
Algorithm 2 Incremental entropy per processor

Input: $freq, currFreq, currH, selectedTask, extraFreq$

Output: $H, NFreq$

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1:  $NFreq = currFreq + extraFreq$ 
2: if  $NFreq == extraFreq$  then
3:    $H = 0$ 
4: else
5:   if  $freq[selectedTask] == 0$  then
6:      $currentTerm = 0$ 
7:   else
8:      $currentTerm = freq[selectedTask] * \log_b(freq[selectedTask])$ 
9:   end if
10:   $newTerm = (freq[selectedTask] + extraFreq) * \log_b(freq[selectedTask] + extraFreq)$ 
11:   $H = \log_b(NFreq) - ((\log_b(currFreq) - currH) * (currFreq - currentTerm + newTerm) / NFreq)$ 
12: end if
13: return  $H, NFreq$ 
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INPUT: A 2 B 4 C 3 A 7

Scheduling time instant 0

INPUT:

Frequency Array: $A = 0, B = 0, C = 0$

$\text{currFreq} = 0$

$\text{currH} = 0$

$\text{selectedTask} = A$

$\text{extraFreq} = 2$

PROCESS:

$\text{nFreq} = \text{currFreq} + \text{extraFreq} = 0 + 2 = 2$

$H = 0$ (given that $\text{nFreq} == \text{extraFreq}$)

New Frequency Array: $A = 2, B = 0, C = 0$

Scheduling time instant 2

INPUT:

Frequency Array: $A = 2, B = 0, C = 0$

$\text{currFreq} = 2$

$\text{currH} = 0$

$\text{selectedTask} = B$

$\text{extraFreq} = 4$

PROCESS:

$\text{nFreq} = \text{currFreq} + \text{extraFreq} = 2 + 4 = 6$

$\text{currTerm} = 0$ (given that $\text{freq}[B] = 0$)

$\text{newTerm} = (\text{freq}[B] + \text{extraFreq}) * \log(\text{freq}[B] + \text{extraFreq}) =$
 $(0 + 4) * \log(0 + 4) = 4 * \log(4)$

$H = \log(\text{nFreq}) - ((\log(\text{currFreq}) - \text{currH}) * \text{currFreq} - \text{currTerm} +$
 $\text{newTerm}) / \text{nFreq} =$

$H = \log(6) - ((\log(2) - 0) * 2 - 0 + 4 * \log(4)) / 6$

$H = 0.9182$

New Frequency Array: $A = 2, B = 4, C = 0$

Scheduling time instant 6

INPUT:

Frequency Array: $A = 2, B = 4, C = 0$

$\text{currFreq} = 6$

$\text{currH} = 0.9182$

$\text{selectedTask} = C$

$\text{extraFreq} = 3$

PROCESS:

$\text{nFreq} = \text{currFreq} + \text{extraFreq} = 6 + 3 = 9$

$\text{currTerm} = 0$ (given that $\text{freq}[C] = 0$)

$\text{newTerm} = (\text{freq}[C] + \text{extraFreq}) * \log(\text{freq}[C] + \text{extraFreq}) =$
 $(0 + 3) * \log(0 + 3) = 3 * \log(3)$

$H = \log(\text{nFreq}) - ((\log(\text{currFreq}) - \text{currH}) * \text{currFreq} - \text{currTerm} +$
 $\text{newTerm}) / \text{nFreq} =$

$H = \log(9) - ((\log(6) - 0.9182) * 6 - 0 + 3 * \log(3)) / 9$

$H = 1.5304$

New Frequency Array: $A = 2, B = 4, C = 3$

Scheduling time instant 9

INPUT:

Frequency Array: $A = 2, B = 4, C = 3$

$\text{currFreq} = 9$

$\text{currH} = 1.5304$

$\text{selectedTask} = A$

$\text{extraFreq} = 7$

PROCESS:

$\text{nFreq} = \text{currFreq} + \text{extraFreq} = 9 + 7 = 16$

$\text{currTerm} = 2 * \log(2)$ (given that $\text{freq}[A] = 2$)

$\text{newTerm} = (\text{freq}[A] + \text{extraFreq}) * \log(\text{freq}[A] + \text{extraFreq}) =$
 $(2 + 7) * \log(2 + 7) = 9 * \log(9)$

$H = \log(\text{nFreq}) - ((\log(\text{currFreq}) - \text{currH}) * \text{currFreq} - \text{currTerm} +$
 $\text{newTerm}) / \text{nFreq} =$

$H = \log(16) - ((\log(9) - 1.5304) * 9 - 2 * \log(2) + 9 * \log(9)) / 16$

$H = 1.4197$

New Frequency Array: $A = 9, B = 4, C = 3$