | 10 (1010) | 30 (11110) | |
| 11 | 31 (11111) | 35 (100011) | 7 (0111) | 11 (1011) | 43 (101011) |

Example: split

| | |
|-------------------|----|
| N= | 4 |
| Level= | 0 |
| Split by Overflow | |
| Next-> | 1 |
| Insert | 43 |

Note: Split is done on
 bucket(00) where the
 pointer points too not the
 overflow bucket

Next →

| h_1 | h_0 | | | | | Overflow |
|-------|-------|----------------|----------------|----------------|----------------|----------------|
| 000 | 00 | 32 (100000) | 44 (101100) | 36 (100100) | | |
| | 01 | 9 (1001) | 25 (11001) | 5 (0101) | 37 (100101) | |
| | 10 | 14 (1110) | 18 (10010) | 10 (1010) | 30 (11110) | |
| | 11 | 31 (11111) | 35 (100011) | 7 (0111) | 11 (1011) | 43 (101011) |
| 100 | 00 | | | | | |

Example: split

- Now we need to relocate entries originally in bucket(00) with respect to new $h_{Level+1}$
- we need to look at the last 3 bits of each entries

Next →

| h_1 | h_0 | | | | | Overflow |
|-------|-------|----------------|----------------|--------------|----------------|----------------|
| 000 | 00 | 32 (100000) | | | | |
| | 01 | 9 (1001) | 25 (11001) | 5 (0101) | 37 (100101) | |
| | 10 | 14 (1110) | 18 (10010) | 10 (1010) | 30 (11110) | |
| | 11 | 31 (11111) | 35 (100011) | 7 (0111) | 11 (1011) | 43 (101011) |
| 100 | 00 | 44 (101100) | 36 (100100) | | | |

Example: split

| | |
|-------------------|----|
| N= | 4 |
| Level= | 0 |
| Split by Overflow | |
| Next-> | 1 |
| Insert | 29 |

Next

| h_1 | h_0 | | | | | Overflow |
|-------|-------|----------------|----------------|--------------|----------------|----------------|
| 000 | 00 | 32 (100000) | | | | |
| | 01 | 9 (1001) | 25 (11001) | 5 (0101) | 37 (100101) | 29 (11101) |
| | 10 | 14 (1110) | 18 (10010) | 10 (1010) | 30 (11110) | |
| | 11 | 31 (11111) | 35 (100011) | 7 (0111) | 11 (1011) | 43 (101011) |
| 100 | 00 | 44 (101100) | 36 (100100) | | | |

Example: split

| | |
|-------------------|----|
| N= | 4 |
| Level= | 0 |
| Split by Overflow | |
| Next-> | 1 |
| Insert | 29 |

Next

| h_1 | h_0 | | | | | Overflow |
|-------|-------|----------------|----------------|---------------|---------------|----------------|
| 000 | 00 | 32 (100000) | | | | |
| | 01 | 9 (1001) | 25 (11001) | | | |
| | 10 | 14 (1110) | 18 (10010) | 10 (1010) | 30 (11110) | |
| | 11 | 31 (11111) | 35 (100011) | 7 (0111) | 11 (1011) | 43 (101011) |
| 100 | 00 | 44 (101100) | 36 (100100) | | | |
| 101 | 01 | 5 (0101) | 37 (100101) | 29 (11101) | | |

Example: split

| | |
|-------------------|---|
| N= | 4 |
| Level= | 0 |
| Split by Overflow | |
| Next-> | 1 |

Next

| h_1 | h_0 | | | | | Overflow |
|-------|-------|----------------|----------------|-----------------|----------------|----------------|
| 000 | 00 | 32 (100000) | | | | |
| 001 | 01 | 9 (1001) | 25 (11001) | | | |
| 010 | 10 | 18 (10010) | 10 (1010) | 66 (1000010) | 34 (100010) | 50 (110010) |
| | 11 | 31 (11111) | 35 (100011) | 7 (0111) | 11 (1011) | 43 (101011) |
| 100 | 00 | 44 (101100) | 36 (100100) | | | |
| 101 | 01 | 5 (0101) | 37 (100101) | 29 (11101) | | |
| 110 | 10 | 14 (1110) | 30 (11110) | 22 (10110) | | |
| 111 | 11 | | | | | |

Example: split

Next

00

| | | | | | | |
|-------|-------|----------------|----------------|-----------------|----------------|----------------|
| h_1 | h_0 | | | | | Overflow |
| 00 | 00 | 32 (100000) | | | | |
| 001 | 01 | 9 (1001) | 25 (11001) | | | |
| 010 | 10 | 18 (10010) | 10 (1010) | 66 (1000010) | 34 (100010) | 50 (110010) |
| 011 | 11 | 31 (11111) | 35 (100011) | 7 (0111) | 11 (1011) | 43 (101011) |
| 100 | 00 | 44 (101100) | 36 (100100) | | | |
| 101 | 01 | 5 (0101) | 37 (100101) | 29 (11101) | | |
| 110 | 10 | 14 (1110) | 30 (11110) | 22 (10110) | | |
| 111 | 11 | | | | | |

N=

8

Level=

1

Split by Overflow

Next->

0

Insert

66

34

50

重新整理列表

Example: search

Next

01

| | | | | | | |
|-------|-------|----------------|----------------|---------------|---------------|----------------|
| h_1 | h_0 | | | | | Overflow |
| 000 | 00 | 32 (100000) | | | | |
| 001 | 01 | 9 (1001) | 25 (11001) | | | |
| | 10 | 14 (1110) | 18 (10010) | 10 (1010) | 30 (11110) | |
| | 11 | 31 (11111) | 35 (100011) | 7 (0111) | 11 (1011) | 43 (101011) |
| 100 | 00 | 44 (101100) | 36 (100100) | | | |
| 101 | 01 | 5 (0101) | 37 (100101) | 29 (11101) | | |

N=

4

Level=

0

Split by Overflow

Next->

2

Find

44

○ If Next $\leq h_0(44) \leq N$, look up in h_0 column with last d_0 bits

○ Else look up in $h_{LEVEL+1}$ column with last d_i bits

