- Print statement runs k number of times every time
- inner loop runs j number of times every time
- middle for loop runs i number of times every time
- outer loop runs for n number of times

$\therefore$

$$\sum_{i=0}^{n}\left(\sum_{j=0}^{i} j\right)$$

inner loop runs j number of times for every time the middle loop runs

middle loop runs for i number of times for every time the outer loop runs

the outer loop runs for n number of times

$\sum_{j=0}^{i} j$ is an known arithmetic series which is known

$$\sum_{j=0}^{i} j = \frac{i(i+1)}{2}$$

$$= \frac{i^2+i}{2}$$

Substituting in we get

$$\sum_{i=0}^{n}\left(\frac{i^2+i}{2}\right)$$

we can remove constants from the series

$$\frac{1}{2}\sum_{i=0}^{n}\left(i^2+i\right)$$

we can separate into 2 series

$$\frac{1}{2}\left(\sum_{i=0}^{n} i^2 + \sum_{i=0}^{n} i\right)$$

$\sum_{i=0}^{n} i$ is the same as the last series

$$\sum_{i=0}^{n} i = \frac{n(n+1)}{2}$$

$\sum_{i=0}^{n} i^2$ is another known series

$$\sum_{i=0}^{n} i^2 = \frac{n(n+1)(2n+1)}{6}$$

Substituting in these values: