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Midterm 2 S15

I will first find the steps of the inner loop:
The j-loop will take 1-step to initialize.
The comparison of $j \leq n$ will take 1-step
On line 3 the j loop will take 2-steps for the the evaluation of $j + i$ and the assignment of $j \leftarrow$
It will also take 1 step to print "Hi"
From this I will find the total steps of j of the inner loop:
We can see a pattern for each iteration of an inner loop:

$j = 1, \quad 1+i, \quad 1+2i, \quad 1+3i, \quad \ldots \quad n$

$k = 1 \quad 2 \quad 3 \quad 4$ $\qquad$ $1 + (k-1)i$

$$1 + (k-1)i \leq n$$
$$(k-1)i \leq n-1$$
$$ki - i \leq n-1$$
$$\frac{ki}{i} \leq \frac{n-1+i}{i}$$
$$k \leq \frac{n-1+i}{i}$$
$$k \leq \frac{n-1}{i} + 1$$

$$1 + \sum_{j=1}^{\frac{n-1}{i}+1} (1+2+1) = 1 + \sum_{i}^{\frac{n-1}{i}+1} 4$$

$$= 1 + 4\left(\frac{n-1}{i} + 1\right) \leftarrow \text{for the inner loop runtime}$$